Architectural Desktop 4 - Development Guide

PART 22

LAYOUT TOOLS

TOOLS

Contents:

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1 Layout Tools - Access

How do I get this toolbar?

You can also acquire access to these commands from the **Desktop** pull-down menu. From the **Desktop** pull-down menu, pick **Layout Tools >** and cascade to their respective command options - see image below, right.

Illustrated to the right is the **Layout Tools** toolbar and the **Anchors** toolbar. Layout Tools produce objects with Anchors so you can attach objects such as Structural Members (Columns) to them very accurately and very quickly.


Layout Tools pull-down menu

Layout Tools are designed to work directly with Anchors. If you create a Layout, the way to attach objects to it, is by using the Anchor tools.

For a simple example, think about a big structural grid and how you can imagine placing columns all over this grid. If you start with a Layout Grid then you already have an object designed for mass distribution of columns. By using the **AddColumn** command, you will be able to Anchor your Column to this structural grid automatically, by simply selecting it as a target object for your column object; i.e., it will lock in to all intersections on the grid.

If you later choose to populate your structural grid with more of the same columns, you can use the Node Anchor tool (or Cell Anchor if the column are in the middle of the gird cells). The Node Anchor tool will allow you to specify that you want to Copy your single Column to all other node points on the structural grid.

Note: you may want to consider using a Column Grid instead of a Layout Grid - it all depends on if you want it to be part of your graphic presentation or not. Column Grids are designed as both Anchoring objects and Annotation objects; i.e., they have more flexibility in Display Representations.
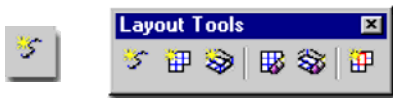

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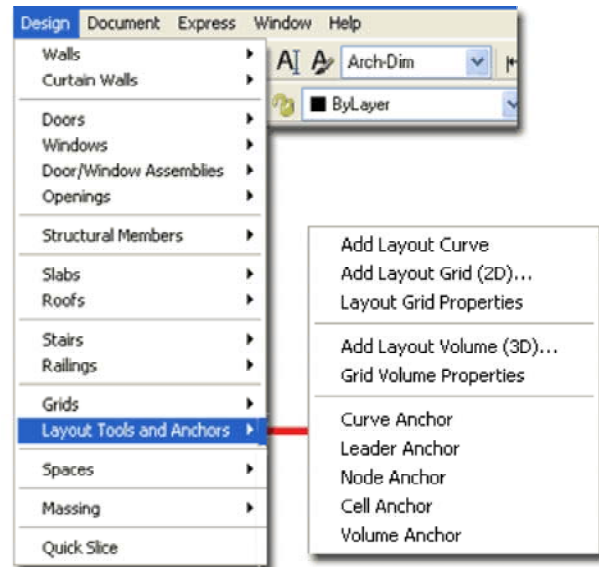
2 Working with the Layout Curve
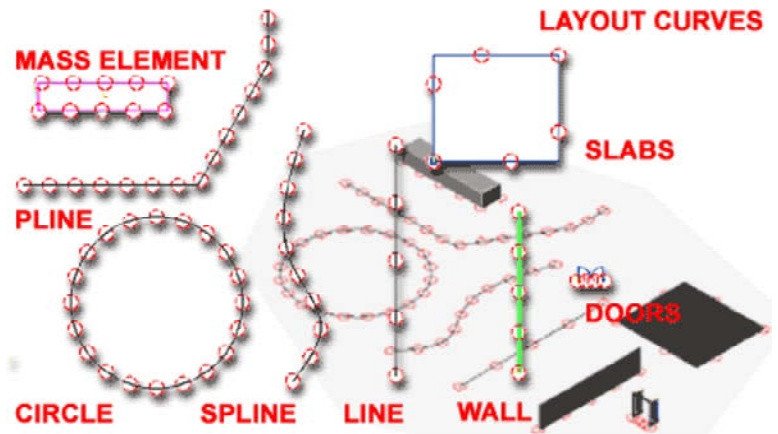
Adding a Layout Curve

Alt.Menu **Design> Layout Tools and Anchors> Add Layout Curve**

Keyboard **LayoutCurveAdd**

The Layout Curve tool does not create any objects but instead Adds Anchor Nodes to them. If you delete the Nodes the object remains. If you delete the object, the Nodes are lost too. However, editing the object does affect the Nodes because they are controlled by it.

In the illustration to the right, I show some common AutoCAD and Architectural Desktop objects (both 2D and 3D objects) and how the **Add Layout Curve** command responds to these objects. If you are familiar with AutoCAD's **Divide** or **Measure** commands you can think of this tool in much the same way. Instead of placing POINTS according to your

LAYOUT CURVES

MASS ELEMENT

SLABS

PLINE

DOORS

CIRCLE   SPLINE   LINE   WALL

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input, the Curve Layout tool places Node Objects.

One confusing aspect of the term Layout Curve, is that we think of curve as curvy but in the case of the Layout Tool, it's just a linear path object as opposed to an area or volume object.

Command: _AecLayoutCurveAdd
Select a curve: < **pick an object** >)
Select node layout mode [Manual/Repeat/Space evenly] <Manual>: **S**
Start offset <0">: < **enter** >
End offset <0">: < **enter** >
Number of nodes <3>: **<type a number>**
Command:

Manual - allows you to specify each Node location by picking or Snapping along your "Curve".

Repeat - allows you to specify a distance between the Nodes. This is exactly like using the **Measure** command to place points or Blocks on a Line.

Space evenly - allows you to specify a total number of Nodes. This is exactly like using the **Divide** command to place points or Blocks on a Line.

Start and **End offset** - provide you with the option to control where the spacing begins and ends. You may not want the nodes at the very beginning or end of a Wall, for example, but in enough to compensate for End Walls.

Adding Columns to a Layout Curve

Menu   **Design>Structural Members>Add Column...**

Keyboard   **ColumnAdd**

Links   Working with Node Anchors - for information on how to Anchor objects after they have already been placed.

Once you have created a **Layout Curve**, as discussed above, you will find that some of ADT's objects are designed to take full advantage of your Layout Curve. Illustrated to the right, I show the **Add Column** command in action. When you Add a Column, notice that on your command line, you are prompted to "**Select Grid or RETURN**:". A Layout Curve is a Grid and you can select it by picking on one of the Node objects to lock yourself onto the grid. When you select a Layout Grid Node as your Grid, you will find that the objects you are adding cannot slip off the Nodes and you can Add multiple copies of them like you have the best Osnap in the world.

The best part about this method is that editing will be far faster and easier than simply having objects placed on a curve in the traditional AutoCAD way.

STRUCTURAL MEMBER "COLUMN" AUTOMATICALLY LOCKS TO CURVE ANCHOR NODE
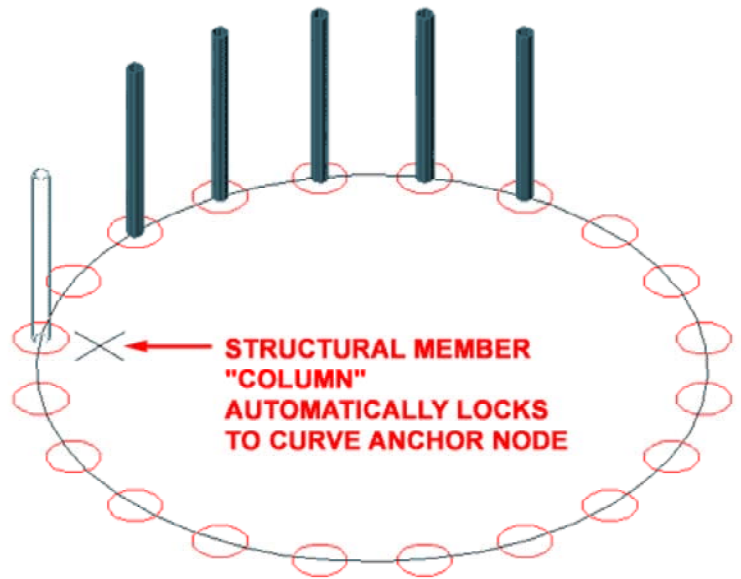
3 Working with the Layout Grid

Adding a Layout Grid

Alt.Menu	**Design> Layout Tools and Anchors> Add Layout Grid (2D)...**

Layout Tools ✕

Keyboard	**LayoutGridAdd**
Links	[Add Column Grid Properties Palette](#) - for information a similar tool designed specifically for Column but can be used just like a Layout Grid.
	[Node Anchors](#) - for information on how to work with the Nodes on this tool.

When **Adding** Layout Grids, the **Properties Palette** offers two basic Shapes (Radial and Rectangular) and several options for spacing the grid lines. This Grid Object is almost identical to the Column Grid with the exception that there is no option for automatically adding Columns.

If you need to create a Layout Grid that is not evenly spaced, create the closest layout and modify it after placement.

GENERAL
Shape - this drop-down list offers to basic shapes: Rectangular and Radial.

Boundary - this drop-down list offers the option to "Select object..." for using a closed Polyline shape to clip the Grid. This is far more typical for Ceiling Grids.

DIMENSIONS
Specify on Screen - set this drop-down list to "**Yes**" if you want to draw the Width and Depth by picking points on your screen.

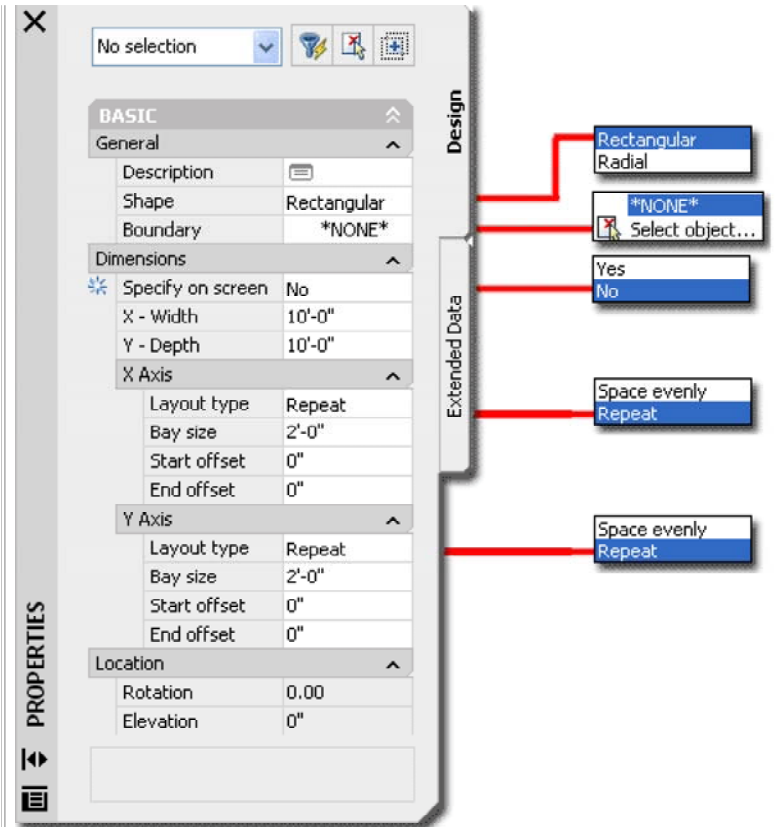**X - Width -** total length of grid along the X-axis.

Y - Depth - total length of grid along the Y-axis.

A AXIS
Layout Type - this drop-down list offers two options: **Space Evenly** and **Repeat**. The Space Evenly option allows you to specify the number of Bays (Grid-lines) instead of the distance between them. The Repeat option allows you to set the distance between each Bay (Grid-line). After you have created a Layout Grid, look for the Manual option on this drop-down list. **Note:** Though you may need to use the Specify on screen option, setting this before defining your X and Y Axis Bay Sizes is not possible because the Specify on screen option will lock out the option to set the Bay sizes. Therefore, set the Bay sizes first and then set the Specify on screen option to Yes.

Bay Size - this option is only available when using the **Repeat** Layout Type. Specify the distance between each Grid line.

Bay Number - this option is only available when using the **Space Evenly** Layout Type. Specify the number of Grid lines you want in any sized Layout Grid.

Start offset - an amount of distance from the grid object's origin that you want the actual grid to start at. This does not affect Spacing but it does affect overall X-Width.

End offset - an amount of distance from the grid object's end that you want the actual grid to end at. This does not affect Spacing but it does affect overall X-Width.

Y AXIS
See comments for X AXIS.

With **Layout Grids** you can use all of the **Anchor Tools** except for the

Volume Anchor which is reserved for Volume Grids discussed below.
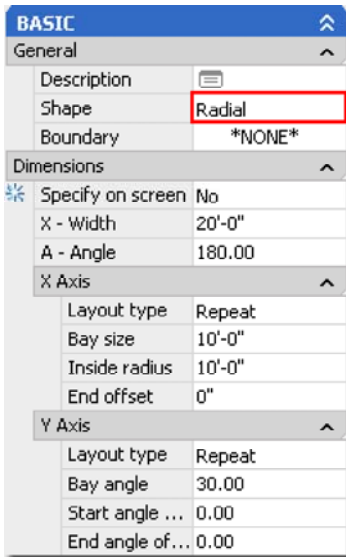
Illustrated to the right I show a few example Objects and the two Layout Grid Shapes that you can work with: the Radial and the Rectangular. You cannot merge the two shapes to make one layout grid.

Just about every Object in ADT can be Anchored to a Layout Grid but sometimes it is more about the type of Anchor you use and how you adjust the Anchor Orientation settings that makes or breaks the implementation.

The house like Mass Element illustrated to the right uses a Cell Anchor but because this Anchor automatically resizes most Objects to fit the Cell, I used the Anchor dialog to deactivate the "Resizing" feature and then reset the Width, Depth and Height to my original specifications. Once you have one Object set, however, Coping it about is extremely easy and fast because you only need to get near the nest Node or Cell position for the Object to automatically Anchor (and rotate in this example).
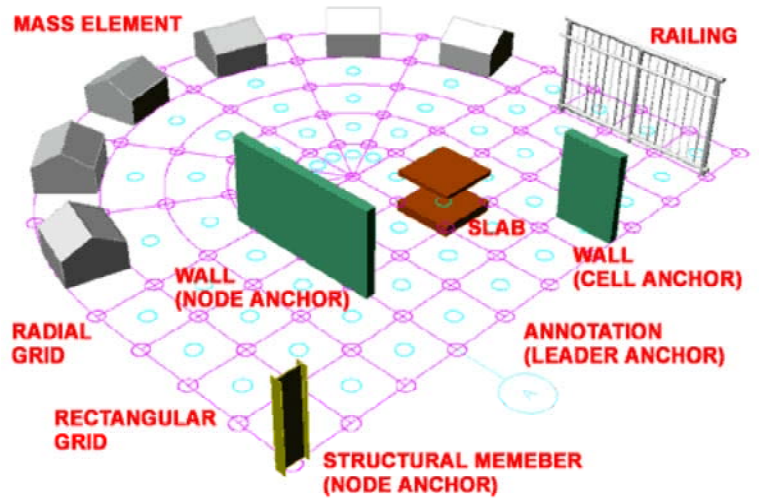

You can Anchor Walls with the Node or Cell Anchor for some rather interesting options on controlling design work. A Wall that has been Anchored with the Cell Anchor will expand to the length or Width of the Cell so as you Expand the Cell dimension, so too will the Length of the Wall Object - See Modifying Layout Grids for the Manual Gridline position option to make this an even more powerful option.

4 Working with the Layout Volume

Adding a Layout Volume

Alt.Menu **Design> Layout Tools and Anchors> Add Layout Volume(3D)...**
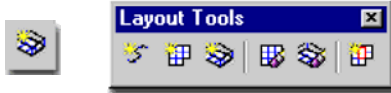
Keyboard **GridVolumeAdd**

Links   Cell Anchor - for information on how to work with the Cells on this tool.

When **Adding** Layout Volume Grids, the **Properties Palette** offers most of the same options available for its 2D counterpart but with the addition of the Z-axis options. In other words, this Volume Grid is a 2D Layout Grid that also produces a Grid in the Z-axis.

Though this tool can be applied wherever you find the need to have points in 3D Space that you want to Anchor ADT Objects to, I find that I have only ever used it in early Schematic Design. What I find particularly useful about this Volume is that it can be a nice visual guide to Massing relationships.

You may notice that this tool does not have a Boundary drop-down list nor a Shape option so you cannot produce non-rectangular Volume Grids.
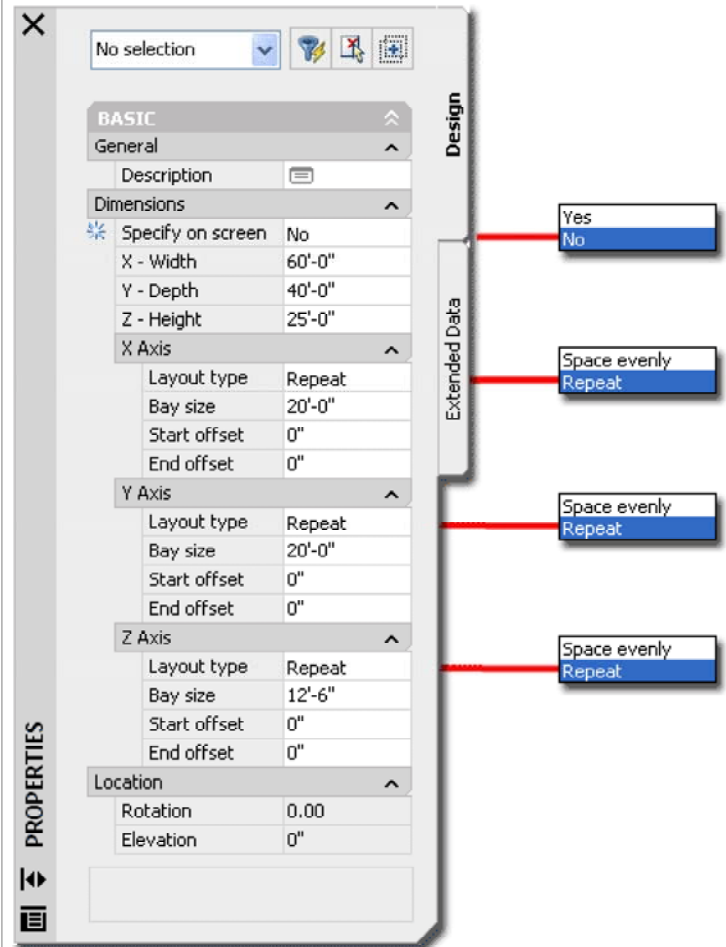
Volume Grid Examples

With **Volume Grids** you can use **all** of the **Anchor Tools** to achieve all sorts of interesting solutions.

In the illustration to the right I show a few example Objects and how they behave when Anchored to a Volume Grid. Space Objects, for example, will expand to fit when Anchored with the **Cell Anchor** while Slabs keep their original size.

Structural Members can be Anchored with any of the Anchor Tools but tend to work best when Anchored with the Node Anchor as illustrated by a Column and Beam - right.

Annotation Objects such as Elevation Datum points can be Anchored with the **Leader Anchor** much like on Grid Layouts. By working with the Anchor dialog (via the Properties Palette), they can be reoriented for 3D Views and quite useful for graphical presentations.
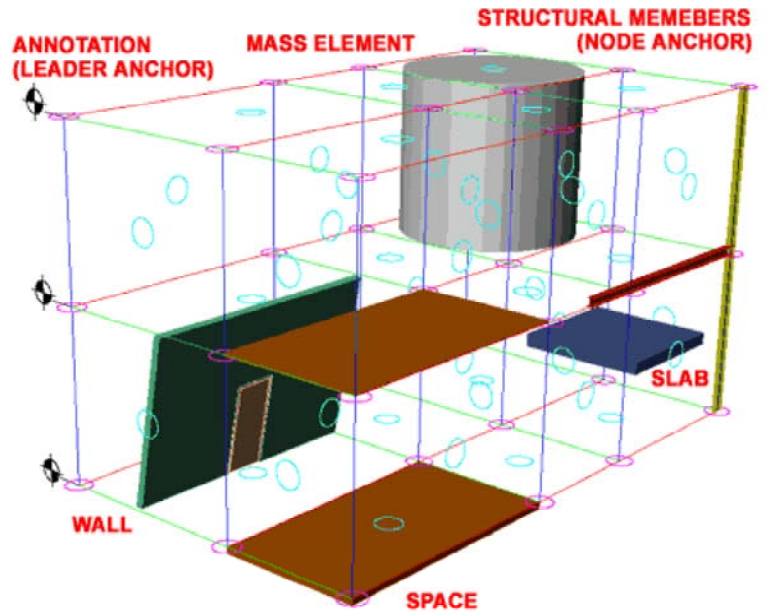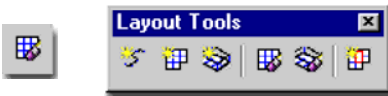
5 Modifying Layout Tools

Modifying a Layout Grid

Alt.Menu **Design> Layout Tools and Anchors> Layout Grid Properties**

Keyboard **LayoutGridProps** or **-LayoutGridModify**

Links Add Layout Grid Properties Palette - for detailed explanation of options

When **Modifying** Layout Grids, the Properties Palette offers all of the same options found when adding these Objects. You will also be able to Modify the **Rotation** and **Elevation** height. Under the Layout Type drop-down lists, you will now find a new option for **Manual**.

By changing a Layout Grid's Layout Type to Manual, you free the Node Grip Points for manual positioning as illustrated below left.

Illustrated to the left I show the **Context pop-up menu** and how it too offers the option to set the Grid Spacing to Manual ("**Layout Mode**"). In addition to this, you also have options to **Add** or **Remove Grid Lines**.

When you set the Layout type to Manual, you should find that the option for spacing is now controlled by the Bays dialog box - see illustration below right.
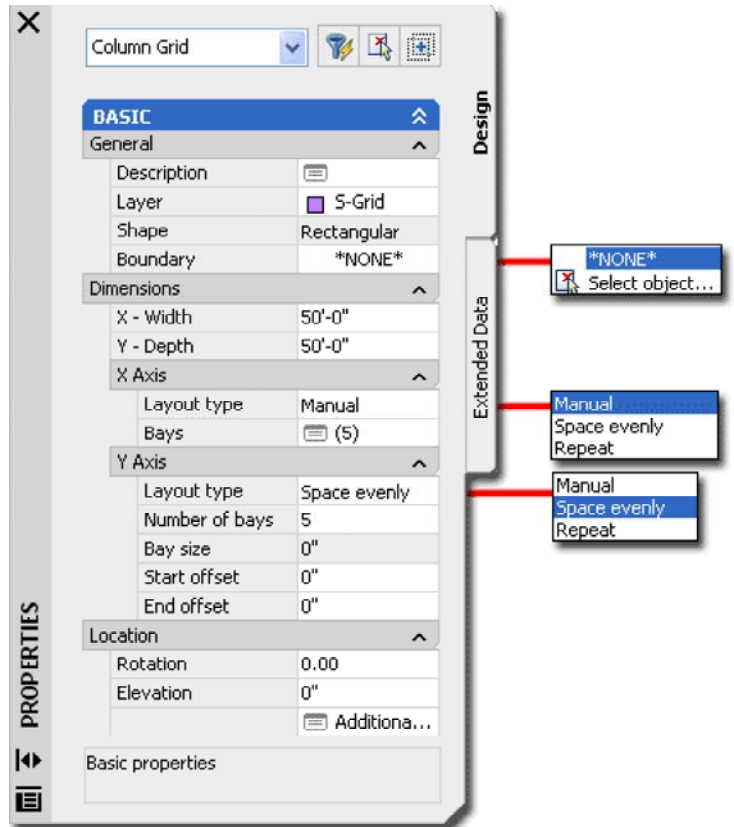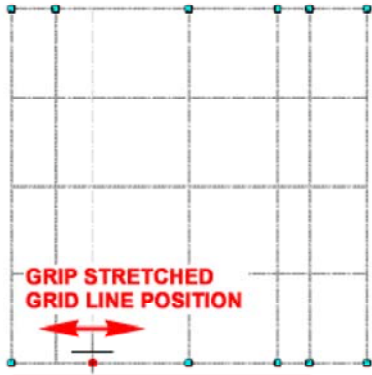
Layout Grid Properties - X and Y Spacing

Keyboard **LayoutGridXAdd** or **LayoutGridYAdd**

LayoutGridXRemove or **LayoutGridYRemove**

LayoutGridXMode or **LayoutGridYMode** - to change a Grid to Manual, Repeat or Space evenly

Bays along the X Axis

Add, edit or remove bays for this grid:

Bay	Distance to line	Spacing
- 1 -	15'-6"	15'-6"
- 2 -	40'-0"	24'-6"
- 3 -	55'-6"	15'-6"
- 4 -	79'-3 1/2"	23'-9 1/2"

OK   Cancel   Help

**MANUAL GRID LINE SPACING ALONG THE X-AXIS**

GRIP STRETCHED GRID LINE POSITION

ADDED GRID LINE - DISTANCE RELATIVE TO ORIGIN

Once a Grid Object has been set to "Manual", you can use the Bays dialog box to Modify Spacing and Add/Remove Grid Lines. You can also use the Context Menu, illustrated above left to Add or Remove Grid Lines. In addition to using the Bays along X Axis or Bays along Y Axis dialog boxes for exact numeric distances for Grid Lines, you can use Grips to Stretch and position Grid Lines as you need.

Adding and Removing Grid Lines on a Layout Grid

Add Grid Line - allows you to define a new gridline based on a distance from the grid object's origin (usually lower left corner). For typical use, you will need to set the Layout Mode to Manual so that your new grid line actually gets placed where you expect it to go. See comments on Remove Grid Line for more details.
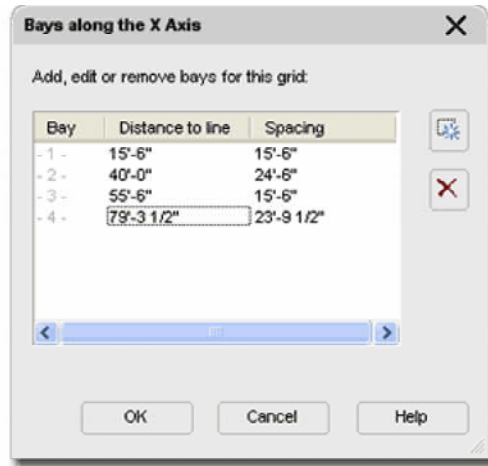
Remove Grid Line - allows you to remove a grid line based on a distance from the grid object's origin or you can simply Snap on the grid line you wish to remove. If you attempt this with Layout Mode set to Repeat, it will not work. If you attempt this with Layout Mode set to Space Evenly, a grid line will be removed and the spacing will be reset evenly for one less grid line. If you attempt this with Layout Mode set to Manual, one grid line will be removed and no other changes will occur to the grid object.

To **Add** or **Remove** a **Layout Grid Line**, you should notice that a line shows up from the origin of your Layout Grid and runs in the direction perpendicular to the grid lines that you intend to remove from or add to. This line assists in defining how far from the origin you want to add a grid line but can be ignored when you are removing grid lines. For removing grid lines, you simply need to pick on the base near the grid line and it will be deleted.
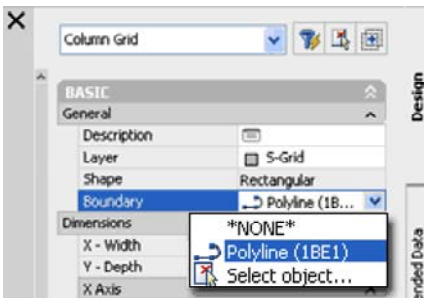

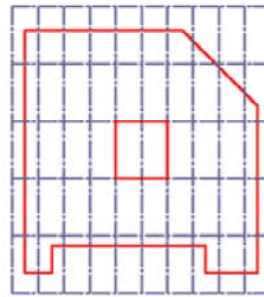**Clipping a Layout Grid**

Menu **N.A/**

Layout Tools

Keyboard **LayoutGridClip**

Mouse **Select Grid** Object, right-click and **Select Clip** on Context pop-up menu


The **Clip Layout Grid** tool may not prove to be as useful as the Clip Ceiling Grid tool but they work the same way. Since a Layout Grid begins as a rectangular or circular shape this is the only way to modify it to match an irregular plan design.

Clipping requires a **closed Polyline shape** and there are two types of Clipping: **Set Boundary** and **Add Hole**. There is also an option to Remove Hole but you can simply delete the Polyline object that defines the Hole or Boundary. The Clipping Object must be kept to maintain the clipping effect. Grip Stretching the Clipping Object will redefine the Boundary or Hole and thus serves as a convenient option for modifying shapes.

CLOSED PLINES
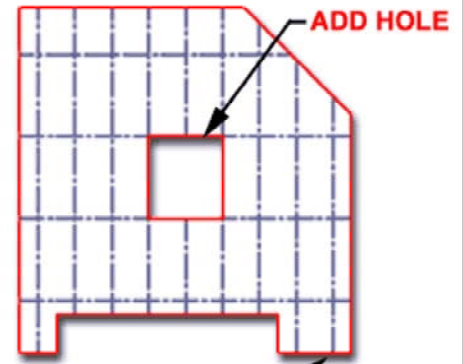
ADD HOLE

SET BOUNDARY

Set boundary - use to define a new perimeter shape for your Layout Grid. To remove, delete the boundary Polyline. Keep the boundary Polyline on a separate layer if you want the option to turn it off separately from the grid.

Add hole - use to remove internal grid lines within a Layout Grid. To remove, use the Remove hole option or delete. Keep the "hole" Polyline on a separate layer if you want the option to turn it off separately from the grid.
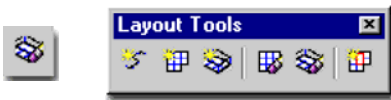
Command: **LayoutGridClip**
Layout grid clip [Set boundary/Add hole/Remove hole]:

Modifying a Layout Volume

Alt Menu **Design> Layout Tools and Anchors> Grid Volume**
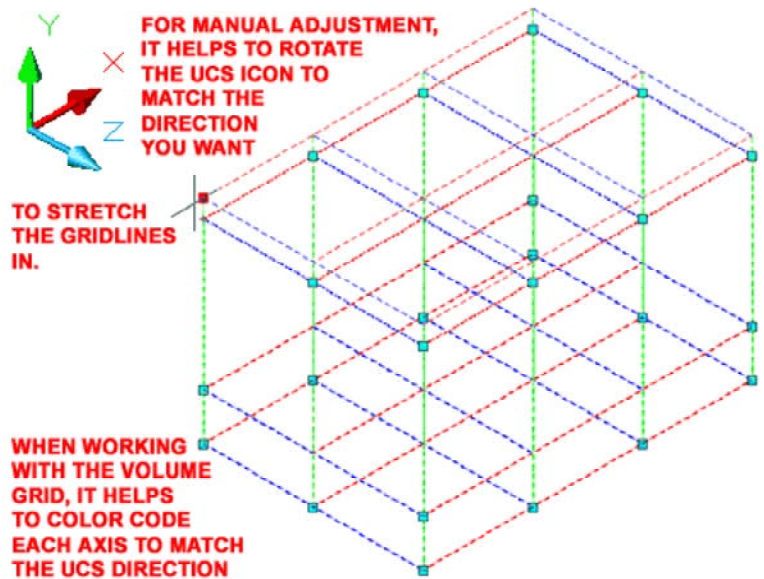
Alt.Menu **Properties**

Keyboard **VolumeGridProps** or -GridVolumeModify

Links [Add Layout Volume Properties Palette](#) - for detailed explanation of options

When **Modifying** Layout Volume Grids, the Properties Palette offers all of the same options found when Adding these Objects. See [Modifying a Layout Grid](#) and [Add Layout Volume Properties Palette](#) for a discussion of the options you can expect to find for this Object. The only difference is that the Layout Volume offers a Z Axis drop-down list and a Z Axis Context menu option. You cannot Clip Volume Grids and you cannot set a Boundary for them either.

Illustrated to the right I show a Volume Grid where all Gridline Dimensions have been set for Manual Adjustment. By using the **Display Properties**, discussed below, to set each direction to a unique Color makes it easier to visualize the direction of the numerous lines you may be looking at. If you intend to alter dimensions in 3D, it is best to rotate the UCS icon to match the direction you intend to Stretch the Gridlines.

FOR MANUAL ADJUSTMENT, IT HELPS TO ROTATE THE UCS ICON TO MATCH THE DIRECTION YOU WANT

TO STRETCH THE GRIDLINES IN.

WHEN WORKING WITH THE VOLUME GRID, IT HELPS TO COLOR CODE EACH AXIS TO MATCH THE UCS DIRECTION

6 Layout Tools - Display Props

Display Properties... - Layout Curve, Layout Grid and Layout Volume

Since the Layout Grid Objects do not have Style Families in ADT, you can only change their Display Properties by the Objects. For the Layout Curve, this means the **Node Display Component**. For the Layout Grid, this means the Node, **Cell**, **X** and **Y Axis** Display Components. For the Layout Volume, this means all of the Display Components available for the Layout Grid plus one for the **Z Axis** Display Component.
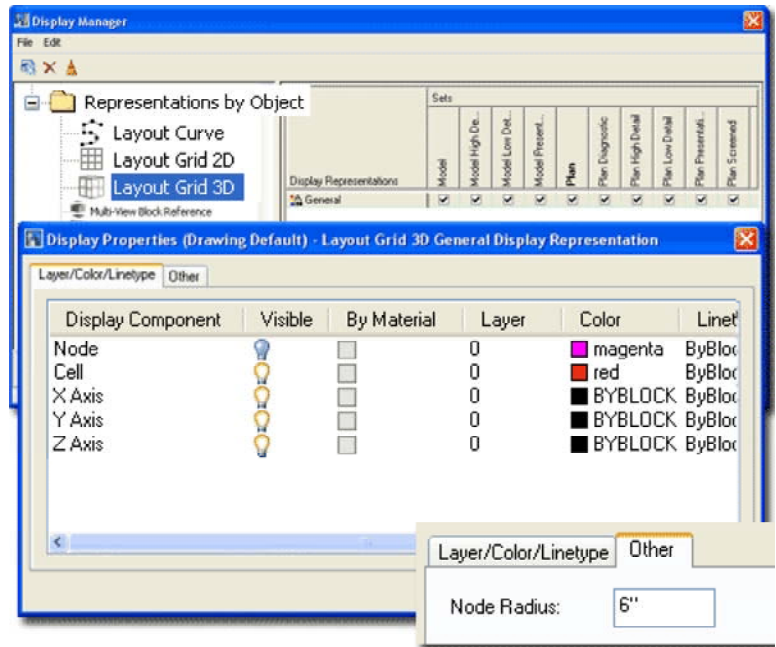
YOU CAN ALSO ACCESS DISPLAY PROPERTIES BY SELECTING AN OBJECT, RIGHT-CLICKING ON YOUR MOUSE AND USE THIS POP-UP MENU OPTION

You can modify the Display Components of these Layout Objects by either working through the **Display Manager Window**, as illustrated to the right, or by using the "**Edit Object Display...**" Content menu option via a Selected Layout Object.
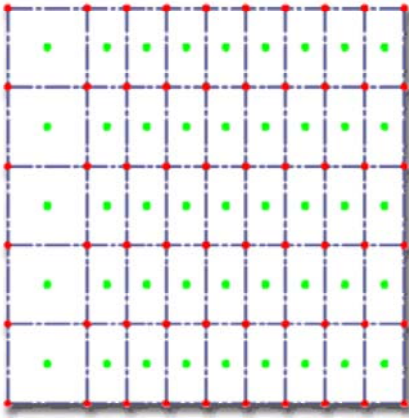
You can use the "**Other**" **tab o**n the Display Properties dialog to control the size of both the **Node** and **Cell** Display Components.
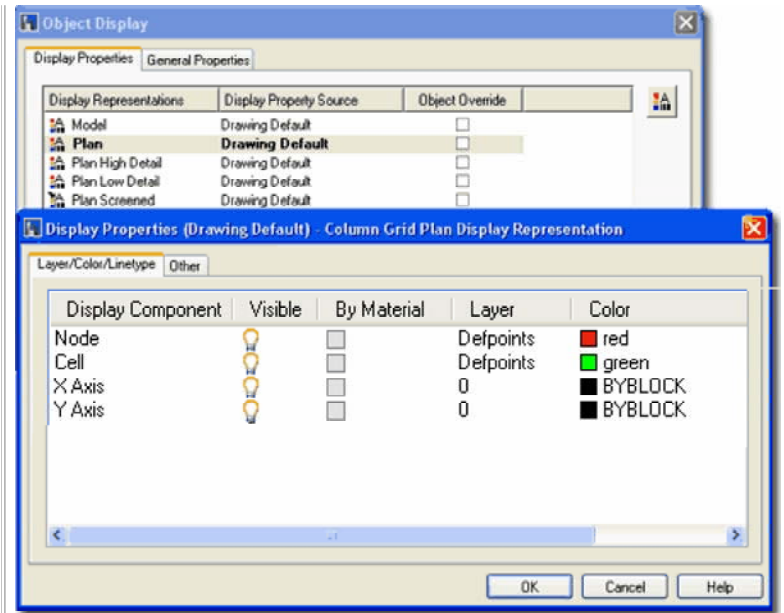
Display Properties - Layout Tool - Component Layers

Illustrated to the right I show the **Display Properties** for the "**Plan**" **Display Representation** and the **four Display Components** that you will find for the Layout Grid (2D).

By default, the **Node** and **Cell Display Components** are not Visible and you may never need to make them Visible since their function is designed for Anchoring Objects rather than printing. When using Anchoring Tools, there is no particular need to have these markers visible because the Anchor tool will automatically find the closest Node or Cell when you Select a Gridline.

Display Component	Visible	By Material	Layer	Color
Node	🔆	☐	Defpoints	🟥 red
Cell	🔆	☐	Defpoints	🟩 green
X Axis	🔆	☐	0	⬛ BYBLOCK
Y Axis	🔆	☐	0	⬛ BYBLOCK

7
Layout Tools - Customizing and Tricks