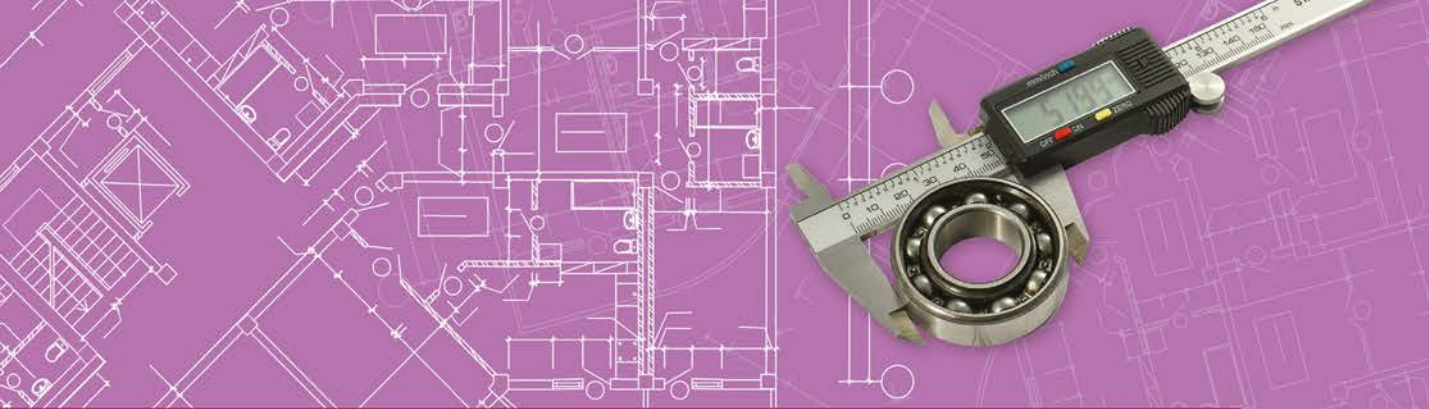
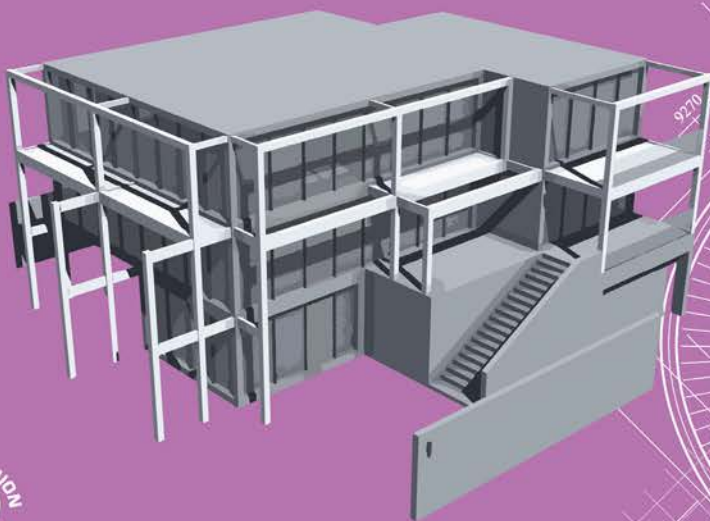




Introduction to AutoCAD® 2017

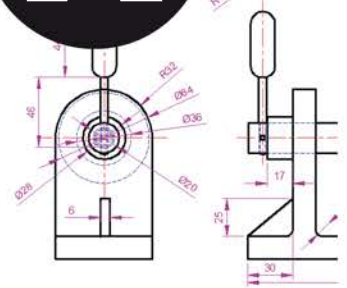
2D and 3D Design



**Bernd S. Palm
and Alf Yarwood**

Autodesk®
Authorised Author





2D COMMANDS

Area: States in square units of the area selected from a number of points

Array (ar): Creates **Rectangular** or **Polar** arrays in 2D

Ase: Brings the **dbConnect Manager** on screen

Attdef: Brings the **Attribute Definition** dialog on screen

Attedit: Allows editing of attributes from the Command line

Audit: Checks and fixes any errors in a drawing

Autopublish: Creates a DWF file for the drawing on screen

Bhatch (h): Brings the **Boundary Hatch** dialog on screen

Block: Brings the **Block Definition** dialog on screen

Bmake (b): Brings the **Block Definition** dialog on screen

Bmpout: Brings the **Create Raster File** dialog on screen

Boundary (bo): Brings the **Boundary Creation** dialog on screen

Break (br): Breaks an object into parts

Cal: Calculates mathematical expressions

Chamfer (cha): Creates a chamfer between two entities

Chprop (ch): Brings the **Properties** window on screen

Circle (c): Creates a circle

Copy (co): Creates a single or multiple copies of selected entities

Copyclip (Ctrl+C): Copies a drawing, or part of a drawing for inserting into a document from another application

Copylink: Forms a link between an AutoCAD drawing and its appearance in another application such as a word processing package

Copytlayer: Copies objects from one layer to another

Customize: Brings the **Customize** dialog to screen, allowing the customization of toolbars, palettes, etc.

Dashboard: Has the same action as **Ribbon**

Dashboardclose: Closes the **Ribbon**

Ddattdef (at): Brings the **Attribute Definition** dialog to screen

Ddatte (ate): Edits individual attribute values

Ddcolor (col): Brings the **Select Color** dialog on screen

Ddedit (ed): The **Text Formatting** dialog box appears on selecting text

Ddim (d): Brings the **Dimension Style Manager** dialog box on screen

Ddinsert (i): Brings the **Insert** dialog on screen

Ddmodify: Brings the **Properties** window on screen

Ddosnap (os): Brings the **Drafting Settings** dialog on screen

Ddptype: Brings the **Point Style** dialog on screen

Ddrmodes (rm): Brings the **Drafting Settings** dialog on screen

Ddunits (un): Brings the **Drawing Units** dialogue on screen

Ddview (v): Brings the **View Manager** on screen

Del: Allows a file (or any file) to be deleted

Dgnexport: Creates a **MicroStation V8 dgn** file from the drawing on screen

Dgnimport: Allows a **MicroStation V8 dgn** file to be imported as an AutoCAD dwg file

Dim: Starts a session of dimensioning

Dimension tools: The **Dimension** toolbar contains the following tools – **Linear, Aligned, Arc Length, Ordinate, Radius, Jogged, Diameter, Angular, Quick Dimension, Baseline, Continue, Quick Leader, Tolerance, Center Mark, Dimension Edit, Dimension Edit Text, Update** and **Dimension Style**

Dim1: Allows the addition of a single addition of a dimension to a drawing

Dist (di): Measures the distance between two points in coordinate units

Distantlight: Creates a distant light

Divide (div): Divides an entity into equal parts

Donut (do): Creates a donut

Dsviwer: Brings the **Aerial View** window on screen

Dtext (dt): Creates dynamic text; text appears in drawing area as it is entered

Dxbn: Brings the **Select DXB File** dialog on screen

Dxfn: Brings the **Select File** dialog on screen

Dxfout: Brings the **Save Drawing As** dialog on screen

Ellipse (el): Creates an ellipse

Erase (e): Erases selected entities from a drawing

Exit: Ends a drawing session and closes AutoCAD 2017

Explode (x): Explodes a block or group into its various entities

Explorer: Brings the **Windows Explorer** on screen

Export (exp): Brings the **Export Data** dialog on screen

Extend (ex): Extends an entity to another

Fillet (f): Creates a fillet between two entities

Filter: Brings the **Object Selection Filters** dialog on screen

Gradient: Brings the **Hatch and Gradient** dialog on screen

Group (g): Brings the **Object Grouping** dialog on screen

Hatch: Allows hatching by the *entry* responses to prompts

Hatchedit (he): Allows editing of associative hatching

Help: Brings the **AutoCAD 2017 Help – User Documentation** dialog on screen

Hide (hi): To hide hidden lines in 3D models

Id: Identifies a point on screen in coordinate units

Imageadjust: (iad) Allows adjustment of images

Imageattach (iat): Brings the **Select Image File** dialog on screen

Imageclip: Allows clipping of images

Import: Brings the **Import File** dialog on screen

Insert (i): Brings the **Insert** dialog on screen

Insertobj: Brings the **Insert Object** dialog on screen

Isoplane (Ctrl/E): Sets the isoplane when constructing an isometric drawing

Join (j) Joins lines that are in line with each other or arcs that are from the same centre point

Laycur: Changes layer of selected objects to current layer

Laydel: Deletes and purges a layer with its contents

Layer (la): Brings the **Layer Properties Manager** dialog on screen

Layout: Allows editing of layouts

Lengthen (len): Lengthens an entity on screen

Limits: Sets the drawing limits in coordinate units

Line (l): Creates a line

Linetype (lt): Brings the **Linetype Manager** dialog on screen

List (li): Lists in a text window details of any entity or group of entities selected

Load: Brings the **Select Shape File** dialog on screen

Ltscale (lts): Allows the linetype scale to be adjusted

Measure (me): Allows measured intervals to be placed along entities

Menu: Brings the **Select Customization File** dialog on screen

Menuload: Brings the **Load/Unload Customizations** dialog on screen

Mirror (mi): Creates an identical mirror image to selected entities

Mledit: Brings the **Multiline Edit Tools** dialog on screen

Mline (ml): Creates mlines

Mlstyle: Brings the **Multiline Styles** dialog on screen

Move (m): Allows selected entities to be moved

Mslide: Brings the **Create Slide File** dialog on screen

Mspace (ms): When in Pspace, changes to MSpace

Mtext (mt or t): Brings the **Multiline Text Editor** on screen

Mview (mv): To make settings of viewports in **Paper Space**

Mvsetup: Allows drawing specifications to be set up

New (Ctrl+N): Brings the **Select template** dialog on screen

Notepad: For editing files from the Windows **Notepad**

Offset (o): Offsets selected entity by a stated distance

Oops: Cancels the effect of using **Erase**

Open: Brings the **Select File** dialog on screen

Options: Brings the **Options** dialog to screen

Ortho: Allows ortho to be set ON/OFF

Osnap (os): Brings the **Drafting Settings** dialog to screen

Pagesetup: Brings the **Page Setup Manager** on screen

Pan (p): Drags a drawing in any direction

Pbrush: Brings Windows **Paint** on screen

Pedit (pe): Allows editing of polylines; one of the options is **Multiple**, allowing continuous editing of polylines without closing the command

Pline (pl): Creates a polyline

Plot (Ctrl+P): Brings the **Plot** dialog to screen

Point (po): Allows a point to be placed on screen

Polygon (pol): Creates a polygon

Polyline (pl): Creates a polyline

Preferences (pr): Brings the **Options** dialog on screen

Preview (pre): Brings the print/plot preview box on screen

Properties: Brings the **Properties** palette on screen

Psfill: Allows polylines to be filled with patterns

Psout: Brings the **Create Postscript File** dialog on screen

Purge (pu): Purges unwanted data from a drawing before saving to file

Qsave: Saves the drawing file to its current name in AutoCAD 2017

Quickcalc (qc): Brings the **QUICKCALC** palette to screen

Quit: Ends a drawing session and closes down AutoCAD 2017

Ray: A construction line from a point

Recover: Brings the **Select File** dialog on screen to allow recovery of selected drawings as necessary

Recoverall: Repairs damaged drawing

Rectang (rec): Creates a pline rectangle

Redefine: If an AutoCAD command name has been turned off by **Undefine**, **Redefine** turns the command name back on

Redo: Cancels the last **Undo**

Redraw (r): Redraws the contents of the AutoCAD 2017 drawing area

Redrawall (ra): Redraws the whole of a drawing

Regen (re): Regenerates the contents of the AutoCAD 2017 drawing area

Regenall (rea): Regenerates the whole of a drawing

Region (reg): Creates a region from an area within a boundary

Rename (ren): Brings the **Rename** dialog on screen

Revcloud: Forms a cloud-like outline around objects in a drawing to which attention needs to be drawn

Ribbon: Brings the ribbon on screen

Ribbonclose: Closes the ribbon

Save (Ctrl+S): Brings the **Save Drawing As** dialog box on screen

Saveas: Brings the **Save Drawing As** dialog box on screen

Saveimg: Brings the **Render Output File** dialog on screen

Scale (sc): Allows selected entities to be scaled in size – smaller or larger

Script (scr): Brings the **Select Script File** dialog on screen

Setvar (set): Can be used to bring a list of the settings of set variables into an AutoCAD Text window

Shape: Inserts an already loaded shape into a drawing

Shell: Allows MS-DOS commands to be entered

Sketch: Allows freehand sketching

Solid (so): Creates a filled outline in triangular parts

Spell (sp): Brings the **Check Spelling** dialog on screen

Spline (spl): Creates a spline curve through selected points

Splinedit (spe): Allows the editing of a spline curve

Status: Shows the status (particularly memory use) in a Text window

Stretch (s): Allows selected entities to be stretched

Style (st): Brings the **Text Styles** dialog on screen

Tablet (ta): Allows a tablet to be used with a pointing device

Tbconfig: Brings the **Customize** dialog on screen to allow configuration of a toolbar

Text: Allows text from the Command line to be entered into a drawing

Thickness (th): Sets the thickness for the Elevation command

Tilemode: Allows settings to enable Paper Space

Tolerance: Brings the **Geometric Tolerance** dialog on screen

Toolbar (to): Brings the **Customize User Interface** dialog on screen

Trim (tr): Allows entities to be trimmed up to other entities

Type: Types the contents of a named file to screen

UCS: Allows selection of UCS (user Coordinate System) facilities

Undefine: Suppresses an AutoCAD command name

Undo (u) (Ctrl+Z): Undoes the last action of a tool

View: Brings the **View** dialog on screen

Vplayer: Controls the visibility of layers in Paper Space

Vports: Brings the **Viewports** dialog on screen

Vslide: Brings the **Select Slide File** dialog on screen

Wblock (w): Brings the **Create Drawing File** dialog on screen

Wipeout: Forms a polygonal outline within which all crossed parts of objects are erased

Wmfin: Brings the **Import WMF** dialog on screen

Wmfopts: Brings the **WMF in Options** dialog on screen

Wmfout: Brings the **Create WMF File** dialog on screen

Xattach (xa): Brings the **Select Reference File** dialog on screen

Xline: Creates a construction line

Xref (xr): Brings the **Xref Manager** dialog on screen

Zoom (z): Brings the zoom tool into action

3D COMMANDS

3darray: Creates an array of 3D models in 3D space

3dcorbit: Allows methods of manipulating 3D models on screen

3ddistance: Allows the controlling of the distance of 3D models from the operator

3ddwf: brings up the **Export 3D DWF** dialog

3dface (3f): Creates a three- or four-sided 3D mesh behind which other features can be hidden

3dfly: Allows walkthroughs in any 3D plane

3dforbit: Controls the viewing of 3D models without constraint

3dmesh: Creates a 3D mesh in 3D space

3dmove: Shows a 3D move icon

3dorbit (3do): Allows a continuous movement and other methods of manipulation of 3D models on screen

3dorbitctr: Allows further and a variety of other methods of manipulation of 3D models on screen

3dpan: Allows the panning of 3D models vertically and horizontally on screen

3drotate: Displays a 3D rotate icon

3dsin: Brings the **3D Studio File Import** dialog on screen

3dsout: Brings the **3D Studio Output File** dialog on screen

3dwalk: Starts walk mode in 3D

Align: Allows selected entities to be aligned to selected points in 3D space

Ameconvert: Converts AME solid models (from Release 12) into AutoCAD 2017 solid models

anipath: Opens the **Motion Path Animation** dialog

Box: Creates a 3D solid box

Cone: Creates a 3D model of a cone

Convertoldlights: Converts lighting from previous releases to AutoCAD 2017 lighting

Convertoldmaterials: Converts materials from previous releases to AutoCAD 2017 materials

Convtsolid: Converts plines and circles with thickness to 3D solids

Convtsurface: Converts objects to surfaces

Cylinder: Creates a 3D cylinder

Dducs (uc): Brings the **UCS** dialog on screen

Edgesurf: Creates a 3D mesh surface from four adjoining edges

Extrude (ext): Extrudes a closed polyline

Flatshot: Brings the **Flatshot** dialog to screen

Freept: Point light created without settings

Freespot: Spotlight created without settings

Helix: Constructs a helix

Interfere: Creates an interference solid from selection of several solids

Intersect (in): Creates an intersection solid from a group of solids

Light: Enables different forms of lighting to be placed in a scene

Lightlist: Opens the **Lights in Model** palette

Loft: Activates the **Loft** command

Materials: Opens the **Materials** palette

Mirror3d: Mirrors 3D models in 3D space in selected directions

Mview (mv): When in Pspace, brings in MSpace objects

Pface: Allows the construction of a 3D mesh through a number of selected vertices

Plan: Allows a drawing in 3D space to be seen in plan (UCS World)

Planesurf: Creates a planar surface

Pointlight: Allows a point light to be created

Pspace (ps): Changes MSpace to PSpace

Pyramid: Creates a pyramid

-render: can be used to make rendering settings from the command line; note the hyphen (-) must precede **render**

Renderpresets: Opens the **Render Presets Manager** dialog

Renderwin: Opens the **Render** window

Revolve (rev): Forms a solid of revolution from outlines

Revsurf: Creates a solid of revolution from a pline

Rmat: Brings the **Materials** palette on screen

Rpref (rpr): Opens the **Advanced Render Settings** palette

Section (sec): Creates a section plane in a 3D model

Shade (sha): Shades a selected 3D model

Slice (sl): Allows a 3D model to be cut into several parts

Solprof: Creates a profile from a 3D solid model drawing

Sphere: Creates a 3D solid model sphere

Spotlight: Creates a spotlight

Stlout: Saves a 3D model drawing in ASCII or binary format

Sunproperties: Opens the **Sun Properties** palette

Torus (tor): Allows a 3D torus to be created

Ucs: Allows settings of the UCS plane

Sweep: Creates a 3D model from a 2D outline along a path

Tabsurf: Creates a 3D solid from an outline and a direction vector

Ucs: Allows settings of the UCS plane

Union (uni): Unites 3D solids into a single solid

View: Creates view settings for 3D models

Visualstyles: Opens the **Visual Styles Manager** palette

Vpoint: Allows viewing positions to be set from x,y,z entries

Vports: Brings the **Viewports** dialog on screen

Wedge (we): Creates a 3D solid in the shape of a wedge

Xedges: Creates a 3D wireframe for a 3D solid

INTERNET COMMANDS

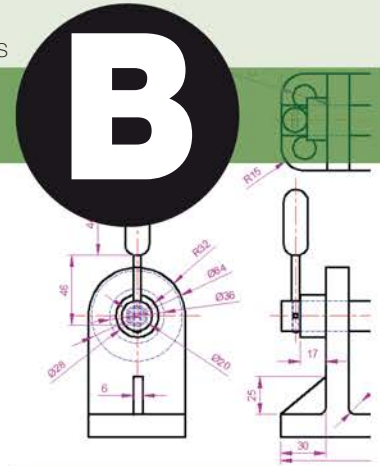
Etransmit: Brings the **Create Transmittal** dialog to screen

Publish: Brings the **Publish** dialog to screen

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APPENDIX

SOME SET VARIABLES



INTRODUCTION

AutoCAD 2017 is controlled by a large number of set variables, the settings of many of which are determined when making entries in dialogs. Some are automatically set with *clicks* on tool icons. Others have to be set from the keyboard. Some are read-only variables that depend upon the configuration of AutoCAD 2017 when it originally loaded into a computer (default values). Only a limited number of the variables are shown here.

A list of those set variables follows, which are of interest in that they often require setting by *entering* figures or letters at the keyboard. To set a variable, enter its name at the command line and respond to the prompts that arise.

To see all set variables, *enter set* (or *setvar*) at the keyboard:

SETVAR Enter variable name or ?: *enter ? right-click*

Enter variable(s) to list <*>: *enter * right-click*

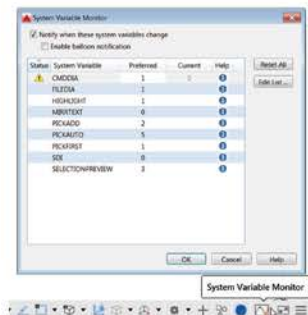
Press Enter to continue: *enter*

And an **AutoCAD Text Window** opens showing a list of the first of the set variables. To continue with the list, press the **Return** key when prompted and, at each press of the **Return** key, another window opens.

To see the settings needed for a set variable, *enter* the name of the variable at the command line, followed by pressing the **F1** key, which brings up a **Help** screen. *Click* the search tab, followed by *entering* set variables in the **Ask** field. From the list then displayed, the various settings of all set variables can be read.

SYSTEM VARIABLE MONITOR

A new command in AutoCAD 2017 opens the System Variable Monitor. It must be typed in the command bar: **SYSVARMONITOR**.



B.1 The System Variable Monitor

Changes in selected system variables are monitored and a warning in the status bar is shown (Fig. B.1). The list of monitored variables can be edited.

SOME OF THE SET VARIABLES

ANGDIR: Sets angle direction. **0** counterclockwise; **1** clockwise

APERTURE: Sets size of pick box in pixels

AUTODWFPUBLISH: Sets **Autopublish** on or off

BLIPMODE: Set to **1** marker blips show; set to **0** no blips

COMMANDLINE: Opens the command line palette

COMMANDLINEHIDE: Closes the command line palette

COPYMODE: Sets whether **Copy** repeats

NOTE →

DIM variables: There are over 70 variables for setting dimensioning, but most are in any case set in the **Dimension Styles** dialog or as dimensioning proceeds. However, one series of the **DIM** variables may be of interest:

DMBLOCK: Sets a name for the block drawn for an operator's own arrowheads; these are drawn in unit sizes and saved as required

DIMBLK1: Operator's arrowhead for first end of line

DIMBLK2: Operator's arrowhead for other end of line

DRAGMODE: Set to **0** no dragging; set to **1** dragging on; set to **2** automatic dragging

DRAG1: Sets regeneration drag sampling; initial value is 10

DRAG2: Sets fast dragging regeneration rate; initial value is 25

FILEDIA: Set to **0** disables **Open** and **Save As** dialogs; set to **1** enables these dialogs

FILLMODE: Set to **0** hatched areas are filled with hatching; set to **1** hatched areas are not filled

GRIPS: Set to **1** and grips show; set to **0** and grips do not show

LIGHTINGUNITS: Set to **1** (international) or **2** (USA) for photometric lighting to function

MBUTTONPAN: Set to **0** no *right-click* menu with the Intellimouse; set to **1** Intellimouse *right-click* menu on

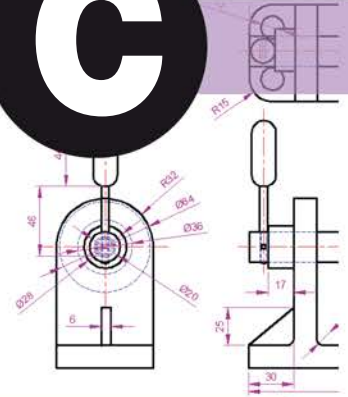
MIRRTEXT: Set to **0** text direction is retained; set to **1** text is mirrored

NAVVCUBE: Sets the **ViewCube** on/off

- NAVVCUBELOCATION:** Controls the position of the **ViewCube** between top-right (0) and bottom-left (3)
- NAVVCUBEOPACITY:** Controls the opacity of the **ViewCube** from 0 (hidden) to 100 (dark)
- NAVVCUBESIZE:** Controls the size of the **ViewCube** between 0 (small) to 2 (large)
- PELLIPSE:** Set to 0 creates true ellipses; set to 1 polyline ellipses
- PERSPECTIVE:** Set to 0 places the drawing area into parallel projection; set to 1 places the drawing area into perspective projection
- PICKBOX:** Sets selection pick box height in pixels
- PICKDRAG:** Set to 0 selection windows picked by two corners; set to 1 selection windows are dragged from corner to corner
- RASTERPREVIEW:** Set to 0 raster preview images not created with drawing; set to 1 preview image created
- SHORTCUTMENU:** For controlling how *right-click* menus show: 0 all shortcut menus disabled; 1 default menus only; 2 edit mode menus; 4 command mode menus; 8 command mode menus when options are currently available; 16 right mouse button held down enables shortcut menu to be displayed; **Initial value: 11**
- SURFTAB1:** Sets mesh density in the M direction for surfaces generated by the **Surfaces** tools
- SURFTAB2:** Sets mesh density in the N direction for surfaces generated by the **Surfaces** tools
- TEXTFILL:** Set to 0 True Type text shows as outlines only; set to 1 True Type text is filled
- TILEMODE:** Set to 0 Paperspace enabled; set to 1 tiled viewports in Modelspace
- TOOLTIPS:** Set to 0 no tool tips; set to 1 tool tips enabled
- TPSTATE:** Set to 0 and the Tool Palettes window is inactive; set to 1 and the Tool Palettes window is active
- TRIMMODE:** Set to 0 edges not trimmed when **Chamfer** and **Fillet** are used; set to 1 edges are trimmed
- UCSFOLLOW:** Set to 0 new UCS settings do not take effect; set to 1 UCS settings follow requested settings
- UCSICON:** Set OFF UCS icon does not show; set to ON it shows

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3D VIEWS



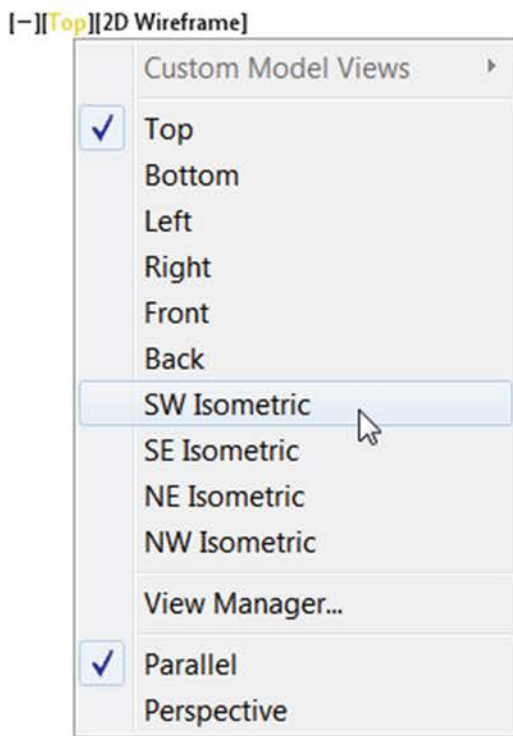


Fig. C.1 The **Views** drop-down menu in the viewport controls

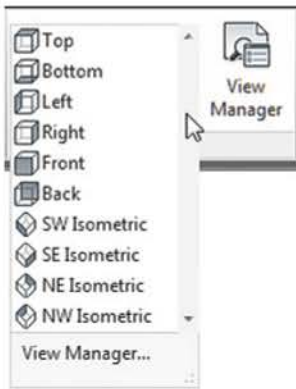


Fig. C.2 The Visualize/Views panel drop-down menu

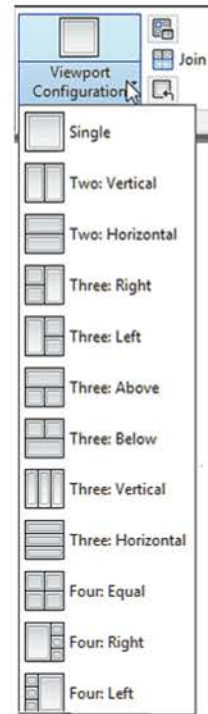


Fig. C.3 The View port Configuration drop-down from the Visualize/Model Viewports panel

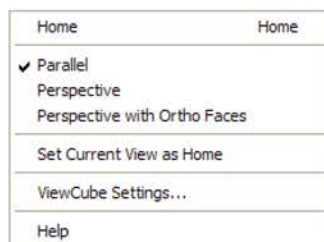
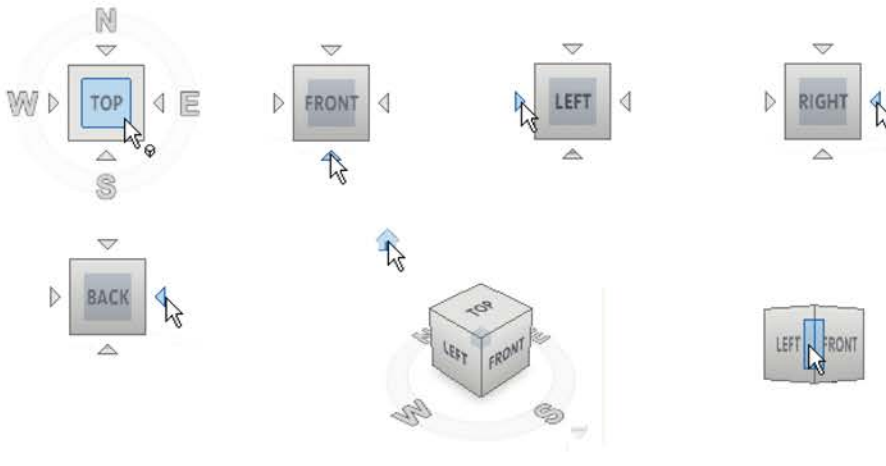


Fig. C.4 Some settings of the ViewCube

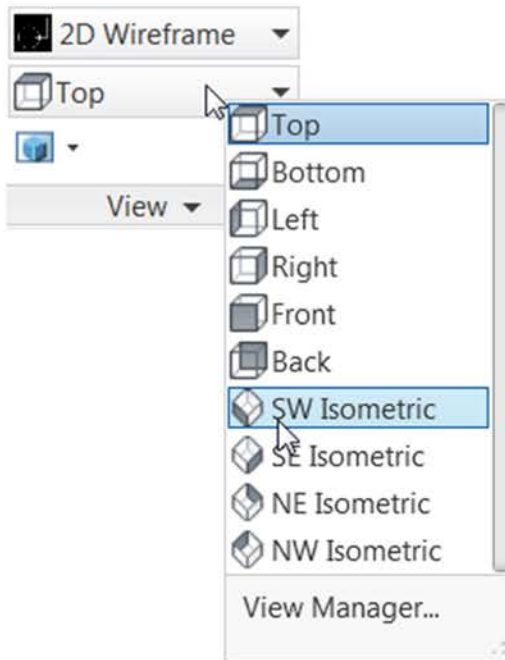


Fig. C.5 The Home/View panel drop-down in the 3D Modelling Workspace

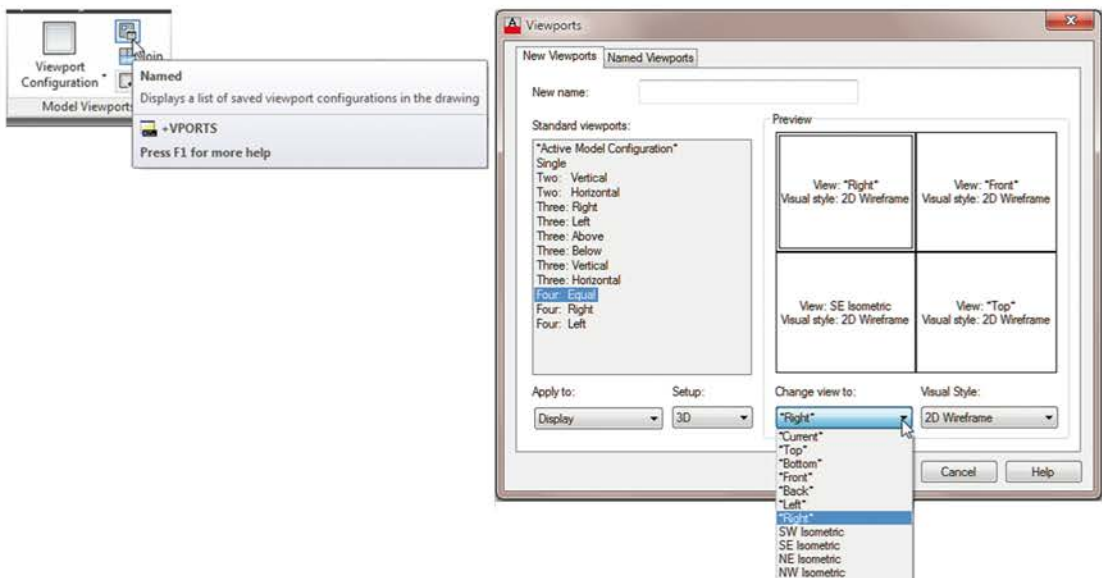


Fig. C.6 Selecting views from the Visualize/Model Viewports panel

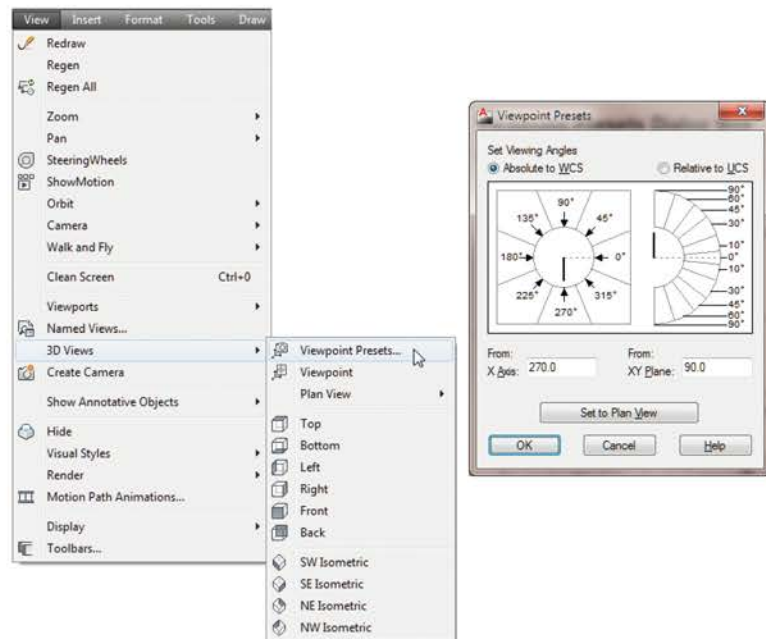


Fig. C.7 The Viewpoint Presets from the View drop-down menu

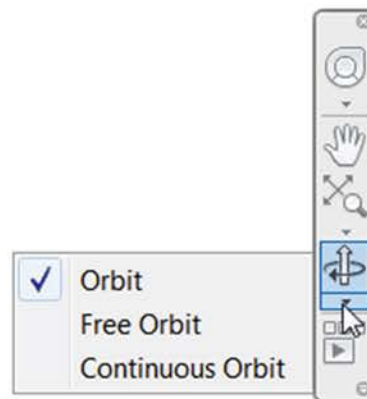
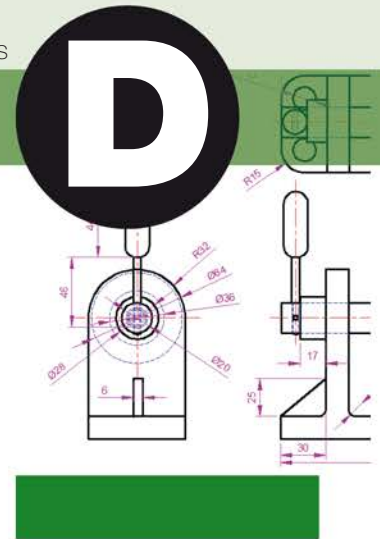


Fig. C.8 Selecting the 3D Orbit tool from the Navigation bar

APPENDIX

KEYBOARD
SHORTCUTS

KEYBOARD SHORTCUTS

- Ctrl+A: Selects everything on screen
- Ctrl+C: Calls the Copy command
- Ctrl+N: Opens the Select template dialog
- Ctrl+O: Opens the Select File dialog
- Ctrl+P: Opens the Plot dialog
- Ctrl+Q: Closes the AutoCAD window
- Ctrl+S: Saves drawing on screen
- Ctrl+V: Pastes from Clipboard into window
- Ctrl+X: Calls the Cut command
- Ctrl+Y: Calls the Redo command
- Ctrl+Z: Undoes the last Plot operation
- Ctrl+Shift+C: Calls the Copy command with Base point
- Ctrl+Shift+V: Pastes a block into the window
- Ctrl+5: Saves the drawing in screen
- Ctrl+Shift+5: Opens the Save Drawing As dialog
- Ctrl+9: Toggles the Command palette on/off
- Del: Deletes a selected object
- F1: Brings the Help window on screen
- F2: Brings the Text window on screen
- F3: Toggles Object Snap on/off
- F4: Toggles 3D Object Snap on/off
- F5: Toggles between isoplanes
- F6: Toggles Dynamic UCS on/off
- F7: Toggles Grid on/off
- F8: Toggles Ortho on/off
- F9: Toggles Snap on/off
- F10: Toggles Polar Tracking on/off
- F11: Toggles Object Tracking on/off

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