The ADT 2004 User Interface

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Autodesk, Inc. - 3/19/2003

Introduction

From Version 1.0 of through to Version 3.3, Architectural Desktop maintained more or less the same interface elements – and these were described in a brain dump by Jim Awe in early 1999. Before ADT 2004 adding and modifying objects utilized the following elements:

- Command line
- Add dialog
- Modify dialog
- Object Property Manager
- Property Sheets
- Basic grips

With Architectural Desktop 2004 one of the objectives was to "get the technology out of your face, and replace with a fluid design process".
Our approach was to enhance and consolidate the user interface. Instead of four similar methods of property entry ADT 2004 uses a single consistent approach. In addition we vastly improved grip manipulation. All of this was achieved without changing the command line options in order that scripts generated before this version operated as before and without modification.

The main elements of the ADT 2004 user interface are now:

- Command line
- Property Palette
- Enhanced Grips
- Edit in place
- Tool Palette

Command Line

As mentioned the command line is largely unchanged from ADT3.3. Therefore the principals in the original UI brain dump remain true.

The only exception to this is the removal of the non-dashed version of the MODIFY commands. For example a Door can be created or manipulated with the following commands.
DOORMODIFY (and other xxxMODIFY commands) have been removed, as this is no different to double clicking the object in question.

- DOOR
- DOORADD
- DOORPROPS
- -DOORADD
- -DOORMODIFY

The "dash" commands as always display a command line prompt without displaying additional UI.

The xxxPROPS commands in ADT 2004 also now display the Property Palette, and as such we have removed the modal property sheets.

3rd party developers are still able to use the framework setup for the old user interface however, so they can migrate to ADT2004 without needing to update their user interface components.

Property Palette

AutoCAD 2000 introduced the use of the Object Property Manager as one means of manipulating drawing objects. This has been extended in AutoCAD and ADT 2004 to become the "Property Palette" supporting the following additional features:

- Property value entry during an object ADD
- Predictable grouping (instead of alphabetic or single grouping)
- Sub grouping, including the ability to collapse a group of properties that are not of interest.
- Better data controls. For example, all distance properties can now be modified by either typing the distance directly or selecting the "Pick 2 points" button and graphically picking the distance in the drawing area. More on the variety of controls later.
- Support for key illustrations. The (now defunct) property sheets in ADT3.3 included key illustrations
- Extra pages for additional contextual information and data entry.

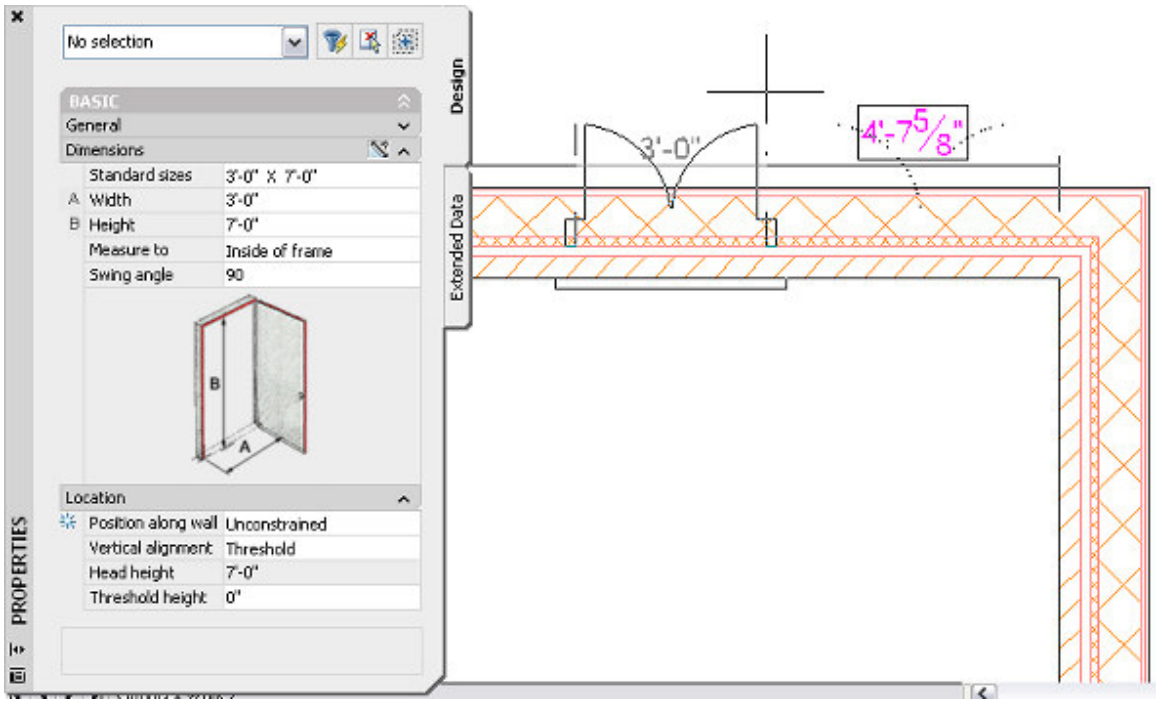


Figure 1: Property Palette and Dynamic Dimensions

These additional features mean that we now enter property values through the Property Palette at all times and that the presentation of those properties is less arbitrary and therefore easier to navigate.

For example, DOORADD updates the property palette to show ADD type properties instead of displaying the old dashboard dialog.
Properties that are only applicable during ADD (rather than MODIFY) are distinguished by the blue asterisk to the left of the property name.

DOORPROPS prompts for the object selection as before, but instead displays the Property Palette.

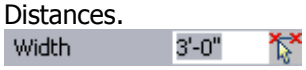
-DOORADD and –DOORMODIFY operate as before, displaying command line prompts without forcing the Property Palette to display.

Grouping within the property palette is consistently broken down into the main categories of "BASIC" and "ADVANCED". Further sub-grouping occurs within BASIC or ADVANCED in order to:

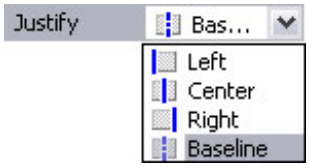
- Group properties logically.
  For example all wall cleanup properties are grouped together in a logical order.
- Hide or display related properties to help focus on only those of interest. This is attained using the up/down arrows on the group title (note that BASIC and ADVANCED use double arrows).
- Hide or display key illustrations, achieved by toggling its "picture button".

Various new and enhanced property entry controls are available to assist with data input with the intention of improving accuracy and productivity:

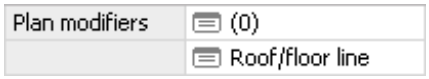
- Distances.

  Text entry or "Pick 2 Point". Either enter the distance directly or select the "Pick 2 Point" button to enter the distance using picks in the drawing window.
- Enhanced list selection.

  Drop down lists are now augmented with helper icons. For example the Wall Justify property shows the options in a drop down list along with a graphical representation of that option. Style properties augment the style name with a graphic that keys you to the Style type it applies to
- Worksheets.

  A worksheet is a simple modal dialog. Where the property displays a mini "worksheet" graphic, selecting the property launches a worksheet for data entry. This is used in cases where the property is too advanced or is inappropriate for a single edit field (e.g. Wall Modifiers or Description).

When an ADT object is selected, the property palette is updated with all of the properties that pertain to that object type. If objects of different types are selected (for example a wall and a door) only those properties common to both object types are displayed.
If a value for the selected objects differs, the value field will display the text "*VARIES*". Values typed into such fields will modify all selected objects to have a new common value.

Selecting an ADT object also populates the second page of the Property Palette. This page is used to access additional information.
You can think of the first "Design" page as containing those properties that pertain to the visual appearance of the object.
The second "Extended Data" tab contains properties that are associated with the object but do not affect it graphically. This includes hyperlinks, reference documents and schedule data assigned to the object. As with the design tab, common properties are shown if more than one object is selected.

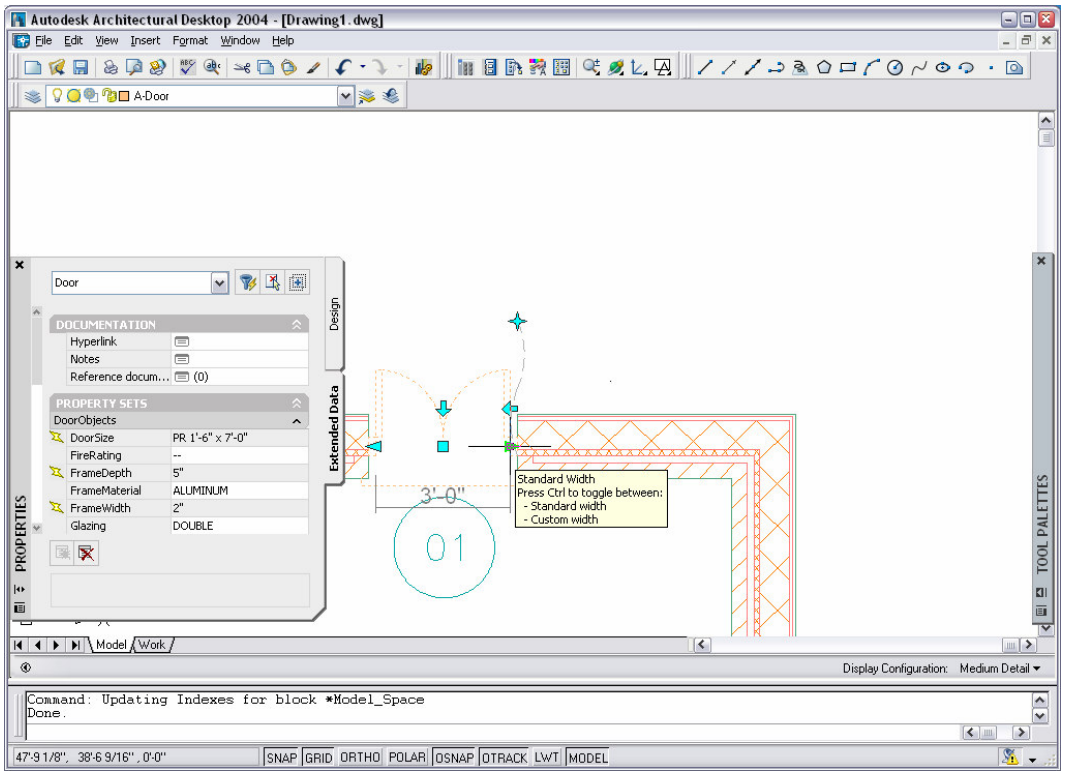


Figure 2: Extended Data tab and Grip Tips

In ADT3.3, 3rd party applications were able to extend the user interface by adding pages to the objects property sheet.
In ADT 2004, the property sheet is removed and instead a 3rd party extends the user interface with a "dynamic property".
A dynamic property is added at runtime. For example, a property page added in ADT3.3 might be converted to a property in ADT 2004 called "My Door Properties" which launches a worksheet with the same UI as before.
This property is integrated directly into the Property Palette at a location determined by the 3rd party programmer.

Why did we remove the Add, Modify and Property Sheet dialogs?

In ADT3.3 all methods of affecting an object were quite different which slows down the learning curve. In addition, the use of Modal dialogs introduces a disassociation between the object in the drawing and the user interface to manipulate it as well as requiring more user distraction.
In addition the Extended Data page allows you to browse through schedule data on an object by object basis without opening a modal dialog, then closing reselecting and reopening the dialog once more enhancing productivity.

Another huge advantage is we have now significantly reduced the amount of future development work needed for each object type. This means that both ourselves and 3rd parties can concentrate more on adding functionality to the objects and less on providing 4 user interfaces for that object. Such streamlining will let us be able to add more of the features you are asking for and less of the interface that just gets in the way anyway.

Grips

While we have vastly improved and simplified the user interface to the objects through the Property Palette, a text entry user interface still has the problem of introducing a focus shift away from the object being manipulated, slowing down workflow considerably.

This realization gave birth to the grip enhancements in ADT 2004 where we wanted to

- Move as much functionality as possible from dialogs onto the object being manipulated
- Reduce the effort required to accomplish graphic manipulation tasks
- Provide more and better feedback about the object with reduced user effort.

A few pieces of terminology will be useful here

- Grip.
  Small shapes that appear at strategic points on a selected object that is used to edit the object quickly and easily.
- Grip Glyph.
  The graphic representation of the grip.
- Grip Tip.
  A mini tool tip that appears when the cursor hovers over a grip (see Figure 2)
- Trigger Grip.
  A new grip type that performs a direct action on the object.

To facilitate the extra quantity of grips, unique glyphs have been assigned to different types of manipulation allowing the behavior of that grip to be more obvious at a glance.

In some cases grip manipulation also displays dynamic dimensions that update as the grip is dragged. This allows direct dimension entry with the keyboard. In the case where more than one dimension displays, it is possible to specify the dimension to be modified by cycling through the dimension with the TAB key. The active dimension displays in magenta for additional feedback.

Drag Grips

A drag grip allows a select and drag using the mouse (or other pointing device) to stretch or move geometry on the selected object.
Drag grips are typically either square or triangular shaped ( or ). A square grip is typically constrained in the 2d plane of the grip and a triangular grip constrains movement to a 1d line or an arc. For most constrained grips, the UCS is automatically set to the appropriate direction while the grip is being dragged.

Trigger Grips

Trigger grips are designed to perform a single action immediately. For example, an arrow trigger () grip will change direction. An example of this would be door swing direction.

Grip Colors

Colors are also used to indicate the scope of the grip. A cyan grip affects the selected object whereas a magenta grip modifies the style for that object.

Grip Tips

In most cases a grip tip appears if the cursor is held over a grip explaining the expected result of using that grip. This grip tip also indicates if modified behavior can be expected if an additional key (usually the CTRL key) is pressed.

Full details of the grip glyphs and their colors are explained in detail in the documentation for ADT 2004.

3rd party access to the grip system has also been provided allowing addition of grips and also of grip glyph graphics.

Edit in Place

A major complaint about previous versions of ADT was the difficulty in changing custom object shapes, for example Wall Sweep profiles. Previously you had to draw a closed polyline, create a profile from this using the Style Manager and then enter the Wall property sheet to apply the profile. All this while you needed to keep the appropriate dimensions in mind. Modifications to the shape were just as involved.

ADT 2004 now allows the shapes to be edited directly on the object using grip manipulation and then have that shape apply to the object and/or the original profile. New profiles can be created in this manner also.
In-place editing improves usability by letting you directly act on the custom shape of the object in the context of its usage, without additional disjoint steps and drawing.

The process in ADT 2004 is highly graphical and can be summarized by the following steps:

- Select the target object whose shape needs changing.
- Select the Edit in Place option from the object's shortcut menu.
- Pick a location on the object at which the profile will be edited, if required.
- ADT creates and selects the in-place edit entity, and dims out all other objects in the drawing.
- Grip edit the pertinent shape. ADT realigns the UCS of all grip manipulation as appropriate to the shape.
- Save the shape, either back to the original profile or to a new profile.
- ADT closes the in-place edit session and updates the object.

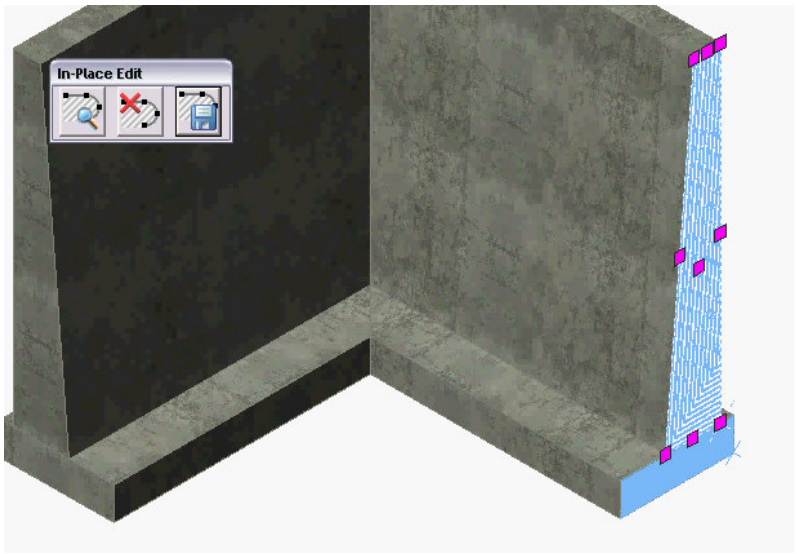


Figure 3: Wall Sweep in-place edit

Edit in place is provided for railings, walls, 2D sections, endcaps, wall modifiers (including body modifiers), mask blocks, custom door/window shapes as well as curtain wall frames and mullions.

Tools and the Tool Palette

ADT 2004 introduces the idea of a Tool. There were a number of driving concepts behind the design of the tool system:

- Make ADT appear more "Architectural" with a cleaner, more elegant look
- Make ADT easier to learn and use
  Reduce the number of ways to achieve the same task
  Focus attention on the object
  Reduce command line reliance
- Increase productivity
  Preload tools with default values for some or all properties to reduce constant data entry
  Allow styles to be assigned to a tool from an external source, and imported automatically when needed

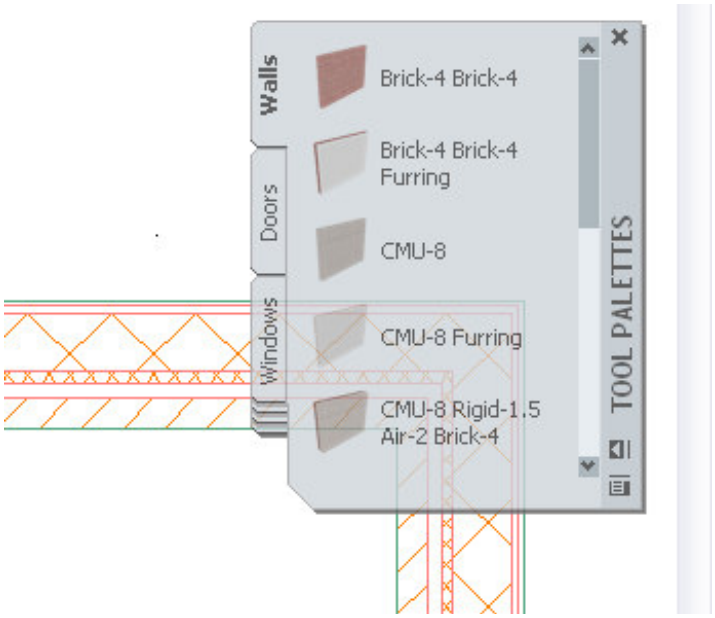


Figure 4: Translucent Tool Palette

With that in mind, Tools were ***never*** intended to replace toolbar and menu options.
A Tool can be thought of as something that creates or manipulates an artifact – i.e. one is required to pick up a tool and work with it.
This is different from a command that is more of an order to perform a particular task.

A Tool also has properties, much like a real tool is adjustable. Instruments can also be considered tools i.e. a distance measurement tool is analogous to a measuring tape.

ADT 2004 has the following Tool types:

- Object Tools (Wall, Door, Window, etc).
- Content Tool
- Command Tool
- Hatch Tool (inherited from AutoCAD 2004)
- Block Tool (inherited from AutoCAD 2004)

A tool can be edited (adjusted), executed (used) and applied to existing objects. In addition a tool can be created by example using drag and drop with:

- an object from the drawing window,

- a Style from the Style Manager
- AEC Content from the Design Center
- a Tool or Tools from the Content Browser

The intention is that the Tool Palettes displayed in the ADT 2004 workspace only display those tools pertinent to your current task. Instead the Content Browser maintains a library of all catalogs and tools that you might ever use. It is expected that your workspace tools are constantly evolving, and kept limited to those tools which are useful right now.
Why display 15 different wall tools when your projects always use the same 4 wall styles?

Groups of tools (as well as individual tools) can be dropped from the Content Browser to a tool palette in the ADT workspace at any time. These items (unless in the Stock Tool Catalogs) can even be refreshed if the original content is modified for example by a CAD Manager.
The Content Browser is explained in more detail in the user documentation.

When a tool is edited, a modal dialog appears containing generic tool properties (name, description and image) along with tool specific properties. The tool specific properties are laid out in much the same was as the Property Palette during ADD with the exception of

- Layer Key and Layer Overrides, allow the tool to specify layer keying that differs from the default
- Style Location and Style; allow the tool to reference an external drawing. This is only imported when the tool is first used
- Object Viewer; allowing a preview of the object that the tool will create, and also serves as the defaults used when automatically generating an image for the tool. (Try it by manipulating the view, and then right clicking the image in the top left of the tool editor and selecting "Refresh Image"

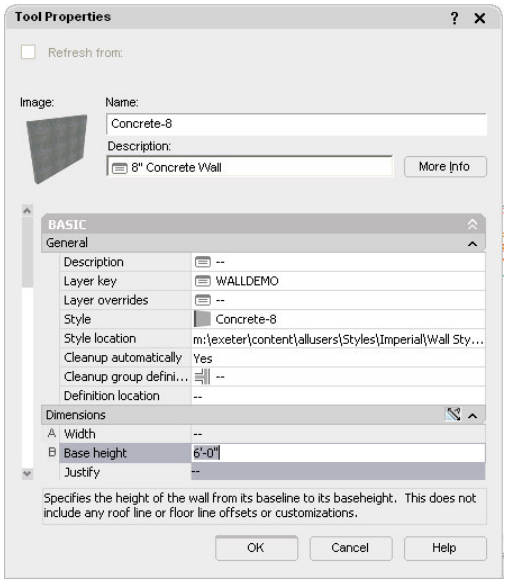


Figure 5: Wall Tool Editor

When a tool property does not define a value, that property is said to be "unspecified". Unspecified properties are indicated by a double dash "--". When a text or numerical entry field is selected a "--" dropdown is shown directly beneath the edit field to allow it to quickly be set to an unspecified state.

Object Tools

An object tool is used to launch the ADD routine for that object based upon a "template". A single click of a tool executes it in the current drawing.
These tools allow a subset of the properties of that object to be set on the tool.
For example, when a Door tool is executed, the DOORADD routine is executed with those preset property values already loaded.

A Door Tool can also be created by example.
If you drag a door object from the drawing onto a tool palette, a Door Tool is created automatically. This tool will inherit all the properties of the existing door. In addition an image is automatically created. This used the last set object viewer properties within the tool editor for that tool type.
If you drag a door style from the Style Manager, a Door Tool is create automatically inheriting the Style Name and Style Location (if the drawing has been saved) properties. All other properties are left unspecified. Object Defaults have migrated to the tool system. If a style that had Object Defaults set in ADT3.3 is dragged to a tool palette, those defaults are specified on the tool in addition to Style and Style Location.

A tool can also be used to "rubber stamp" its properties on existing objects. Right clicking most object tools will illicit one or more "Apply Tool Properties to…" options. This was designed to allow rapid application of a number of properties to existing objects - for example you may design an addition using the Standard wall style. When the final wall specs are known, these can be set on a tool and applied in one sweep on all the standard walls.

Content Tools

These were designed as a simple placeholder for Design Center content and are created by dragging custom design center content onto the tool palette. The Design Center is still the place to edit the content.

Command Tools

We added these to cover any situations where Object Tools or Content Tools do not do the job. They accept any string acceptable on a menu or toolbar item.

What this all means

Manipulating objects in ADT 2004 has been boiled down to

- Grips, for direct modification of an objects geometry - allowing direct access to a more complete set of an objects properties
- Property Palette, the consistent place to manipulating properties of an object or set of objects.
- Tools, object creation on steroids - reducing the time modifying creation properties and the amount of time in additional UI (such as the Style Manager)
- In place editing provides direct access to embedded profiles and designs within an object using familiar grip editing tools.