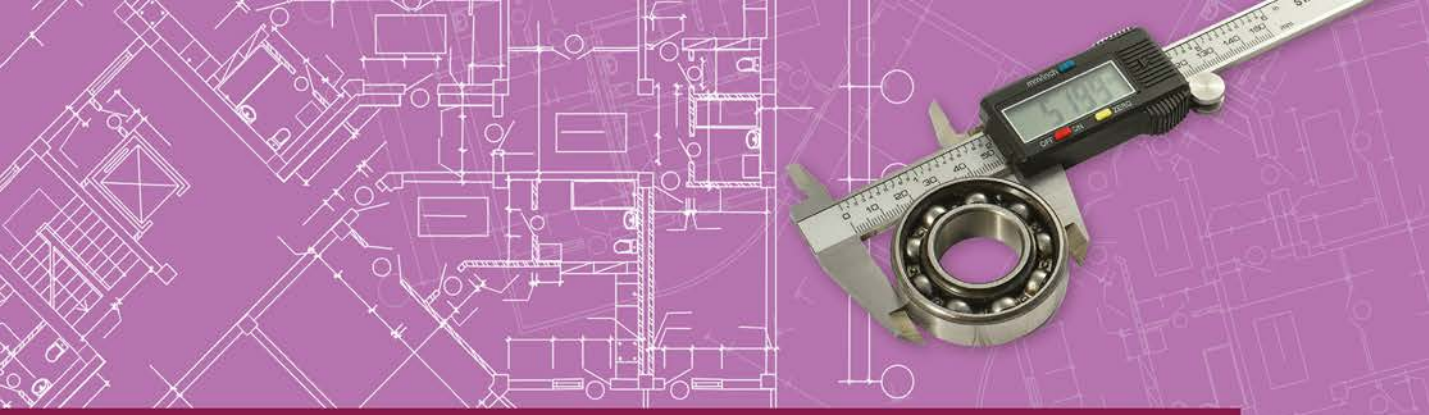
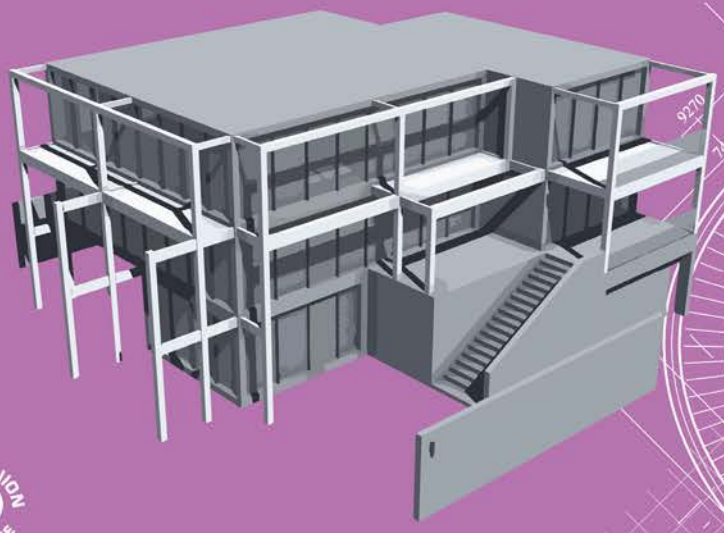


Introduction to AutoCAD® 2017

2D and 3D Design



COMPANION @ WEBSITE

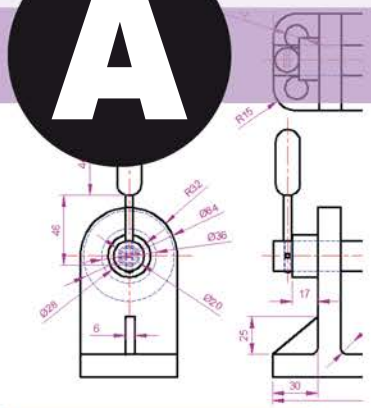
Bernd S. Palm and Alf Yarwood

Autodesk Authorised Author

ROUTLEDGE

APPENDIX A

LIST OF TOOLS



INTRODUCTION

AutoCAD 2017 allows the use of over 1,000 commands (or tools). A selection of the most commonly used from these commands (tools) are described in this appendix. Some of the commands described here have not been used in this book because this book is an introductory text designed to initiate readers into the basic methods of using AutoCAD 2017. It is hoped the list will encourage readers to experiment with those tools not described in the book. The abbreviations, for tools that have them, are included in brackets after the tool name. Tool names can be *entered* at the keyboard in upper or lower case.

A list of 2D commands is followed by a list of 3D commands. Internet commands are described at the end of this list. It must be remembered that not all of the tools available in AutoCAD 2017 are shown here.

2D COMMANDS

About: Brings the **About AutoCAD** bitmap on screen

Adcenter (dc): Brings the **DesignCenter** palette on screen

Align (al): Aligns objects between chosen points

Appload: Brings the **Load/Unload Applications** dialog to screen

Arc (a): Creates an arc

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

Copytolayer: 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 and entity into equal parts

Donut (do): Creates a donut

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

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

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

Dxfin: 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

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

Convtosurface: 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

Freepoint: 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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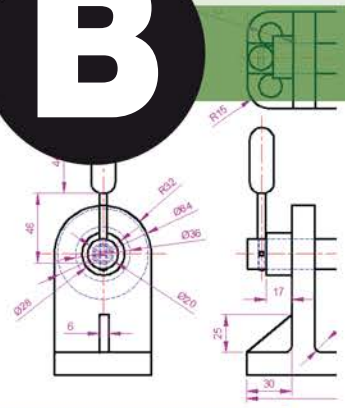
APPENDIX B



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:

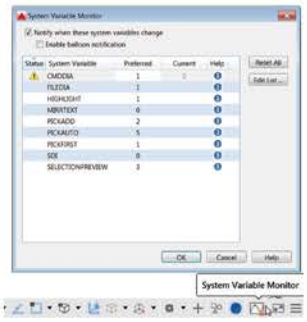
SETVAR Enter variable name or ?: *enter* **?** *right-click*
Enter variable(s) to list <*>: *enter* ***** *right-click*
Press Enter to continue: *enter*

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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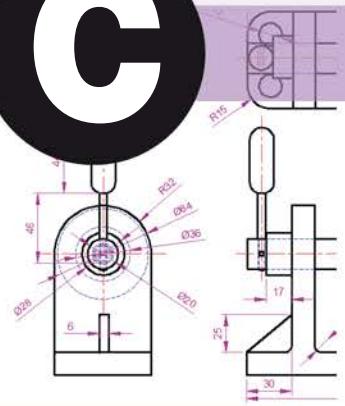
APPENDIX C

3D VIEWS



INTRODUCTION

There are a number of methods of setting the positions of 3D views, some of which have not been shown in the contents of this book. When setting a 3D view, any of the methods shown in this appendix can be used.

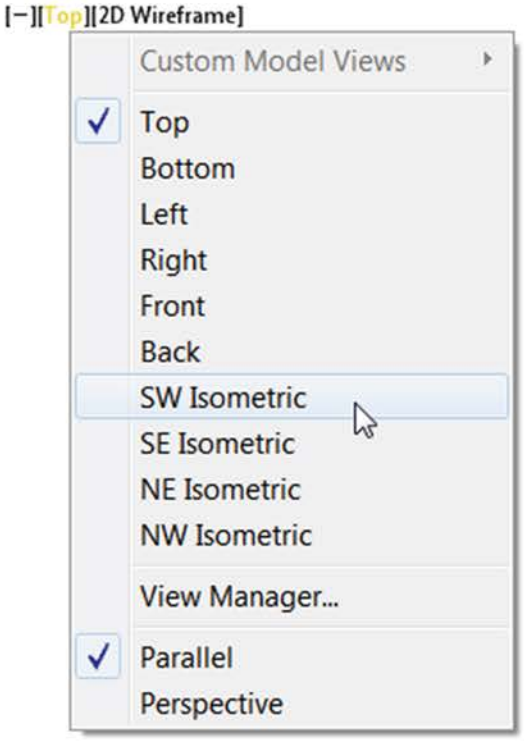


Fig. C.1 The **Views** drop-down menu in the viewport controls

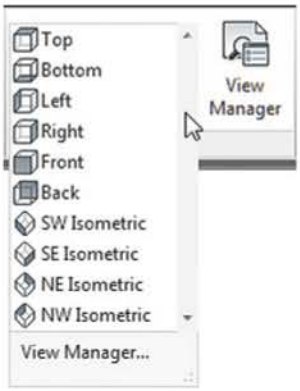


Fig. C.2 The **Visualize/Views** panel drop-down menu

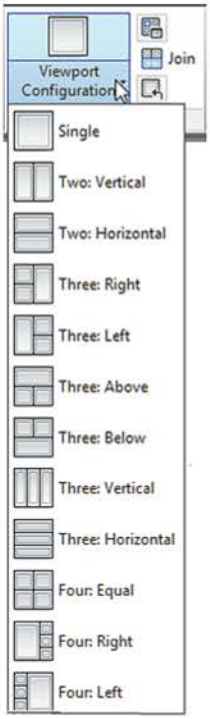


Fig. C.3 The **View port Configuration** drop-down from the **Visualize/Model Viewports** panel

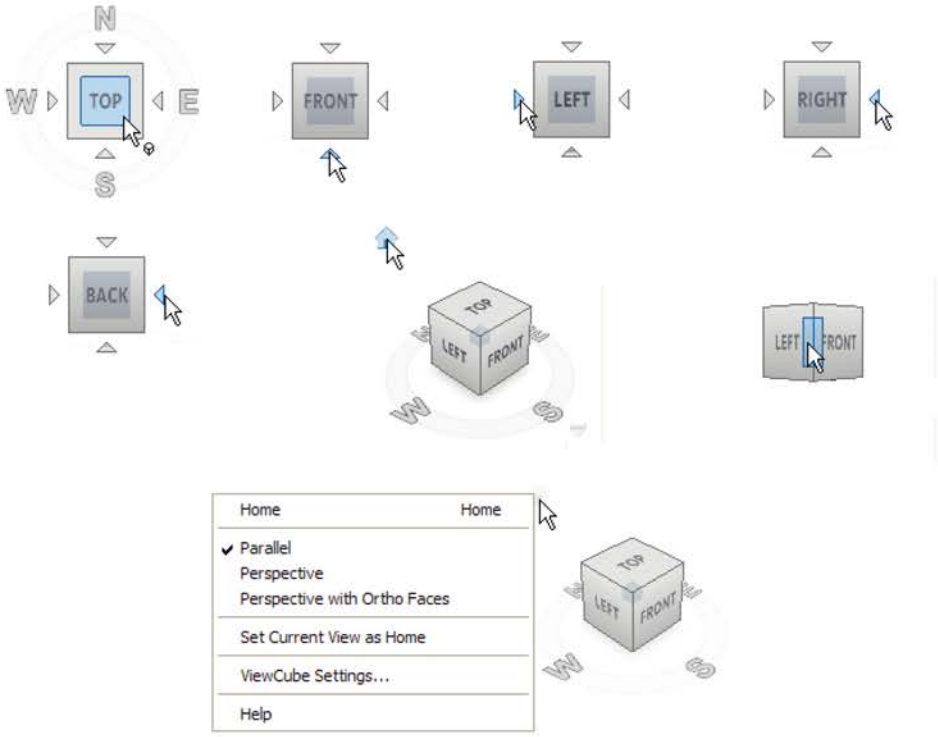


Fig. C.4 Some settings of the **ViewCube**

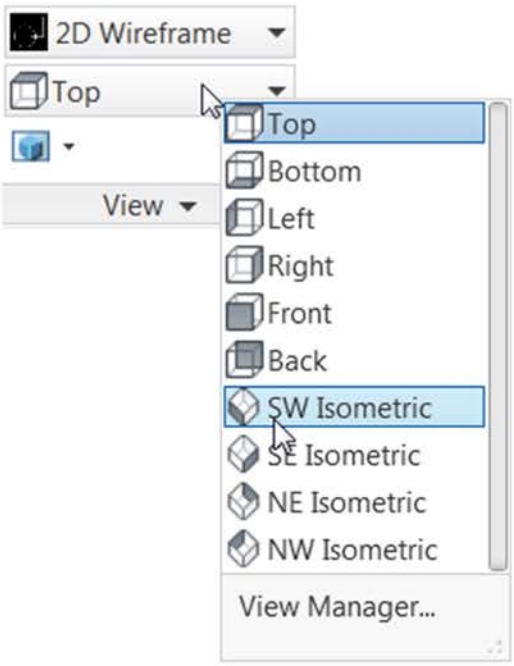


Fig. C.5 The **Home/View** panel drop-down in the **3D Modelling Workspace**

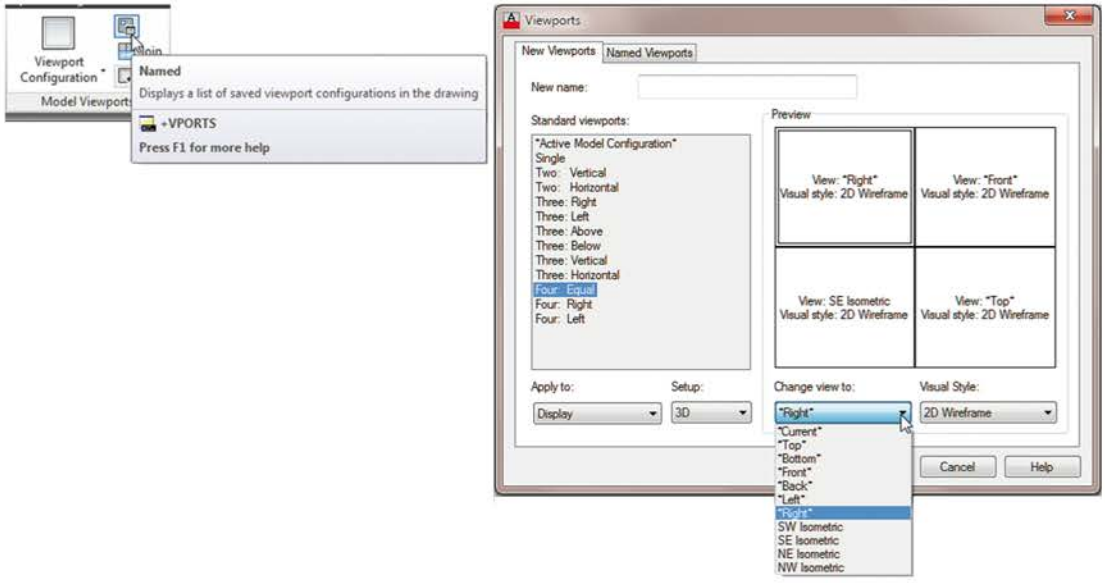


Fig. C.6 Selecting views from the **Visualize/Model Viewports** panel

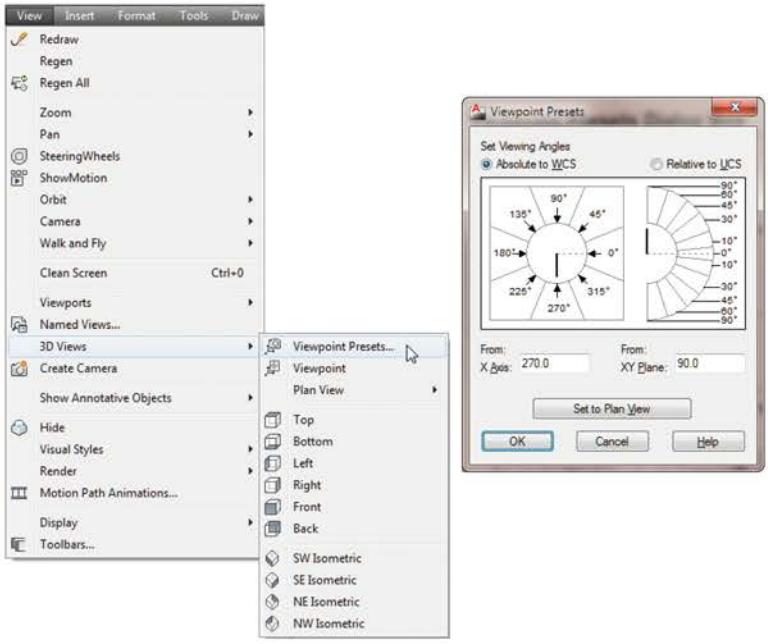


Fig. C.7 The **Viewpoint Presets** from the **View** drop-down menu

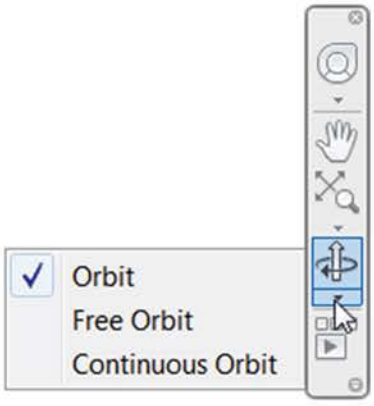
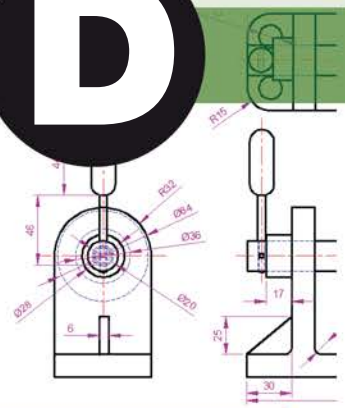


Fig. C.8 Selecting the 3D Orbit tool from the **Navigation** bar

APPENDIX D

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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