UNIT-III

Autodesk 3ds Max 2021 software is supported on the following 64-bit operating systems and at a minimum, requires a system with the following 64-bit hardware:

Software	
Operating System	64-bit Microsoft® Windows® 10. See Autodesk's Product Support Lifecycle for support information.
Browser	Autodesk recommends the latest version of the following web browsers for access to online supplemental content: • Microsoft® Edge • Google Chrome™ • Microsoft® Internet Explorer® • Mozilla® Firefox®

Hardware	
CPU	64-bit Intel® or AMD® multi-core processor with SSE4.2 instruction set
Graphics Hardware	Refer to 3ds Max Certified Hardware for a detailed list of recommended systems and graphics cards
RAM	4 GB of RAM minimum (8 GB or more recommended)
Disk Space	9 GB of free disk space for install
Pointing Device	Three-button mouse

LIVING IN A 3D WORLD, BUILDING VERTICAL EDGES AND FACES

What Are Three Dimensional Shapes?

In geometry, a three dimensional shape can be defined as a solid figure or an object or shape that has three dimensions— length, width, and height. Unlike two dimensional shapes, three-dimensional shapes have height, which is the same as thickness or depth. Three dimensional is also written as 3D and hence, these figures are commonly called 3D shapes too. All three dimensional figures occupy space, which is measured in terms of volume.

In 3D shapes, 3D refers to three-dimensionality. Dimensions can usually be thought of as measurements in a direction. Length, width, and depth can be considered dimensions.

History of 3D Shapes

All 3D shapes have three measurements: length, width, and height. Shapes look different from different directions. All 2D shapes are only measured by their length and width. Aristotle said that 2D shapes are lines and not figures or bodies. They are always described as extensions of lines or areas bounded by lines. Conversely, 3D shapes have volume.

By convention, the first three dimensions are represented as spatial dimensions x-y-z. Width, height, and depth are their respective names.

Examples of Three Dimensional Shapes

A cube, rectangular prism, sphere, cone, and cylinder are the basic three dimensional figures we see around us.

Cube   Rectangular prism   Sphere   Cone   cylinder
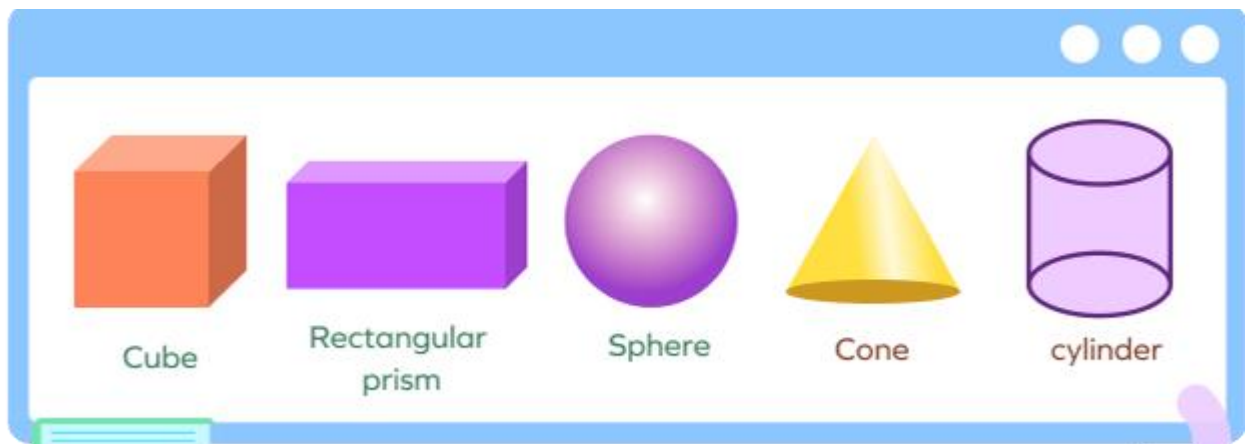
Real-life Examples of Three Dimensional Shapes

3D shapes can be seen all around us. We can see a cube in a Rubik's Cube and a die, a rectangular prism in a book and a box, a sphere in a globe and a ball, a cone in a carrot and an ice cream cone, and a cylinder in a bucket and a barrel around us.

Some real-life examples of 3D shapes are listed below:

1. Cone: Traffic cones and birthday caps are cone-shaped.
2. Triangular prism: A tent is the shape of a triangular prism.
3. Square pyramid: The pyramid of Giza in Egypt is the shape of a square pyramid.

4. Rectangular prism: Boxes such as shoe boxes and cereal boxes are shaped like rectangular prisms.

Cube		
Rectangular prism		
Sphere		
Cone		
Cylinder		

Attributes of Three Dimensional Shapes

There are three attributes of a three dimensional figure: face, edge, and vertex. Let's understand three dimensional shapes and their properties in detail.
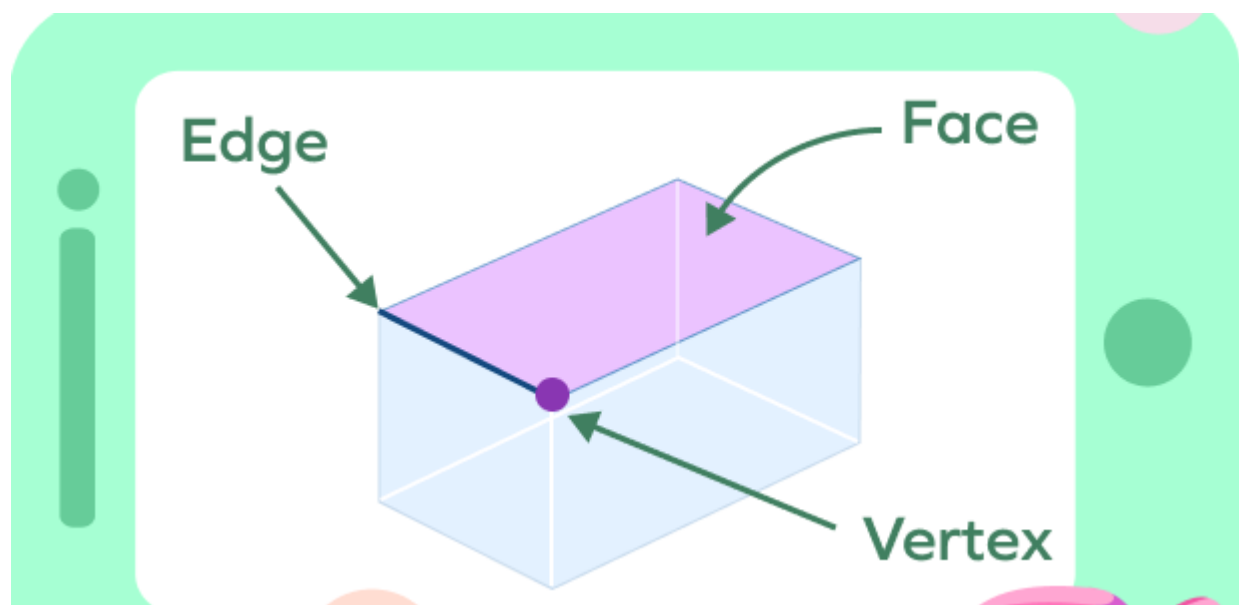
Face: Each single surface, flat or curved, of the 3D figure is called its face.

Edge: The line, where two faces of the 3D figures meet, is called its edge.

Vertex: Each corner, where three faces of 3D figures meet, is called its vertex. Vertices are the plural of the vertex.

List of Three Dimensional Shapes

Here's a list of the names of three dimensional shapes with their pictures, and attributes.

Sphere

All the points on a sphere are at the same distance from its center. The Earth is like that in some ways, except for one: when you look at it from far away, it looks like a sphere, but when you look at it from up close, it is not truly round. A sphere has several characteristics:

- It is perfectly symmetrical and shaped just like a ball.
- It also has length besides radius, diameter, circumference, volume, and area.
- The distance from the center to every point on the surface of a sphere is equal.
- No edges or vertices are found on its one face.
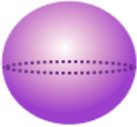- Since it does not have a flat face, it is not a polyhedron.

Cube and Cuboid

A cube and a cuboid are both big blocks. The difference between them is that a cube has square faces, while a cuboid has rectangular faces.
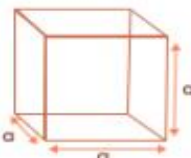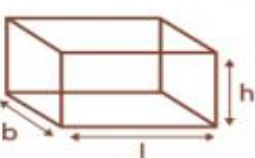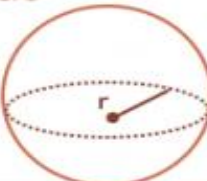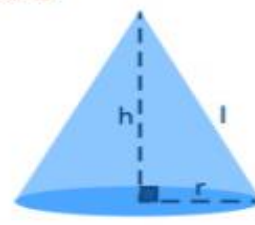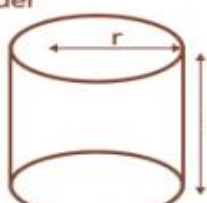
Cylinder

A cylinder has two circular faces on both its ends and one curved surface along its length. It has height and radius. A cylinder's height is perpendicular to its surface, from top to bottom. The following are some fundamental characteristics of cylinders:

- The face of a cylinder is curved.
- From the bottom to the top, its shape remains the same.
- Two identical ends shape the object's three-dimensional form. The ends can be round or oval.
- A right cylinder has the centers of its circular bases along the same line, while an oblique cylinder has the centers of its bases along different lines.

Name of 3-D shape:	Picture of 3-D shape:	Attributes:
Cube		Faces : 6 Edges :12 Vertices : 8
Rectangular Prism or Cuboid		Faces : 6 Edges : 12 Vertices : 8
Sphere		Curved Face : 1 Edges : 0 Vertices : 0
Cone		Flat Face : 1 , Curved Face : 1 Edges : 1 Vertices : 1
Cylinder		Flat Face : 2 , Curved Face : 1 Edge : 2 Vertices : 0
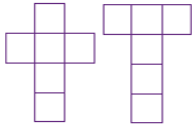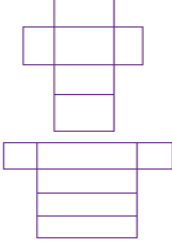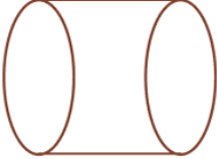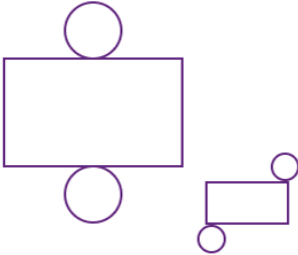
Formula of Three Dimensional Shapes

Shape	Volume	Surface Area
Cube	Volume = a^3	Surface Area = $6a^2$
Rectangular Prism or Cuboid	Volume = $l \times b \times h$	Surface area = $2(l \times b + b \times h + l \times h)$
Sphere	Volume = $\dfrac{4}{3}\pi r^3$	Curved surface area = $4\pi r^2$
Cone	Volume = $\dfrac{1}{3}\pi r^2 h$	Curved surface area = $\pi r l$ Total surface area = $\pi r l + \pi r^2 = \pi r(l+r)$ $\left(l = \sqrt{h^2 + r^2}\right)$
Cylinder	Volume = $\pi r^2 h$	Curved surface area = $2\pi r h$ Total Surface area $= 2\pi r h + 2\pi r^2$ $= 2\pi r(h+r)$

Net of Three Dimensional Shapes

A net is a pattern made when the surface of a 3D figure is laid out flat, showing each face of the figure.

3D figures can have more than one net pattern. A few 3D shapes names and their nets are shown below:

Shape	Net
Cube	
Rectangular Prism or Cuboid	
Cone	
Cylinder	

All three dimensional shapes are made up of two dimensional shapes.

Difference between 2D Shapes and 3D Shapes

Let's differentiate between 2D and 3D shapes by understanding two dimensional and three dimensional shapes and their properties.

Difference between 2-D Shapes and 3-D Shapes

2-D Shape	3-D Shape
It is a flat plane figure.	It is a solid figure.
It has two dimensions : length and width	It has three dimensions : length, width, and height
It does not have any thickness.	It has thickness or depth.
Example: Triangle, Square, Rectangle, Circle.	Example: Cube, Cuboid, Cone, Sphere.

Solved Examples

Example 1: Which of the following is a 3D shape?

Cone Square Sphere Cuboid Cylinder Parallelogram

Solution:

Cone Sphere Cuboid Cylinder

Example 2: State whether the following are *true* or *false*.

1. A three-dimensional shape has 3 dimensions.
2. Three-dimensional shapes are also called flat shapes.
3. Three-dimensional shapes occupy space.
4. All three-dimensional shapes have flat faces.

Solution:

1. True
2. False. Three-dimensional shapes are also called solid shapes.
3. True
4. False. Sphere is a three-dimensional shape with no flat face.

Example 3: Complete the table with attributes of the 3D shapes listed.

Shape	Number of edges	Number of vertices	Number of faces
Cube			
Cylinder			
Sphere			
Cuboid			

Solution:

Shape	Number of edges	Number of vertices	Number of faces
Cube	12	8	6
Cylinder	2	0	3
Sphere	0	0	1
Cuboid	12	8	6

Example 4: Match the object with its shape.

(a) Shoebox	(i) Sphere
(b) Football	(ii) Cone
(c) Tin of tuna	(iii) Cuboid
(d) Carrot	(iv) Cylinder

Solution:

1. – (iii)
2. – (i)
3. – (iv)
4. – (ii)

Example 5: Calculate the surface area of a cuboid with a width of 4 units, length of 3 units, and height of 5 units.

Solution:

Given, the cuboid has three units of length, four units of width, and five units of height.

Surface area of the cuboid =2×(lw+wh+lh) square units

=2×(lw+wh+lh)

=2[(3×4)+(4×5)+(3×5)]

=2(12+20+15)

=2(47)

=94 square units

Therefore, the surface area of the given cuboid is 94 square units.

Example 6: Jane likes to drink milk from a cylinder-shaped glass. Her glass has 15 units of height and 3 units of base radius. How much milk can she fill in the glass?

Solution:

Given that the height of the glass is 15 units, and the radius of the base is 3 units.

Using the formula for the volume of a cylinder, we can find the volume of the glass.

The volume of the glass, $V = \pi r^2 h$

$= \pi (3)^2 (15)$

$= 135\pi$

$= 424.11 \text{in}^2$

Therefore, Jane can fill approximately 424 cubic units of milk in her glass.

3D animation refers to the process of taking digital objects and making them come to life by creating the illusion that they're moving through a three-dimensional space. These computer-generated objects appear on a two-dimensional screen, but they're crafted to mimic the principles of a 3D world.

Ways to use 3D animation

3D animation first got its start in gaming, TV shows, and movies. However, it's become widely used beyond these contexts. From corporate ad campaigns to architectural modeling and medical research, 3D animation is used across many industries and for diverse purposes. Here's an overview of common uses of 3D animation today.

Television and movies

3D animation is often used for character animation in TV and movies. The technique can make characters seem more lifelike, enhancing the emotional connection viewers establish with them. A 3D animated character is more vivid and engaging, almost like playing with a toy.

Gaming

3D animation can also give a more lifelike feeling to video games, intensifying the action for the player. When you're battling an enemy or racing through an obstacle course, having the 3D sensation can make for a far more thrilling experience. 3D animation can also be used with virtual reality and augmented reality special effects, giving the player the sense that they're inside the world in real-time.

Company presentations

The days of boring PowerPoint presentations are long gone. Presentations with 3D animated features help draw the audience in and command their attention for the entirety of a presentation.

Marketing

3D animation can also prove valuable in marketing. For example, a marketer might use this technique to show off all the product's features as they would appear in real life. Audiences can get a better sense of what the goods look like. Brands can also use 3D animation to showcase products through tutorials or demos.

Architecture and design

3D animation is also handy for creating life-like renderings of houses and buildings before they're constructed. Combined with VR and AR tools, architects can even step inside and walk through their designs. This is also useful for interior decorating, letting designers get a concrete idea of what a room will look like. These 3D rendering examples rounded up by LCP360 show what this technology can accomplish.

Prototyping

3D animation can also be combined with another cutting-edge tool, 3D printing, to create product prototypes at a low cost. From engineering firms to medical technology companies, businesses can save money on raw materials as well as time and manpower by visualizing and crafting a low-cost prototype. They can then tweak their goods based on the prototype before developing a finalized product.

Medicine

Medical professionals can use 3D animation for teaching, to show detailed imagery of the human body, and even digitally demonstrate medical techniques. For areas that are hard to experiment in, like surgery, this can be invaluable. Medical animation can also be used to communicate with patients—for example, by showing them what to expect from a procedure.

Simulations

Finally, 3D animation can be used in simulations across an array of fields. For example, 3D videos can be used to help enhance employee training. A single 3D animated video can be accessed by workers whenever they need it, minimizing the need for costly and confusing mass training sessions.

3D animation process

3D techniques can take an animated figure that appears on a two-dimensional screen and not only can they make that object look three-dimensional but they can also make it look like it's moving through a three-dimensional space. A skilled animation will have you reaching out and expecting to touch a 3D object, only to face a flat-screen. How is 3D animation created? Here's an overview of how to 3D animate for beginners.

1. Modeling

In the modeling phase, animators create 3D objects that will serve as the basis for animation. This kind of animation is achieved by using a modeling tool. A 3D mesh is made from a simple object, called a primitive, which is then shaped and refined to the desired figure. The 3D models are then given details like color and texture. This is followed by a process known as rigging, which sets up a skeleton for the animation character that will allow it to move.

2. Layout and animation

Only once the above steps are complete will a 3D animator move on to the actual animation process. At this point, they can take a 3D object and make it move. There are different ways to do this, from using keyframes — moving the object on a frame-by-frame basis — to using motion capture data.

3. Rendering

Once the animation is perfected, along with the lighting and camera angles, the animator can move on to rendering. In this process, the graphic images that have been designed are actually created and exported. The final render of the 3D character will be tweaked according to light and shadows, reflections, transparency, and other details.

What are the benefits of 3D animation?

3D animation has shown its utility in an array of contexts, from advertising to medical research, architectural design, and beyond. Why are so many industries embracing this cutting-edge graphic technique? These are some of the distinct benefits offered by 3D animation.

User engagement

By creating more lifelike and interesting imagery, 3D animation can boost user engagement. This applies across various contexts—from video games to marketing and company presentations—by drawing the viewer in and keeping them captivated, and great animation ups the odds that the viewer will stay alert and engaged.

Larger audience attraction

3D animation appeals to a broad range of audiences. It can also be used to target large crowds of people. Placing a 3D animation on a giant screen can be a great way to draw the attention of a big group. For example, a digital billboard with 3D animation can make a big splash in a crowded space.

Communicates effectively

It's possible to create clearer images that provide a real-world impression by using 3D animation. This can enhance communication, eliminating confusion— for example, as to what a product might look like in a 360-degree view. Thanks to its visual impact, 3D animation can also boost emotional connection, further enhancing communication.

Excellent branding tool

3D animation allows businesses to better convey their brand by providing more detailed insights into their products, services, and overall vision. Companies that use this kind of cutting-edge technology can also establish themselves as a more modern and forward-thinking brand in the eyes of consumers.

Introduction:

Third Dimension (3D) computer graphics is '2 dimensional portrayal of the simulated 3D world'. It is the virtual world we see around us.

Use of 3D animation software can be termed as video capturing of the real world which is full of 3D objects and then generating the series of 2D images rapidly to simulate motion in the form of output.

While transferring 2D image in third dimension; a z-coordinate axis has to be added along with the default ones i.e. x-axis and y-axis. In addition to this, we just don't create objects in 3D; but we have to generate the 2D images of the 3D scene which will resemble the 3D objects.

Example: An arrangement of a 3D Coordinate axis.

Image axes

It is not difficult to recognize the above image of three arrows in different directions in space. They are just three lines on a 2d surface formed using a thin cylinder and a cone.
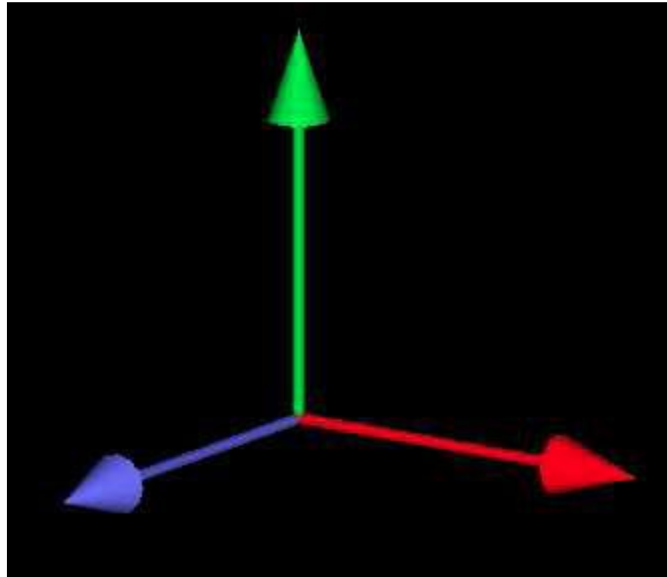
Co-Ordinate System:

Our first job is to get familiarize with 3D coordinate system. In 3D the x and y axis are arranged in alpine called the xy - plane with z-axis perpendicular to it. But, here the z-axis is divided into two sections by the origin (0, 0, 0). One of the divisions displays the positive z-axis which we have to decide.

The traditional coordinate system recognize xy plane with the screen. The x-axis points towards right in positive direction and the y-axis towards positive upwards. The z-axis is perpendicular to the screen which is the positive direction and the negative into the screen. This is a **right-handed coordinate system**.
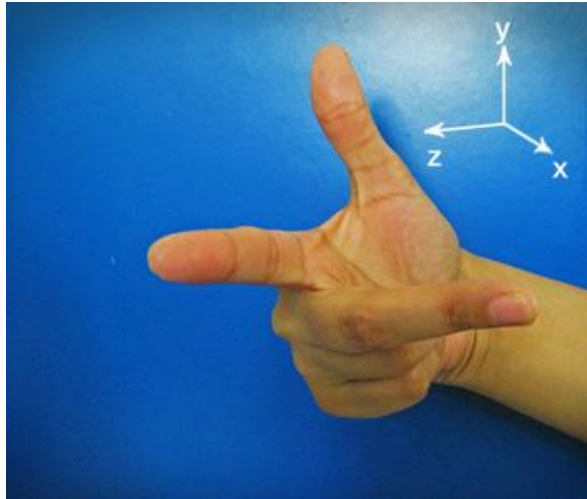
If you curl the fingers of your right hand in the direction from the positive x-axis to the positive y-axis, then your thumb points in the direction of the positive y-axis. This is only the traditional coordinate system. For drawing you use a different coordinate system.

There are quite a few co-ordinating systems and these are associated with chain of transforms to one another. The co-ordinates which we use to create an object in 3D world are called the **Object coordinates**.

In a particular scene; the scale, rotation and position of an object can be altered. The object coordinate system is suitable for the object that is being created. The coordinates which is used to create the complete scene with objects is called the World coordinates. After creating the scene the output can be taken in the form of an image.

Objects of 3D Animation Objects are made up of the following components:
• Vertices
• Edge (Line, Spline or Segment)
• Polygon

Vertices:
These are the point locations in space with no dimensions, but make the complex objects when grouped with other points.
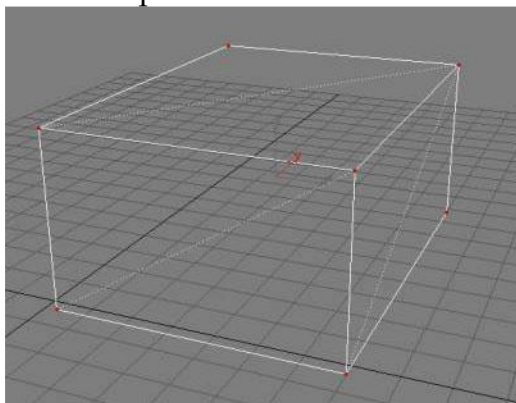
Edge (Line, Spline or Segment): An Edge is the set of two points connected by a 2 dimensional line.
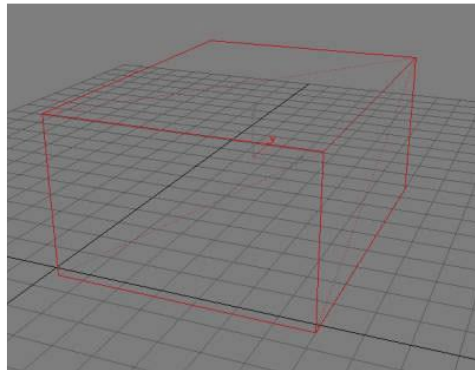
Polygon:
Three or more edges that define a surface is called Polygon.
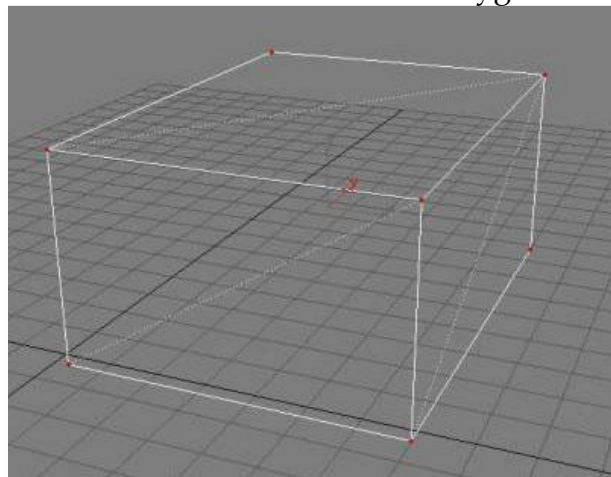
Architectural rendering is the process of creating images of the designs we intend to build. It is the current trend of communication of our design to the client. It is a form of visualization which helps you and as well as your client to best understand the place and the design. Architectural renders become crucial in the architectural profession today. And so, it is vital to take the best renders and present them in the best way. Here are some of the tips for the best and faster rendering in 3ds max and SketchUp.

1. Optimize the models

If you don't see it, hide it. It is the first and the foremost rule for a fast rendering. If an object becomes invisible in a scene, then you may turn off the object or the layers of the object. It will increase the efficiency, and so the rendering time of the image.

Also, you can optimize models based on the distance to the camera and the level of detail required. For example, if there are more cars and they are going to be far away, you can use simpler models and optimize them using optimizing modifiers in 3ds max and SketchUp.

2. Reduce polycount

Photo Source: https://forums.autodesk.com/t5/3ds-max-modeling/reduce-polygon-count-in-a-selected-area-of-a-mesh-model
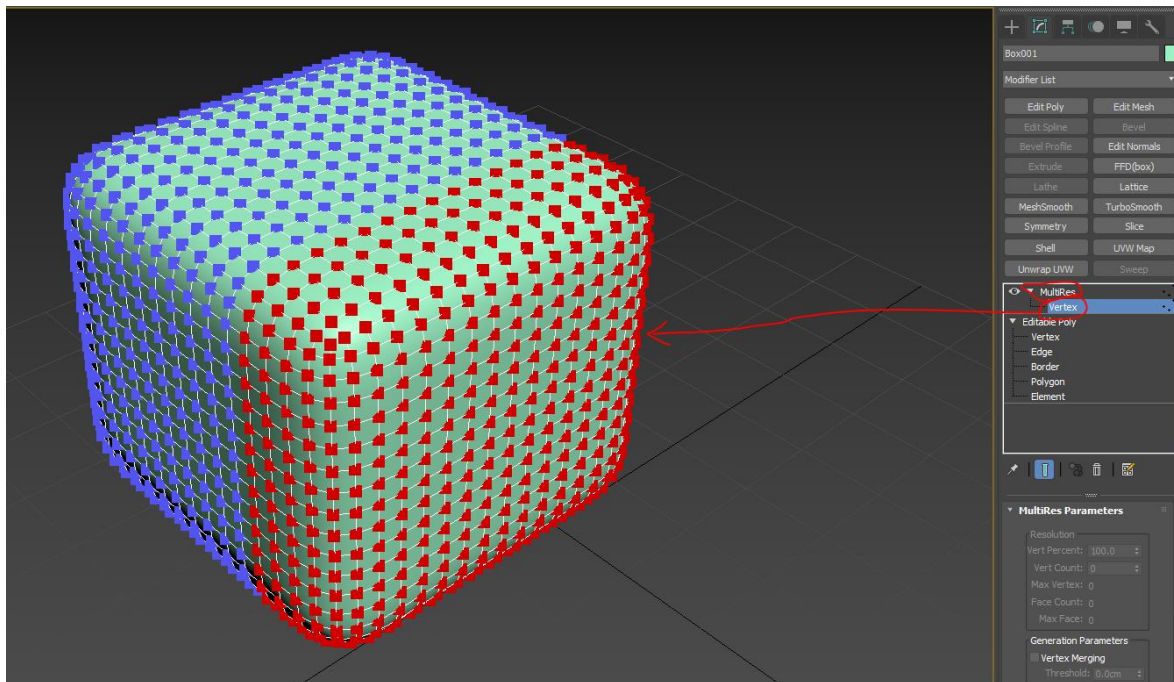
The more polygons you have in your scene, the longer the time it takes to render. Models in 3ds max and Sketchup, with lesser polygons, increase the render time and when the model becomes heavy, slower will be the render speed. Hence, it becomes crucial to use models with lesser polygons, and you can reduce the polygons through Skimp or Transmuter. Consider greater polygon models for objects that are nearer to the camera and lesser polygon models for those which are far away in the scene. Reducing the polycount of the objects would increase the efficiency and the render time by up to 5% for the high poly models.

3. Use proxies
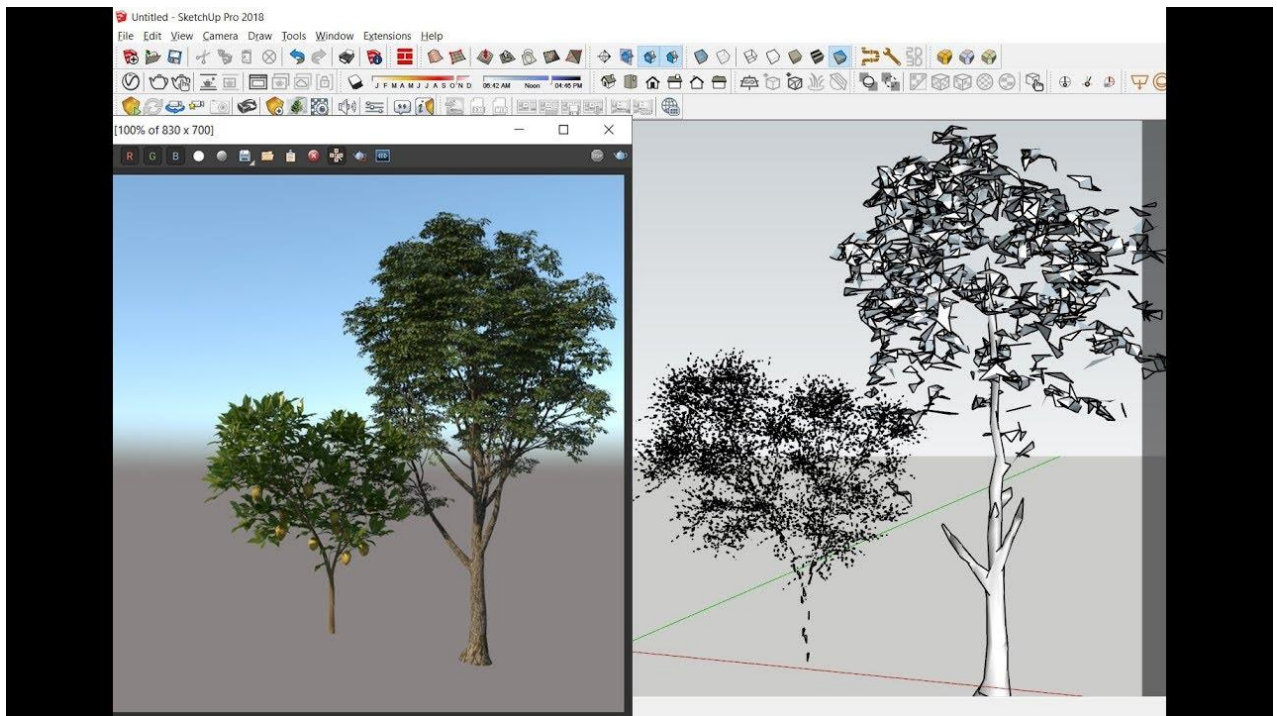
If you cannot avoid so many complex models in your renders, the better option for a faster render would be the use of proxies. With proxies, you can reduce the polycounts of the models and so the render takes place faster in v ray versions of both 3ds max and Sketchup. Turning objects into proxies also reduces the file size of the models and it would be a lot more efficient for bigger projects at a city scale or a neighborhood scale. You shall use the Chaos cosmos library to download proxy models for your render. And do not forget to purge the original objects after turning them into proxies.

4. Select materials properly

Many things, such as wood floors, walls, and cabinets, reflect light. Objects in the foreground with visible reflections and objects which reflect lights will look much better if you make them reflective. But reflective objects which don't have anything specific to reflect will just slow down your rendering processing reflection which doesn't really affect the final image. For example, using white-colored materials in the render obviously increases the render time as white is reflective and so, you can choose off-white material which reduces the render time significantly and retains the result at the same time.

5. Reduce texture resolution

Photo Source: https://garagefarm.net/blog/how-displacement-maps-work-and-how-to-optimize-them-in-v-ray-part-1
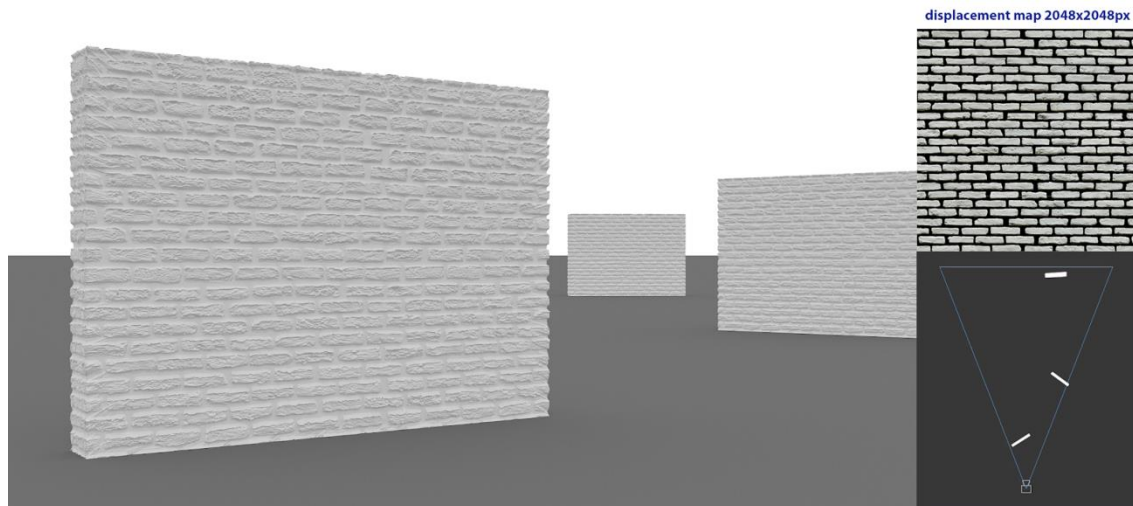
As the model with lesser polycount increases the render speed, is the resolution of the textures. You can use 1k to 2k resolution textures for the models which are far away from the camera and the 4k resolution for the objects that are close enough. The math behind the digital image seems very complex at first glance, but you will come to see it as very plain and logical.

The equation is simple: **Raw image size = Horizontal resolution x Vertical resolution (in pixels) x Number of channels x Color depth (Number of bits per channel)**

6. Minimize using displacement maps

You know that using displacement maps in Sketchup as well as 3ds max makes the renders smooth and beautiful. But it does not mean that you should use displacement maps for all materials, because it slows down your render. Consider using material maps wherever necessary. For example, you can use displacement maps for materials such as brick, whereas for the seamless materials like wood, you can use bump maps, which will be efficient in reducing the render time while retaining the quality.

Photo Source: https://www.yankodesign.com/2019/04/13/creating-realistic-textures-with-displacement-maps-in-keyshot-8/
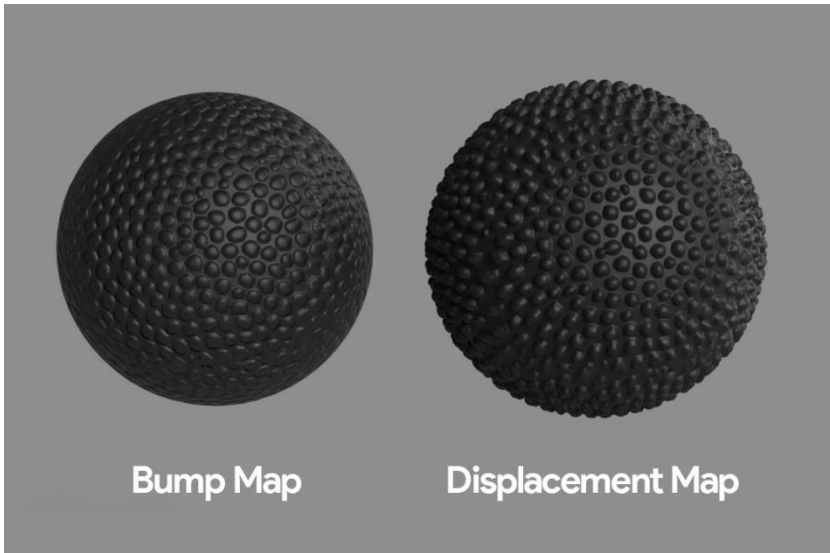
7. Optimize lighting

Photo Source: https://www.youtube.com/watch?v=-IFhiexC-B0
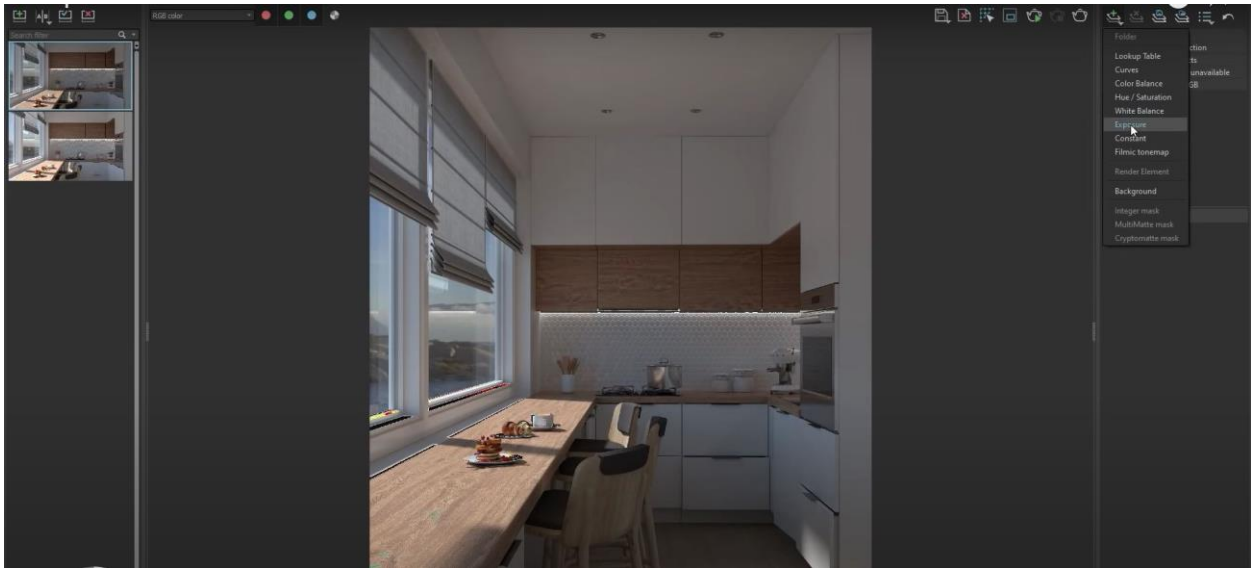
Lighting is the most crucial part of the renders. It is important to know to optimize the lighting of the scene to make the render more efficient. If you want your render to be too bright, then you have to wait for a longer time to get your render. Instead, render a darker image and use exposure to brighten the image, which reduces the time as well as gets back the brightness you need. Also, minimize the light sources in your renders and get rid of the lights which do not affect the image.

The 3ds Max interface comprises controls, status information, and viewports, where you work and view your scene.

One of the most important aspect of using 3ds Max is its versatility. Many program functions are available from multiple interface elements. For example, you can open Track View for animation control from the Main toolbar as well as the Graph Editors menu, but the easiest way to get to a specific object's track in Track View is to right-click the object and then choose Track View Selected from the Quad menu.

You can customize the user interface in a variety of ways: by adding keyboard shortcuts, moving toolbars and command panels around, creating new toolbars and buttons, and even recording scripts into toolbar buttons.

The user interface is high DPI aware, and ensures that you have the optimal experience with your display hardware.

Note: Some images of the user interface (icons, toolbars, etc.) found within 3ds Max Help may be of older versions of the software.
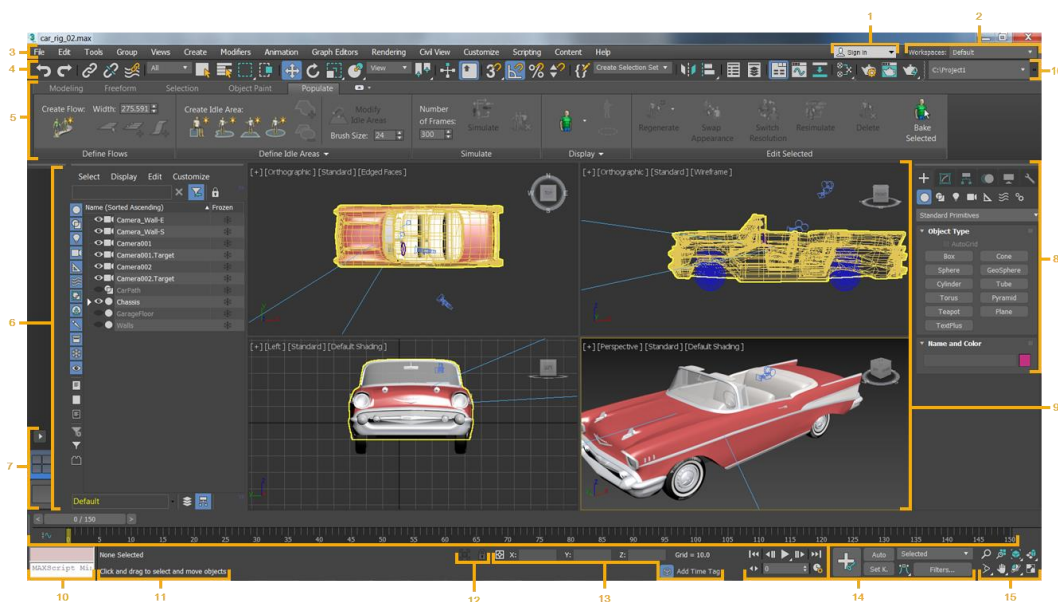
The main toolbar provides quick access to tools and dialogs for many of the most common tasks in 3ds Max.
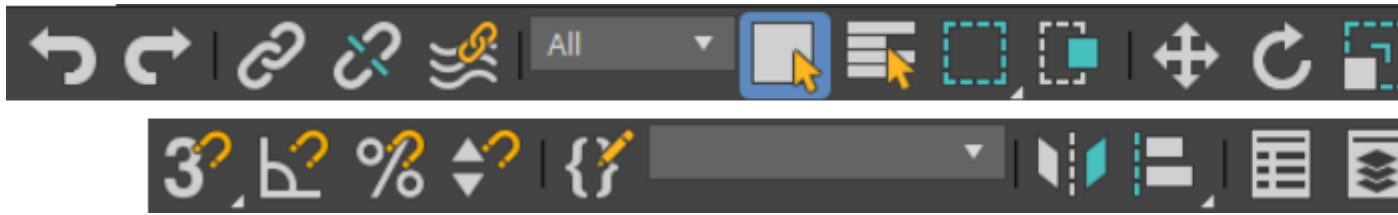
The main toolbar, split in two for this illustration

The Main toolbar is visible by default when first launching 3ds Max. However, if you close it and want to reopen it, you can open it from the Show UI submenu.
The main toolbar can be floated and docked in a different position on the interface by clicking and dragging the handle to the left of the toolbar. You can also make the Main toolbar modular, by selecting the Main Toolbar-Modular workspace from the Workspace Selector. Once modular, you can float and dock groups of tools to your liking.

Tip: If the main toolbar is wider than the 3ds Max window (or even than your computer screen), you can pan it by dragging a gray area of the toolbar, such as below the drop-down lists.

 Undo/Redo

 Select and Link

 Unlink Selection

 Bind to Space Warp

 Selection Filter List

 Select Object

 Select by Name
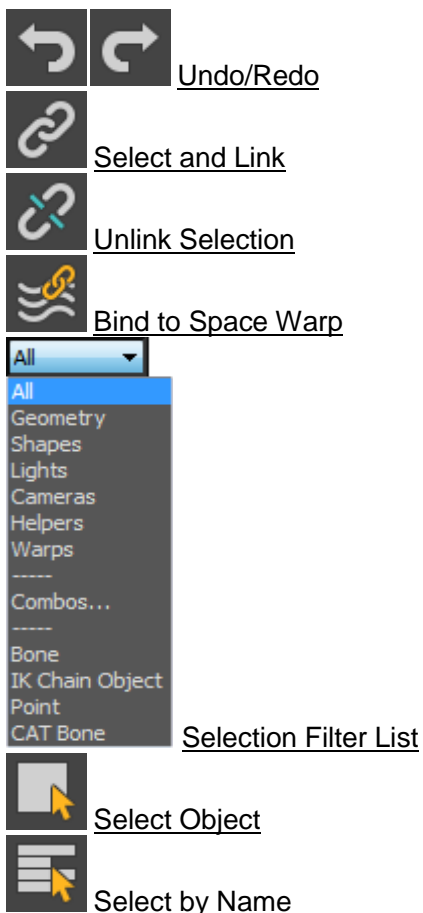
 Selection Region flyout

 Window/Crossing Selection Toggle

 Select and Move

 Select and Rotate

 Select and Scale flyout

Note: Right-clicking the Move, Rotate, or Scale button opens the Transform Type-In dialog.

 Select and Place flyout

Note: Right-clicking the Select And Place or Select And Rotate button opens the Placement Settings dialog, also described in Select and Place.

 Reference Coordinate System

 Use Center flyout

 Select and Manipulate

 Keyboard Shortcut Override Toggle

 2D Snap, 2.5D Snap, 3D Snap flyout

 Angle Snap Toggle

 Percent Snap Toggle

 Spinner Snap Toggle

 Edit Named Selection Sets

 Named Selection Sets

 Mirror

 Align flyout

 Toggle Scene Explorer

 Toggle Layer Explorer

 Toggle Ribbon

 Curve Editor (Open)

 Schematic View (Open)

 Material Editor flyout

 Render Setup

 Rendered Frame Window

 Render flyout

The menu bar is located directly under the main window's title bar. The title of each menu indicates the purpose of the commands on the menu.

Menu systems

3ds Max includes two menu systems. The default menu is the one you see on the initial product launch; it follows standard Windows conventions. Alternatively, you can use the Alt menu, which organizes things slightly different. The Alt menu is part of the Alt Menu and Toolbar, and Modular-mini workspaces.

The optional Alt menu system features improved organization of the default layout, configurable display, detailed tooltips that link to relevant help topics, drag-and-drop menu categories, and the ability to search for menu commands from the keyboard.

To access the Alt menus, open the Workspaces selector and choose one of the workspaces with Alt menus.

Common menu features

The following is a list of functions common to both menu systems:

- To open a menu from the menu bar, click its name, such as Edit or Customize. The menu opens as a list of commands and submenus or panels. To open a submenu, point at its name. To invoke a command, click its name.

Tip: While a menu is open, you can open any other menu simply by pointing to it with the mouse; no further clicking is necessary.

- As an alternative to using a mouse or other pointing device, most menu names includes an underlined character when you hold down the Alt key. Pressing Alt + that character key opens the menu, unless that particular key combination is assigned to a keyboard shortcut.

- Some commands in the open menu have an underlined character as well. While the menu is open, pressing that character key invokes the command. While navigating menus with the keyboard, you can also use the arrow keys to move the highlighting and the Enter key to activate a command.

- An ellipsis (…) after a command name indicates that invoking the command opens a dialog.

- A right-pointing triangle after a command name indicates that pointing at the name will cause a submenu to open.

- If a command has a keyboard shortcut, the menu shows it to the right of the command name.

- If a command has an icon, it displays to the left of the command name.
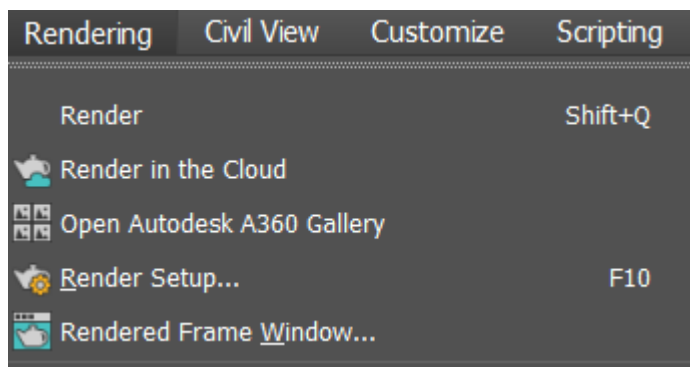
In the Rendering menu, Render Setup has an icon, an ellipsis, and a keyboard shortcut.

- If the 3ds Max window isn't wide enough to display all menu titles, a scroll bar appears just below the menu bar. To access hidden parts of the menu bar, drag the scroll bar or click the arrows at the left and right ends.

- To view a tooltip that provides a brief description of a menu command, hover the mouse pointer over the command briefly. While a tooltip is visible, you can open the help to a topic about the command by pressing function key F1.

- To float a menu panel or submenu, drag its title bar away from the menu in any direction. To dock a floating panel with another, drag it over the other panel. Then, when a blue line appears, indicating where the panel will dock, release the mouse button. Depending on where you position the panel while dragging, you can dock it above or below the host panel.

Note: A floating panel also remains in its original location on the menu. Also, all floating panels are saved upon exiting the program and restored upon restarting.

- o To move a floating panel or panel group, drag the bar at the top of the group.
- o To restore a floating panel group to the menus, click the icon at the right end of the bar at the top of the group.
- o When a command name is too long to fit in the allotted space, the center of the name is elided. The beginning and end of the name are shown, and the middle part is replaced by an ellipsis (...).

Global menu search

To search the entire 3ds Max system (menus and actions) for a particular command, press the X key with no menus open. This opens a small Search All Actions dialog at the mouse cursor location. As you enter the search text, a drop-down list opens from the search dialog showing matching actions. To choose an action, click its name. To clear the search field, click the X icon at the right end of the search box. To exit the search, choose a command, click outside the search interface, or press Esc.
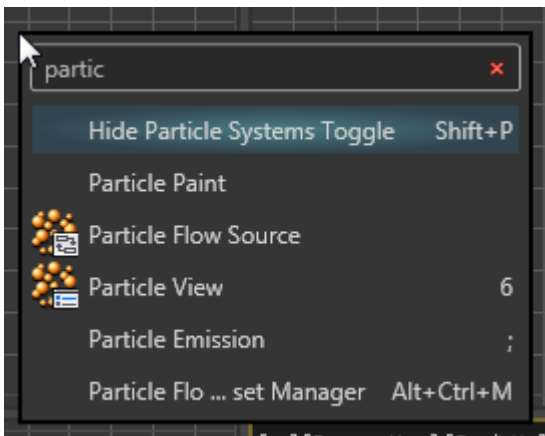
Entering text in the global search field shows all matching actions.

This function is also available as Search 3ds Max Commands on the Help panel of the Help menu in the Alt menu system.

<mark>Command Panel</mark>

The command panel comprises six user-interface panels that give you access to most of the modeling features of 3ds Max, as well as some animation features, display choices, and miscellaneous utilities. Only one panel is visible at a time. To display a different panel, you click its tab at the top of the command panel. These are the panels:

- ⊞ Create panel

  Contains controls for creating objects: geometry, cameras, lights, and so on.

- ⊡ Modify panel

  Contains controls for applying modifiers to objects and editing editable objects such as meshes and patches.

- ⊟ Hierarchy panel

  Contains controls for managing links in a hierarchy, joints, and inverse kinematics.

- ◉ Motion panel

  Contains controls for animation controllers and trajectories.

- ⬚ Display panel

  Contains controls that let you hide and unhide objects, along with other display options

- ⚘ Utilities panel

  Contains miscellaneous utility programs.

By default, the command panel appears at the right of the 3ds Max window. You can "dock" it along other edges of 3ds Max window, or make it a floating panel. See Customizing 3ds Max.

Topics in this section

- **Object Name and Wireframe Color**

  The name and color fields appear at the top of all command panels other than the Create panel. On the Create panel, the fields are contained in a rollout. You can change an object's name or color from any of these locations.

- **Create Panel**

  The Create panel provides the controls for creating objects. This is the first step in building a new scene in 3ds Max.

- **About the Modify Panel**

- **Hierarchy Panel**

  The Hierarchy panel provides access to tools to adjust the hierarchical linkage between objects.

- **Motion Panel**

  The Motion panel provides tools to adjust the motion of the selected object.

- **Display Panel**

  The Display panel provides access to tools that control the display of objects in the scene.

- **Utilities Panel**

  The Utilities panel gives you access to a variety of useful tools.

Configuring Viewports

You can customize your viewport layout, viewport rendering, display performance, as well as how objects are displayed by changing general configuration settings.

Active Viewport Borders

When multiple viewports are visible, one viewport, marked with a highlighted border, is always active. This is where commands and other actions take effect. For example, press Alt+W to toggle between maximizing the active viewport and viewing all available viewports.

Only one viewport at a time can be active. Other viewports are for observation only; unless disabled, they simultaneously track actions taken in the active viewport. When Auto Key or Set Key is on, the active viewport border changes to red.

In general, a viewport becomes active as you work in it. You can move an object in one viewport, and then drag the same object in another viewport to continue the move. To activate a viewport without changing the selection, right-click it. If you left-click a viewport, the viewport is activated and whatever you click is selected, or, if you click an empty area, everything is deselected. You can restore previous selections with Undo (Ctrl+Z).

Switching Viewports When Maximized

When a multi-viewport layout is active and a viewport is maximized (toggle with Alt+W), you can switch to other viewports in the layout by first pressing and holding the Windows key (sometimes labeled "Start") and then pressing and releasing the Shift key. This opens an overlay interface for switching to a different viewport:
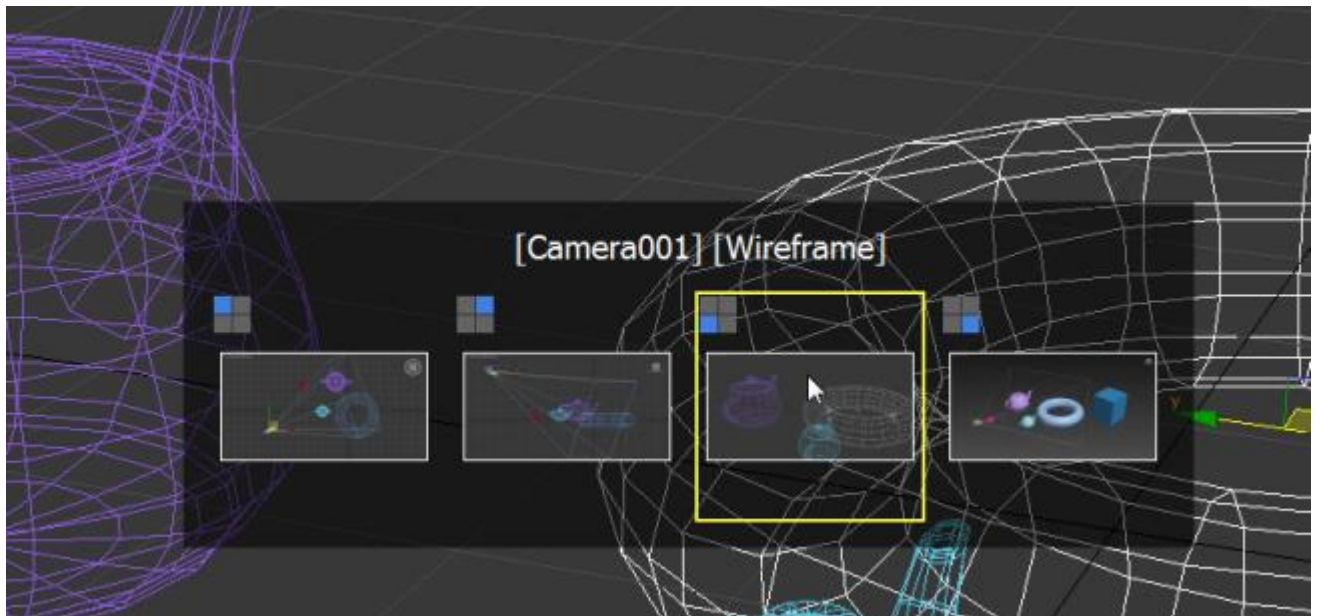
Overlay interface for changing the maximized viewport

At this point, the next available viewport is highlighted. You can change the highlighting by pressing Shift repeatedly; releasing the key at any time maximizes the highlighted viewport. Alternatively, point to the desired viewport and click the mouse button.

Dynamic Resizing of Viewports

You can resize the four viewports so they are of unequal proportions. To do so, drag the intersection of two, three, or four viewports, on the splitter bars. To return to the original layout, right-click an intersection of the dividing lines and choose Reset Layout from the right-click menu.

The new viewport proportions are saved in the scene. However, changing the viewport layout always resets them.

World-Space Tripod
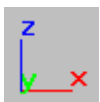
The three-color world-space tripod is visible in the lower-left corner of each viewport. The colors correspond to the three axes of world space: red=X, green=Y, and blue=Z. The axes are labeled in these same colors. The tripod always refers to world space, regardless of the current reference coordinate system.

The world-space tripod is on by default. To turn off this feature, see "To turn off the world-space tripod in all viewports" in the following procedures.

Viewport Tooltips for Object Names

When you're working with objects in a viewport and pause the cursor over any unselected object, a tooltip appears with the name of that object. If you need to select something or link to something, wait until you see the tooltip to be sure you have selected the object you want. These tooltips are disabled when you work in sub-object mode.

Tooltips are on by default. To turn off this feature, see To turn off object name tooltips, below. For more information see Viewport Navigation and The 3ds Max Window.

Procedures

To make a viewport active, do one of the following:

- Click any viewport.

  If you click an object in the viewport, it is selected. If you click a space where there are no objects, any selected objects are deselected.

- Right-click any viewport.

  Right-clicking activates a viewport without changing the selection state of objects. (You can also do this by left-clicking the viewport label.)

- Use Windows/Start + Shift to cycle among the current viewports.

To switch between single and multiple viewports, do one of the following:

- Activate the viewport to minimize or maximize, then, on the keyboard, press Alt+W.

- Click Maximize Viewport Toggle in the lower-right corner of the 3ds Max window.

To change viewports when one is maximized:

1. Press and hold Windows/Start, then press and release Shift.

This opens the viewport-switching interface.

2. If necessary, press Shift repeatedly to highlight the desired viewport, then release Windows/Start to maximize the highlighted viewport.

   Alternatively, simply click the desired viewport.

To resize the viewports:

1. Drag the intersection of two, three, or four viewports to move the horizontal and vertical splitter bars.

2. Move the intersection to any new location.

   If you don't drag a corner, you can move the borders horizontally or vertically only.

3. To reset the viewports, right-click an intersection and choose Reset Layout from the right-click menu.

To change the number of viewports and their arrangement:

1. In any viewport, click or right-click the General viewport label ([+]). 3ds Max opens the General viewport menu. Choose Configure.

2. On the Viewport Configuration dialog, click the Layout tab.

3. Choose a layout from the choices at the top of the dialog.

4. Assign what each viewport will display in the lower window of the dialog by clicking or right-clicking a viewport representation and choosing from the right-click menu.

5. Click OK to make the change.

To turn off the world-space tripod in all viewports:

1. Choose Customize menu ➤ Preferences to display the Preferences dialog.

2. Click the Viewports tab.

3. In the Viewport Parameters group, turn off Display World Axis.

4. Click OK to make the change.

To turn off object-name tooltips:

1. Choose Customize menu ➤ Preferences to display the Preferences dialog.

2. Click the General tab.

3. In the UI Display group, turn off Enable Viewport Tooltips.

4. Click OK to make the change.

Topics in this section

- **Setting Viewport Layout**

  3ds Max defaults to a 2 x 2 arrangement of viewports. Thirteen other layouts are available, but the maximum number of viewports on the screen remains four.

- **Controlling Object Display**

  You use the Display panel, layers, and Scene Explorer to control how objects are displayed in viewports, and to hide or freeze objects. This section covers usage of the Display panel controls.

- **Controlling Viewport Rendering**

  You can choose from multiple options to display your scene. You can display objects as simple boxes, or render them with smooth shading and texture mapping. If you want, you can choose a different display method for each viewport.

- **Controlling Display Performance**

  3ds Max contains controls to help you adjust display performance: the balance between quality and time in displaying objects.

At the right end of the status bar are the buttons that control the display and navigation of the viewports.

Some of the buttons change for camera and light viewports. The Field Of View button changes for Perspective viewports.

The state of the navigation-button flyouts for all viewport types is saved in the [Performance] section of the Initialization file.

<mark>Viewport Navigation Controls</mark>

The navigation controls depend on the active viewport. Perspective, orthographic, camera, and light viewports all have specialized controls. The term "orthographic" refers to User viewports as well as viewports like Top, Front, and so on. The Zoom Extents All flyout and Maximize Viewport toggle, available in all viewports, are included with the perspective and orthographic viewport controls.

Many of these controls are modal, meaning the tool stays active for repeated use. The button highlights when on. To turn it off, press Esc, right-click in a viewport, or choose another tool.

2D Pan Zoom Mode

Controls Available in All Viewports

Zoom Extents All, Zoom Extents All Selected

Maximize Viewport Toggle

Perspective and Orthographic Viewport Controls
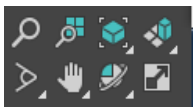
Zoom

Zoom All

Zoom Extents/Zoom Extents Selected

Field-of-View Button (Perspective) or Zoom Region

Pan View

Walk Through

Orbit, Orbit Selected, Orbit Sub-Object

Camera Viewport Controls

Dolly Camera, Target, or Both

Perspective

Roll Camera

Field-of-View Button

Truck Camera

Walk Through

 Orbit/Pan Camera

Light Viewport Controls

 Dolly Light, Target, or Both

 Light Hotspot

 Roll Light

 Light Falloff

 Truck Light

 Orbit/Pan Light

Viewport Label Menus

Depending on the display driver selected, each viewport contains a series of up to five menus in the top left hand corner that control viewport display.

The menus are:

1. General

2. Point-of-View (POV)

3. Shading

4. Per-View Preference (Nitrous only)

5. 2D Pan Zoom (displayed only in 2D Pan Zoom mode)

Click or right-click a menu to view its specific options.

General Viewport Label Menu

Products and versions covered

By: **AUTODESK**
Help

Dec 01 2020 <u>In-product view</u>

Use this menu to adjust general options for viewport display and configuration.

General menu

Note: This menu can be customized. For more information, see the Procedures section below.

Interface

Maximize Viewport / Minimize Viewport

    Choose to maximize or minimize the viewport.

    Keyboard shortcut: Alt+W

Active Viewport

    Choose the active viewport from a submenu list of currently visible viewports.

Disable Viewport

    Prevents the viewport from updating with changes made in other viewports. While the disabled viewport is active, it behaves normally. However, when you change the scene in another viewport, the view in the disabled viewport does not change until you activate the viewport again. Use this control to speed up screen redraws when you are working on complex geometry.

    While a viewport is disabled, the text "<<Disabled>>" appears to the right of the viewport label menus.

    Keyboard shortcut: D

Show Grids

    Toggles display of the home grid. Does not affect other grid display.

    Keyboard shortcut: G

ViewCube

    Displays options for ViewCube display.

SteeringWheels

    Displays options for SteeringWheels display.

xView

Displays the xView submenu. See <u>Using xView</u> for more information.

Create Preview

Displays the Create Preview submenu.

Configure Viewports

Displays the Viewport Configuration dialog.

2D Pan Zoom Mode (Camera, Perspective, and Spotlight views with Nitrous display only)

Choose this to turn on 2D Pan Zoom. While 2D Pan Zoom mode is active, a check mark appears next to this menu item, the ![button] button becomes active, and the 2D Pan Zoom Viewport menu appears to the right of the other viewport label menus.
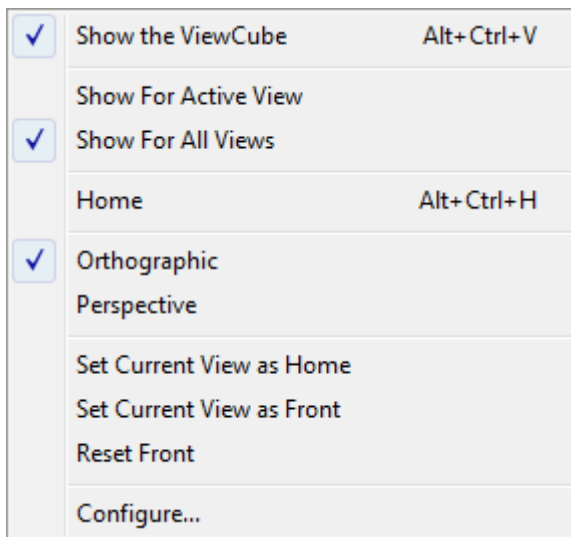
This submenu provides options for displaying and using the ViewCube.

Show the ViewCube

Toggles display of the ViewCube.

Keyboard shortcut: `Alt+Ctrl+V`

Show for Active View

Displays the ViewCube only in the active viewport.

Show for All Views

Displays the ViewCube in all viewports, whether active or not.

Home

Displays the Home view of the model.

Keyboard shortcut: `Alt+Ctrl+H`

Orthographic

Changes the view to an Orthographic view.

Note: Choosing this option also changes the setting of the POV menu.

Perspective

Changes the view to a Perspective view.

Note: Choosing this option also changes the setting of the POV menu.

Set Current View as Home

Defines the current view in this viewport as the Home view for the scene.

Set Current View as Front

Defines the current view as the Front view of the model.

Note: You first need to orient the view using a view tool so that you are looking at what you consider to be the Front of the model with its Top facing upward and then choose Set Current View as Front.

Reset Front

Restores the Front view to the original Front view of the scene.

Configure

Displays the ViewCube panel of the Viewport Configuration dialog.

SteeringWheels submenu

This submenu provides options for displaying and using SteeringWheels.

Toggle SteeringWheels

Toggles SteeringWheels display for this viewport.

Keyboard shortcut: `Shift+W`

View Object Wheel

Displays the View Object wheel.

Tour Building Wheel

Displays the Tour Building wheel.

Full Navigation Wheel

Displays the Full Navigation wheel.

Mini View Object Wheel

Displays the mini version of the View Object wheel.

Mini Tour Building Wheel

Displays the mini version of the Tour Building wheel.

Mini Full Navigation Wheel

Displays the mini version of the Full Navigation wheel.

Configure

Displays the SteeringWheels panel of the Viewport Configuration dialog.

Create Preview submenu
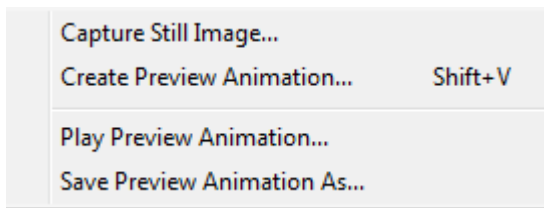
Capture Still Image

Creates a snapshot of the active viewport in a Rendered Frame window , where you can save it as an image file.

Create Preview Animation

Displays the Make Preview dialog, enabling you to create an AVI file or custom file type preview of the animation in the current viewport.

Play Preview Animation

Displays the Windows-standard Media Player to view the current preview animation.

Save Preview Animation As

Saves the *_scene.avi* preview animation under another filename.

Float Viewport submenu

Floating Viewport - 1 (2,3)

> Opens a floating viewport window. The window functions just as the regular viewport and is fully configurable. The viewport is not dockable, but can be moved for use on another monitor if your have multiple monitors. A maximum of three viewports can be floating at the same time.
>
> Note: You cannot float a viewport if you are using the legacy Direct3D display driver.

Procedures

To toggle display of the home grid in the active viewport, do one of the following:

- Click or right-click the General viewport label ([+]), and then click Show Grids.

- Press G.

To customize the General Viewport Label menu:

1. From the Menu bar, choose Customize > Customize User Interface....

2. From the Custom User Interface dialog, click the Menu tab.

3. From the Menu panel, click the drop-down menu on the top right and choose Viewport Menu Label Bar.

4. In the Menu window, add and remove commands as required under Views - General Viewport Label Menu.

Using specialized user interface tools.

The Customize User Interface dialog lets you create an entirely customized user interface, including shortcuts, quad menus, menus, toolbars, and colors. You can also add commands and macro scripts by selecting either a text or icon button to represent the command or script on the toolbar.

- Default menu: Customize menu > Customize User Interface

- Alt menu: Customize menu > Customization > Customize User Interface

Most commands in the 3ds Max interface appear in this dialog as *actions*. An action is simply a command that you can assign to a keyboard shortcut, toolbar, quad menu, or menu. The Keyboard, Toolbars, Quads, and Menus panels of this dialog show lists of actions that you can assign. The lists on the Colors panel contain UI elements instead.

Note: A few actions do not correspond to any elements in the default user interface. For more information, see Additional Keyboard Commands.

These are the file formats:

- **KBDX** Stores custom keyboard-shortcut assignments.

- **MUSX** Stores custom mouse settings.

- **CUIX** Stores custom toolbar settings.

- **MNUX** Stores custom menu settings (both quad menus and pull-down menus).

- **CLRX** Stores custom color settings.

Note: These file formats supersede the formats used in releases prior to 3ds Max 2013.

The Keyboard panel lets you create your own keyboard shortcuts. You can assign shortcuts to most commands available in 3ds Max.

- Default menu: Customize menu > Customize User Interface > Keyboard tab

- Alt menu: Customize menu > Customization > Customize User Interface > Keyboard tab

The same shortcuts can be assigned to multiple commands, as long as they occur in different contexts. For example, in Video Post, the shortcut Ctrl+S is assigned to Add Scene Event; however, in the Main UI, it is assigned to Save File.

When you use a keyboard shortcut, 3ds Max looks for a context-specific shortcut first. If none is found it then looks for the appropriate command in the Main UI shortcuts.

For the context-specific shortcuts to work properly, the Keyboard Shortcut Override toggle must be on (the default). If it is off, only the Main UI keyboard shortcuts are available.
Customized mouse settings use the KBDX file format. The default settings are saved in *defaultui.kbdx.* (Prior to 3ds Max 2013, keyboard files had a file name extension of KBD. This format is now superseded.)

When you choose Maya as the interaction mode, the shortcut settings are updated to behave in a manner compatible with Autodesk Maya. These settings are saved in *defaultui.kbdx.* These settings are saved in *mayamodeui.kbdx,* and choosing Maya mode copies them to *defaultui.kbdx.* Conversely, choosing 3ds Max mode copies the settings from maxmodeui.kbdx to *defaultui.kbdx.*
The first time you start 3ds Max on your system, 3ds Max generates *maxmodeui.kbdx* based on the settings in the *defaultui.kbdx* file that ships with 3ds Max.

Procedures

To create a keyboard shortcut:

1. Choose Customize menu ➤ Customize User Interface ➤ Keyboard panel.

2. Use the Group and Category lists to find the action for which you want to create a shortcut.

3. Click action in the Action list to highlight it.

4. In the Hotkey field, enter the keyboard shortcut you want to assign to the action.

   Note: If the keyboard shortcut you enter is already assigned to an action, that action name appears in the Assigned To field.

5. Click Assign.

Interface
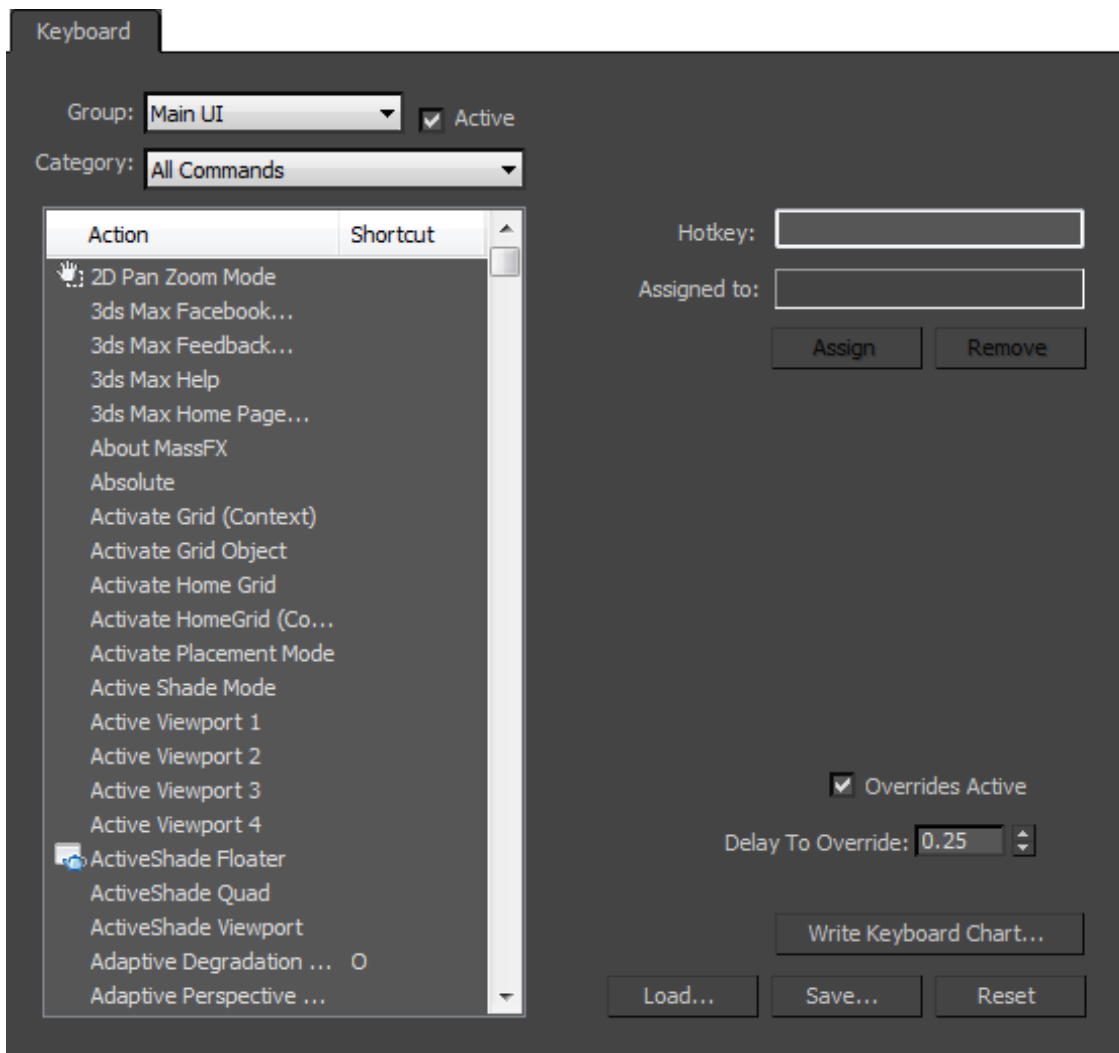
Group drop-down list

Lets you select the context you want to customize, such as Main UI, Track View, Material Editor, and so on.

Active

Toggles availability of context-specific keyboard shortcuts. When on, you can use duplicate shortcut keys between contexts within the overall user interface. For example, A can be the shortcut for Angle Snap toggle within the Main UI, and also a shortcut for Assign Material to Selection when you are working in the Material Editor. When Active is off, the shortcuts defined for the appropriate context are not available. Default=on.

Category drop-down list

Lets you choose among categories of user interface actions for the chosen group.

Action list

Displays all the available actions and shortcuts, if defined, for the chosen group (context) and category.

Hotkey field

Lets you enter a keyboard shortcut. Once the shortcut is entered, the Assign Button is active.

Assigned To

Displays the action a shortcut is assigned to if the shortcut you entered is already assigned.

Assign

Becomes available when you enter a keyboard shortcut in the Hotkey field. When you click Assign, it transfers the shortcut information to the Action list on the left side of the dialog.

Remove

Removes all shortcuts for the selected action in the Action list on the left side of the dialog.

Overrides Active

When on, holding keys for boldface shortcuts in the Edit Poly and Editable Poly groups overrides standard functionality. For example, while editing an Editable Poly object at the Polygon sub-object level, pressing and holding `Shift+Ctrl+B` activates the Bevel tool temporarily, overriding the current operation.

Delay To Override

The delay before which the active keyboard shortcut overrides the current operation (see Overrides Active, preceding).

Write Keyboard Chart

Opens the Save File As dialog, where you can save changes you made to keyboard shortcuts in a TXT file that you can print.

Load

Displays the Load Shortcut File dialog. Allows you to load custom shortcuts from a KBDX file into your 3ds Max interface.

Save

Displays the Save Shortcut File As dialog. Allows you to save any changes you've made to the shortcuts to a KBDX file.

Reset

Restores the shortcuts to the default setup (*defaultui.kbdx*).

Mouse Panel

Products and versions covered

By: **AUTODESK**
Help

Dec 11 2018<u>In-product view</u>

The Mouse panel lets you customize mouse behavior.

- Default menu: Customize menu > Customize User Interface > Mouse tab

- Alt menu: Customize menu > Customization > Customize User Interface > Mouse tab

When you load, save, or reset customized mouse settings, 3ds Max uses the MUSX file format. The default settings are saved in *defaultui.musx.*

When you choose Maya as the interaction mode, the mouse settings are updated to behave in a manner compatible with Autodesk Maya. These settings are saved in *mayamodeui.musx,* and choosing Maya mode copies them to *defaultui.musx.* Conversely, choosing 3ds Max mode copies the settings from *maxmodeui.musx* to *defaultui.musx.*

Important: The mouse settings that affect Zoom and Pan in 3ds Max mode versus Maya mode (the three shortcut settings and the Zoom In direction) also affect the windows in Track View, the Motion Mixer, Motion Flow, the Edit UVWs dialog, and the expanded track bar ("Mini Curve Editor").

Interface
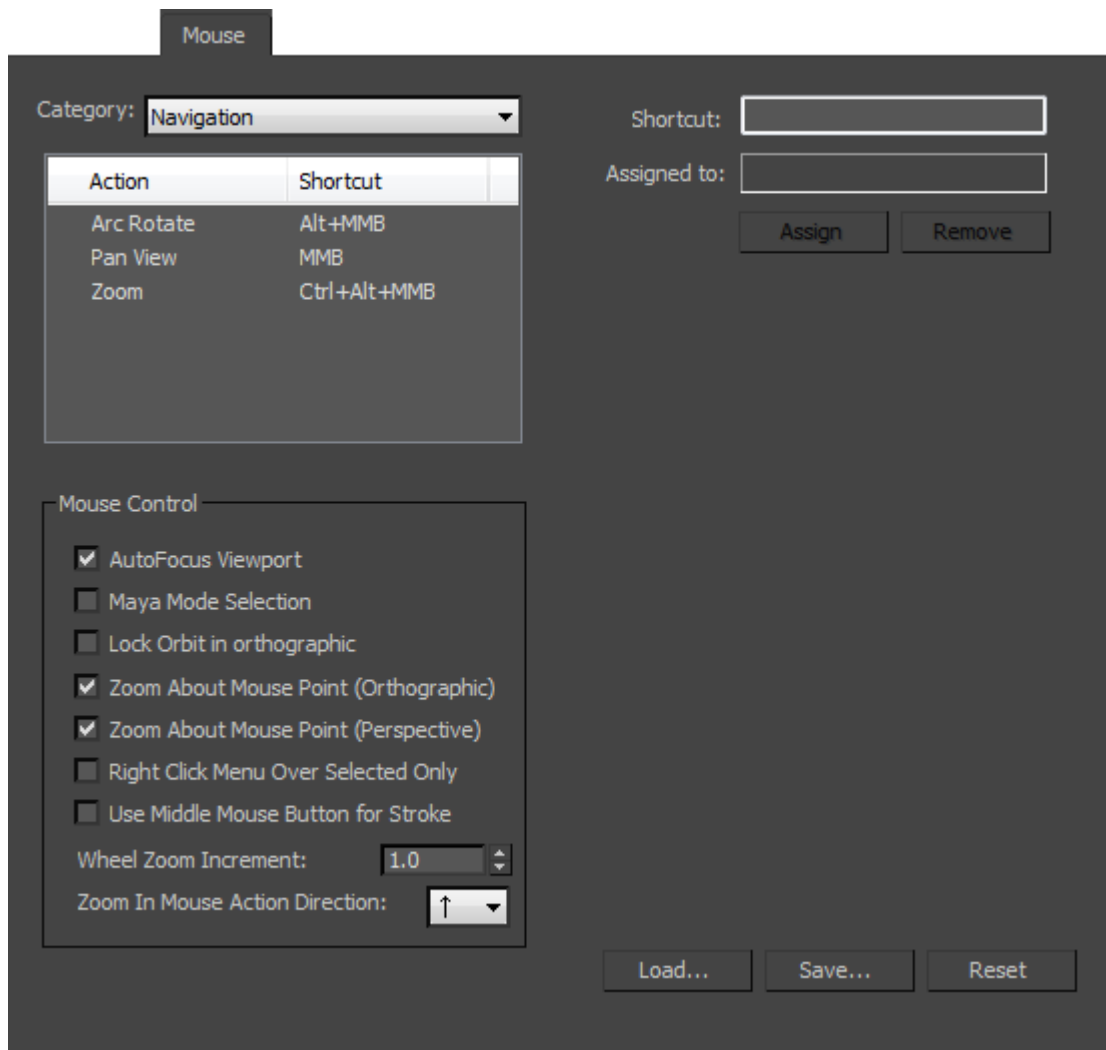
Category drop-down list

Lets you choose among categories of user interface actions for the mouse.

Action list

Displays all the available actions and shortcuts, if defined, for the mouse.

Note: "Arc Rotate" is also known as "Orbit."

Shortcut field

Lets you enter a keyboard shortcut. Once the shortcut is entered, the Assign Button is active.

Assigned To

Displays the action a shortcut is assigned to if the shortcut you entered is already assigned.

Assign

Becomes available when you enter a keyboard shortcut in the Hotkey field. When you click Assign, it transfers the shortcut information to the Action list on the left side of the dialog.

Remove

Removes all shortcuts for the selected action in the Action list on the left side of the dialog.

Mouse Control group

AutoFocus Viewport

When on, pressing any key or mouse button while the mouse is over a viewport makes that viewport active. Default=on.

This option provides compatibility with Autodesk Maya. When Maya is the active interaction mode, pressing spacebar while the mouse is over a viewport makes the viewport active *and* maximizes the viewport.

Maya Mode Selection

When on, Shift+mouse-click either adds to or subtracts from a selection set, while Ctrl+mouse-click subtracts from a selection. Default=off.

This option provides compatibility with Autodesk Maya.

Lock Orbit in orthographic views

When on, Orbit is locked and unavailable in orthographic viewports. Default=off.

This option provides compatibility with Autodesk Maya.

Zoom About Mouse Point (Orthographic)

When on, viewports zoom about the point where you click the mouse. When off, viewports zoom about the center of the view. Applies to orthographic viewports only. Default=on.

Zoom About Mouse Point (Perspective)

When on, viewports zoom about the point where you click the mouse. When off, viewports zoom about the center of the view. Applies to perspective viewports only. Default=on.

Right Click Menu Over Selected Only

Limits the right-click menu display over a selected object. Default=off.

When this option is off, you can right-click anywhere in the viewports to display a menu.

Use Middle Mouse Button for Stroke

When on, assigns command shortcuts to stroke patterns applied by dragging with the middle mouse button. See Strokes. Default=off.

When off, the middle mouse button pans the viewport. To zoom with a three-button mouse, hold down Ctrl+Alt and drag the middle mouse button (does not work for Camera views).

Note: When Maya mode is active, Alt + the middle mouse button pans the viewport and Alt + the right mouse button zooms it. (This Zoom shortcut does not work for Camera views.)

Wheel Zoom Increment

Determines the sensitivity of the zoom when you use the wheel on the mouse. Increase sensitivity up to a maximum value of 100 or reduce it to a minimum of 0.01. Default=1.0.

Zoom In Mouse Action Direction

Use the drop-down list to choose the direction in which dragging the mouse zooms *in* while <u>Zoom</u> is active. Default=up.

This option provides compatibility with Autodesk Maya.

Load

Displays the Load Shortcut File dialog. Allows you to load custom shortcuts from an MUSX file into your 3ds Max interface.

Save

Displays the Save Shortcut File As dialog. Allows you to save any changes you've made to the shortcuts to an MUSX file.

Reset

Restores the shortcuts to the default setup (*defaultui.musx).*

Toolbars Panel

The Toolbars panel lets you edit existing toolbars and create your own custom toolbars. You can add, remove, and edit buttons on existing toolbars, or you can delete the toolbars entirely. You can also create custom toolbars with both 3ds Max commands and scripts.

- Default menu: Customize menu > Customize User Interface > Toolbars tab
- Alt menu: Customize menu > Customization > Customize User Interface > Toolbars tab

Customized toolbar settings use the CUIX file format. (Prior to 3ds Max 2013, keyboard files had a file name extension of CUI. This format is now superseded.)

Procedures

To create and populate a toolbar:

1. Open the Customize User Interface dialog and go to the Toolbars tab.
2. Click New.

   The New Toolbar dialog appears.

3. Enter a name for the new toolbar and click OK.

   The new toolbar appears as a small floater. Like any floating toolbar, you can resize it and change proportions by dragging the corners and edges.

4. Use any of these three methods to add commands to the toolbar:

   - Drag a command to the toolbar from the Customize User Interface dialog ➤ Action list. If the action has a default icon assigned to it (it appears next to the command in the action list), the icon will appear as a button on your toolbar. If no icon is assigned to the command, the name of the command will appear as a button on the toolbar.

- To copy an existing button, `Ctrl`+drag the button from any toolbar onto your toolbar.

- To move an existing button, `Alt`+drag the button from any toolbar onto your toolbar.

5. If you don't want the new toolbar to appear in the interface by default, choose it from the drop-down list on the right side of the Customize User Interface dialog, and then turn on the Hide checkbox. Thereafter you can toggle the custom toolbar by right-clicking a blank area of any toolbar and choosing the toolbar name from the context menu.

To add commands to a toolbar:

1. Open the Customize User Interface dialog and go to the Toolbars tab.

   Alternatively, right-click the label of a toolbar and then choose Customize.

2. If necessary, open the toolbar to customize using either of the following methods:

   - Right-click a blank area of any toolbar and choose the toolbar name from the context menu.

   - Choose the toolbar name from the toolbars drop-down list on the right side of the dialog and then turn off the Hide checkbox.

3. Use any of these three methods to add commands to the toolbar:

   - Drag a command to the toolbar from the Customize User Interface dialog ➤ Action list. If the action has a default icon assigned to it (it appears next to the command in the action list), the icon will appear as a button on your toolbar. If no icon is assigned to the command, the name of the command will appear as a button on the toolbar.

   - To copy an existing button, `Ctrl`+drag the button from any toolbar onto your toolbar.

   - To move an existing button, `Alt`+drag the button from any toolbar onto your toolbar.

To record a script and add it to a toolbar:

   Use this method to record a series of commands into a MAXScript command sequence and then turn the script into a toolbar button. You can then re-invoke that sequence at any time. No scripting knowledge is necessary.

1. Open the Customize User Interface dialog and go to the Toolbars tab.

   Alternatively, right-click the label of a toolbar and then choose Customize.

2. Open a MAXScript Listener window by any of the following methods:

   - Press `F11`.

   - Choose MAXScript menu ➤ MAXScript Listener.

   - Choose   Utilities panel ➤ MAXScript ➤ MAXScript rollout ➤ Open Listener.

   - Click or right-click the POV viewport label, and then from the <u>POV viewport label menu</u>, choose Extended Viewports ➤ MAXScript Listener.

3. Choose MAXScript menu ➤ Macro Recorder, or, from on the Listener dialog, choose MacroRecorder ➤ Enable.

4. Perform the actions you want to record.

   The Macro Recorder records the actions you perform as a script in the upper portion of the Listener dialog (pink background).

5. Highlight the lines you want in the recorded script, and then drag those lines directly onto a toolbar.

Note: Your macro might require some minor editing to remove extraneous steps or to refine the procedure.

You can edit the appearance of the text or icons on your toolbars with <u>Edit Button Appearance,</u> which is available when you right-click the toolbar button.
To add a button to the Main toolbar:

- Drag an action from the Action list and drop it on the list in the Main Toolbar group.

    The toolbar updates to show the new button. If the action you chose doesn't have an associated icon, a generic button appears on the toolbar. See <u>Edit Button Appearance Dialog</u>.

To remove a button from the toolbar:

1. Click an item in the Main toolbar list to highlight it.

2. Click Remove.

    3ds Max removes the button from the list and the Main toolbar.

Interface
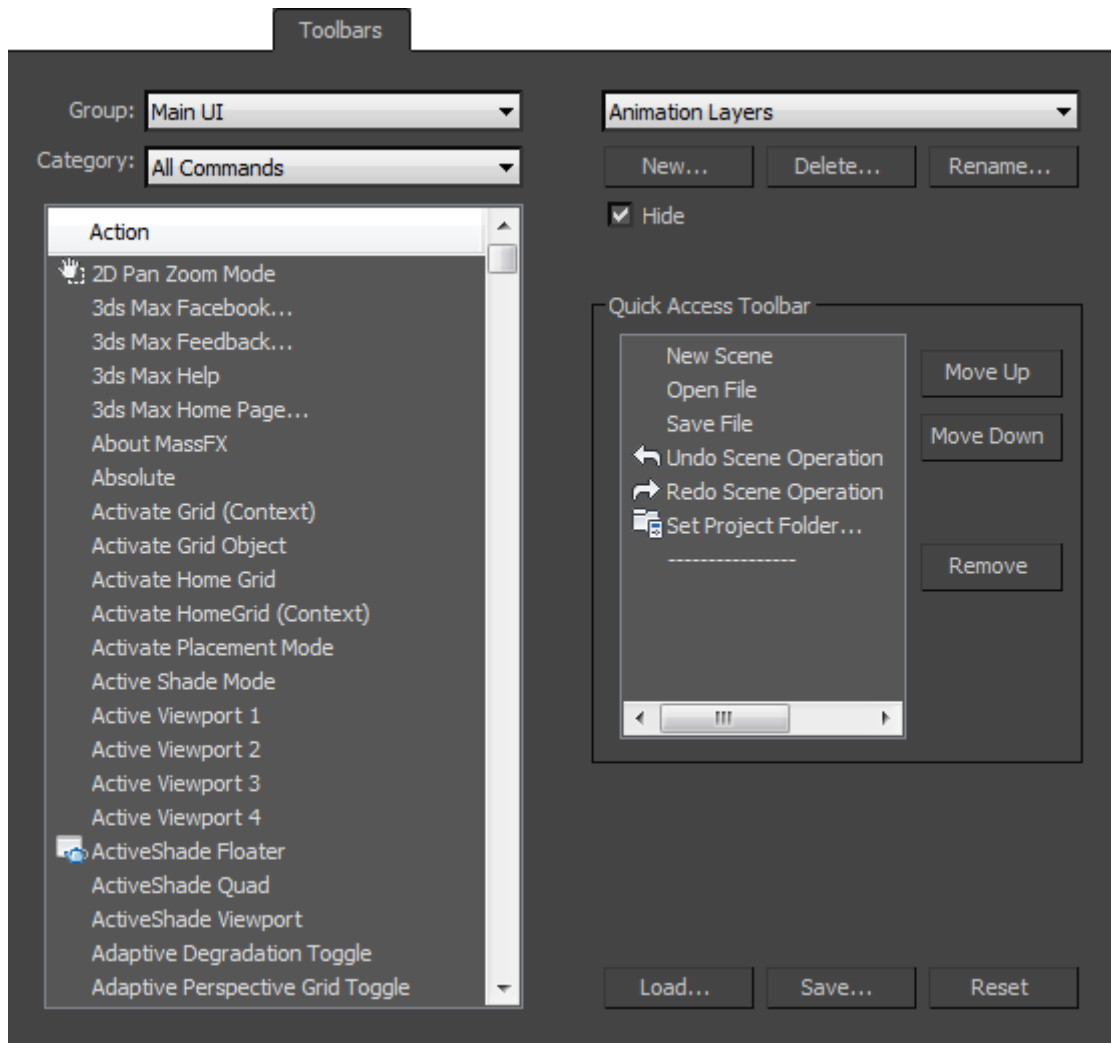
Group drop-down list

Lets you choose the functional context you want to customize. Contexts include Main UI (user interface), Track View, and Material Editor.

Category drop-down list

Lets you choose among categories of user-interface actions for the chosen group.

Action list

Displays all available actions for the chosen group and category.

[toolbars drop-down list]

Lets you choose among existing toolbars (aside from the main toolbar, which is not customizable.

New

Opens the New Toolbar dialog. Enter the name of the toolbar you want to create and click OK. The new toolbar appears as a small floater.

Once you've created a toolbar, there are three ways to add commands:

- Drag actions from the Action Window in the Toolbars panel of the Customize User Interface dialog onto your toolbar.
- Ctrl+drag buttons from any toolbar onto your toolbar. This action creates a copy of the button on your toolbar.
- Alt+drag buttons from any toolbar onto your toolbar. This action moves the button from the original toolbar onto your toolbar.

Delete
Deletes the toolbar item displayed in the Toolbars list.

Rename

Displays the Rename Toolbar dialog. Select a toolbar from the Toolbars list to activate the Rename button. Click Rename, change the name of the toolbar, and click OK. The toolbar name changes in the toolbar floater.

Hide

Toggles 3ds Max window display of the toolbar that is chosen in the toolbars list.

Load

Displays the Load UI File dialog. Allows you to load custom user interface (CUIX) files.

Save

Displays the Save UI File As dialog. Allows you to save any changes to the user interface in a CUIX file.

Reset

Restores the default setup (*defaultUI.cuix).*

The Quads panel lets you customize the quad menus. You can create your own quad menu sets, or you can edit existing sets. In the Quads panel, you can customize menu labels, functionality, layout, and shortcuts. The advanced quad menu options let you modify the color and behavior of the quad menu system. You can also save and load custom menu sets.

- Default menu: Customize menu > Customize User Interface > Quads tab

- Alt menu: Customize menu > Customization > Customize User Interface > Quads tab

Customized quad menu settings use the MNUX file format. (Prior to 3ds Max 2013, menu files had a file name extension of MNU. This format is now superseded.)

Procedures

To create a quad set:

1. Choose Customize menu ➤ Customize User Interface ➤ Quads tab.

2. Click New.

   The New Quad Set dialog appears.

3. Enter the name of the quad set and click OK.

   The new set appears in the Quad set list.

To add a command to a quad set:

1. Choose Customize menu ➤ Customize User Interface ➤ Quads tab.

2. Choose the quad set you want to edit from the upper-right drop-down list.

   If you want to change the name of the quad set, click Rename and enter a new name in the Rename Quad Set dialog.

3. Select the quadrant where you want to place the command.

   You can edit the name of the quadrant by changing the text in the Label area.

4. Choose the appropriate Group and Category from the respective drop-down lists.

5. Choose a command from the action list and drag it into the Quad Menu window.

   Use the same procedure to add menus and separators to your quad set.

To delete a quad set:

   Note: You cannot delete any of the default quad sets.

1. Choose Customize menu ➤ Customize User Interface ➤ Quads tab.

2. Choose the quad set you want to delete from the upper-right drop-down list.

3. Click Delete.

To remove a command from a quad set:

1. Choose Customize menu ➤ Customize User Interface ➤ Quads tab.

2. Choose the quad set you want to edit from the upper-right drop-down list.

3. Choose the command you want to remove.

4. Click the Delete button.

   Use the same procedure to remove menus and separators from your quad set.

To move a command in a quad set:

- Choose the command in the quad set list and drag it to a new position in the list.

Interface
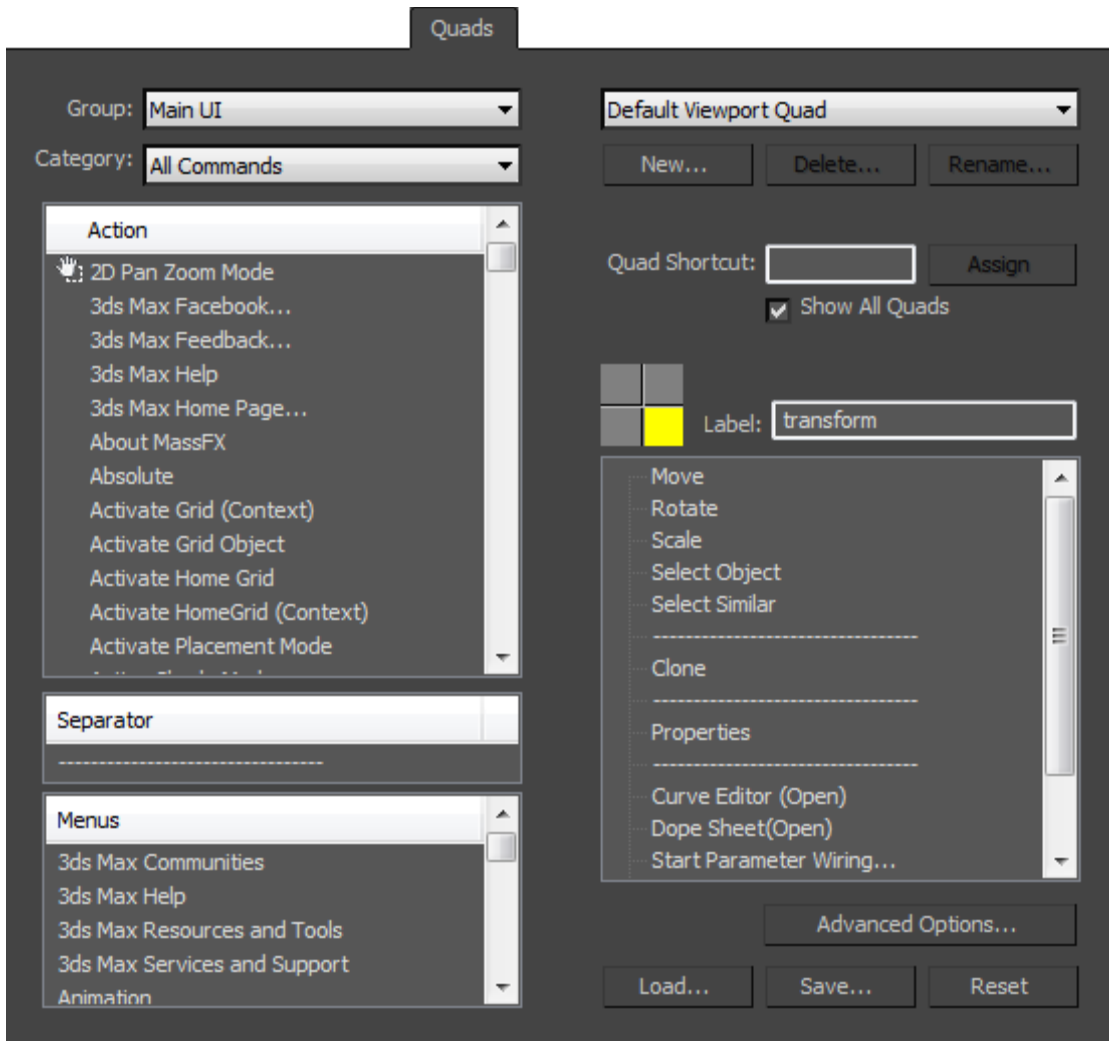
Group drop-down list

Lets you select the context you want to customize, such as Main UI, Track View, Material Editor, and so on.

Category drop-down list

Lets you choose among categories of user interface actions for the chosen context.

Action list

Displays all the available actions for the chosen group and category. To add an action to a specific quad set, select it and drag it to the quad menu window on the right side of this dialog. Right-click an action in this window to edit the macro script that defines the action (if there is one).

Separator list

Displays a separator line that you can use to separate groups of menu items in a quadrant. To add a separator line to a specific quad set, select it and drag it to the quad menu window on the right side of this dialog.

Menus list

Displays the names of all 3ds Max menus. To add a menu to a specific quad set, select it and drag it to the quad menu window on the right side of this dialog. Right-click a menu in this window to delete the menu, rename it, or create a new, empty menu.

[quad set drop-down list]

Displays the available quad sets.

Additional Quad Menus appear in this list. They can be edited, renamed, and reorganized; however, they cannot be deleted.

New

Opens the New Quad Set dialog. Enter the name of the quad set you want to create and click OK. The new quad set appears in the Quad set list.

Delete

Deletes the item displayed in the Quad set list. Available only for user-generated quad sets.

Rename

Opens the Rename Quad Set dialog. To activate the Rename button, choose a quad set from the list. To change the name, click Rename, edit the name of the quad set, and then click OK.

Quad Shortcut

Allows you to define a keyboard shortcut for displaying the quad set. Enter the shortcut and click Assign to make the change.

Show All Quads

When on, the keyboard shortcut shows all four quadrants of the quad menu. When off, the keyboard shortcut shows only one quadrant at a time.

Label

Displays the label for the highlighted quadrant (shown in yellow to the left of the Label).

[quad menu window]

Displays the menu options for the currently selected quad menu and quad set. To add menus and commands, drag options from the Action and Menus windows to this window.

Items included in the quad menu are displayed only when they are available. For example, if your quad menu contains Track View Selected, the command will display only if a selection exists when you open the quad menu. if none of the commands are available when you open the quad menu, the quadrant does not appear.

When you right-click an item in the quad menu window, several actions become available:

- **Delete Menu Item** Removes the highlighted action, separator, or menu from the quad menu.

- **Edit Menu Item Name** Opens the Edit Menu Item Name dialog. To edit the name, the Customize Name checkbox must be on. Enter the desired name in the name text field and click OK. The item name is changed in the quad menu, but not in the quad menu window.

- **Flatten Sub-Menu** Displays contents of the highlighted submenu at the top level of the quad. If you choose this item, the menu name is followed by the string: "[FLAT]".

- **Edit MacroScript** Opens the MacroScript for the highlighted action in a MAXScript editor window.

Advanced Options

Opens the <u>Advanced Quad Menu Options dialog</u>.

Load

Displays the Load Menu File dialog. Allows you to load custom menu (MNUX) files into the 3ds Max interface.

Save

Displays the Save Menu File As dialog. Allows you to save changes to the quad menus in a MNUX file.

Reset

Restores the default setup (*defaultui.mnux)*.

The Menus panel lets you customize the menus in 3ds Max. You can edit existing menus or create your own. You can customize menu labels, functionality, and layout.

- Default menu: Customize menu > Customize User Interface > Menus tab

- Alt menu: Customize menu > Customization > Customize User Interface > Menus tab

Customized menu settings use the MNUX file format. (Prior to 3ds Max 2013, menu files had a file name extension of MNU. This format is now superseded.)

Procedures

To create a menu:

1. Open the Customize User Interface dialog to the Menus panel.
2. Click New.

   The New Menu dialog appears.

3. Enter the name of the menu, and click OK.

   The new menu appears in the menu list.

To add a command to a menu:

1. Open the Customize User Interface dialog to the Menus panel.
2. Choose the menu you want to edit from the drop-down list.

   If you want to change the name of the menu, click Rename, and enter a new name in the Rename Menu dialog.

3. Choose the appropriate Group and Category from the respective drop-down lists.

4. Choose a command from the action list and drag it into the Menu window.

   Use the same procedure to add menus and separators to your menu.

To delete a menu:

1. Open the Customize User Interface dialog to the Menus panel.

2. Choose the menu you want to delete from the drop-down list.

3. Click Delete.

To remove a command from a menu:

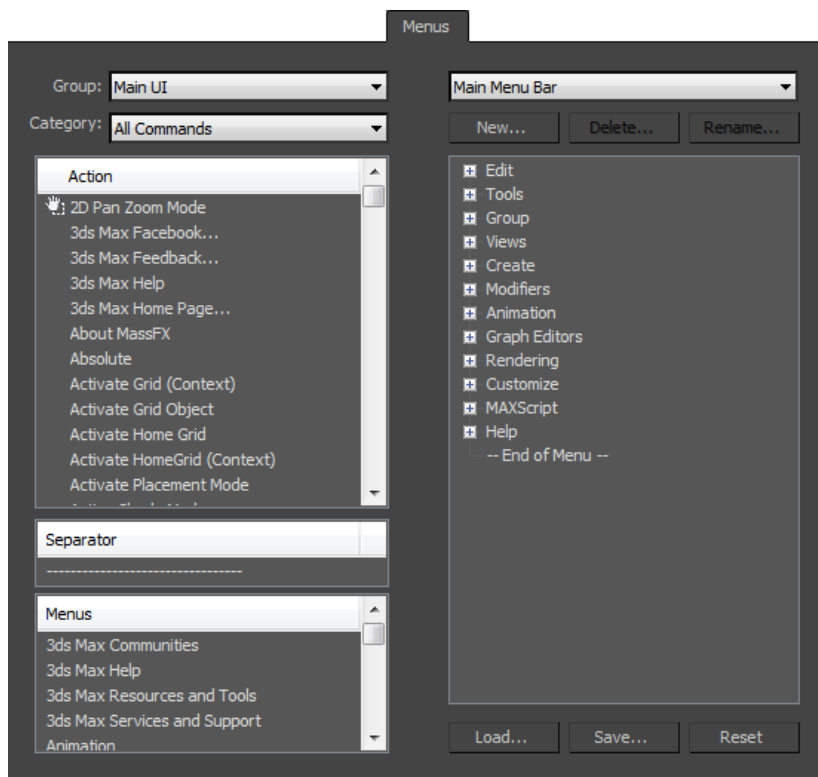1. Open the Customize User Interface dialog to the Menus panel.

2. Choose the menu you want to edit from the drop-down list.

3. Choose the command you want to remove.

4. Press Delete.

   Use the same procedure to remove menus and separators from your menus.

To move a command in a menu:

• Choose the command in the menu window and drag it to a new position in the window.

Interface

Group drop-down list

Lets you select the context you want to customize, such as: Main UI, Track View, Material Editor, and so on.

Category drop-down list

Lets you choose among categories of user interface actions for the chosen context.

Action list

Displays all the available actions for the chosen group and category. To add an action to a specific menu, select it and drag it to the menu window on the right side of this dialog. Right-click an action in this window to edit the macro script that defines this action (if there is one).

Separator list

Displays a separator line that can be used to separate groups of menu items. To add a separator to a specific menu, select it and drag it to the menu window on the right side of this dialog.

Menus list

Displays the names of all menus. To add a menu to another menu (shown in the Menu List), select and drag it to the menu window on the right side of this dialog. Right-click an entry in this list to delete the menu, rename it, or create a new, empty menu.

[menus drop-down list]

Lists all available menus. To edit a menu, choose it from the list; this makes its contents available for editing in the menu window below it (see following).

The default item is Main Menu Bar.

New

Opens the New Menu dialog. Enter the name of the menu you want to create and click OK. The new menu appears in the menu window on the left side of the dialog as well as in the Menu List.

Delete

Deletes the item highlighted in the menu list window below.

Rename

Opens the Edit Menu Item Name dialog. Select an item in the menu list window and click Rename. This dialog lets you specify a custom name to be displayed in the menu. If you precede a letter in the custom name with the "**&**" (ampersand) character, that letter is used as a menu accelerator.

[menu window]

Displays the entries for the menu currently chosen in the menus drop-down list. To add menus and commands (actions), simply select and drag the options from the Action and Menus lists to this window.

Several actions become available when you right-click any item in the menu window:

- **Delete Menu Item** Removes the highlighted action, separator, or menu from the menu.

- **Edit Menu Item Name** Opens the Edit Menu Item Name dialog. The Customize Name checkbox must be on to edit the name. Enter the desired name in the Name text field and press OK.

  Changing a menu item name updates its menu entry, but the original name remains in the menu window. Also, if you precede a letter in the custom name with the "**&**" (ampersand) character, that letter is used as a menu accelerator.

- **Edit Menu Item Icon** Opens a file dialog that lets you choose a PNG image to use as the icon for this menu item.

  Note: The assigned icon appears on the menu only when the Alt menu system is active.

- **Flatten Sub-Menu** Displays contents of the highlighted submenu at the top level of the menu. If you choose this item, the menu name is followed by the string: "[FLAT]".

- **Edit MacroScript** Opens the script for the highlighted action in a MAXScript editor window.

Load

Displays the Load Menu File dialog. Allows you to load custom menu (MNUX) files into the 3ds Max interface.

Save

Displays the Save Menu File As dialog. Allows you to save changes to the menus in an MNUX file.

Note: Quad menu customizations also use MNUX files.

The Colors panel of the Customize User Interface dialog allows you to customize the look of the 3ds Max interface. You can adjust the colors for almost every element in the interface, giving you the freedom to design your own unique style.

- Default menu: Customize menu > Customize User Interface > Colors tab

- Customize menu > Customization > Customize User Interface > Colors tab

The quad menu colors cannot be customized from the Color panel. To customize quad menu colors, use the Advanced Quad Menu Options dialog.

Customized color settings use the CLRX file format. (Prior to 3ds Max 2013, color files had a file name extension of CLR. This format is now superseded.)

Procedures

To change an interface element color:

1. Open the Customize User Interface dialog to the Colors panel.

2. From the Elements drop-down list, choose the category of the interface element whose color you intend to change.

3. In the list below the Elements field, highlight the element whose color you intend to change.

   The Color swatch shows the current color of the element.

4. Click the Color swatch and then use the Color Selector dialog to choose a new color. Click the Close button to set the color.

   To restore the color that was active at the time that you opened the dialog, highlight the element and click Reset.

5. Continue choosing elements and changing colors as necessary.

6. To finish and apply the color changes to the interface, close the dialog by clicking the X button in the upper-right corner.

Tip: If you change several colors and then want to restore all colors to the default values, click the Load button and open *DefaultUI.clr*.

Interface
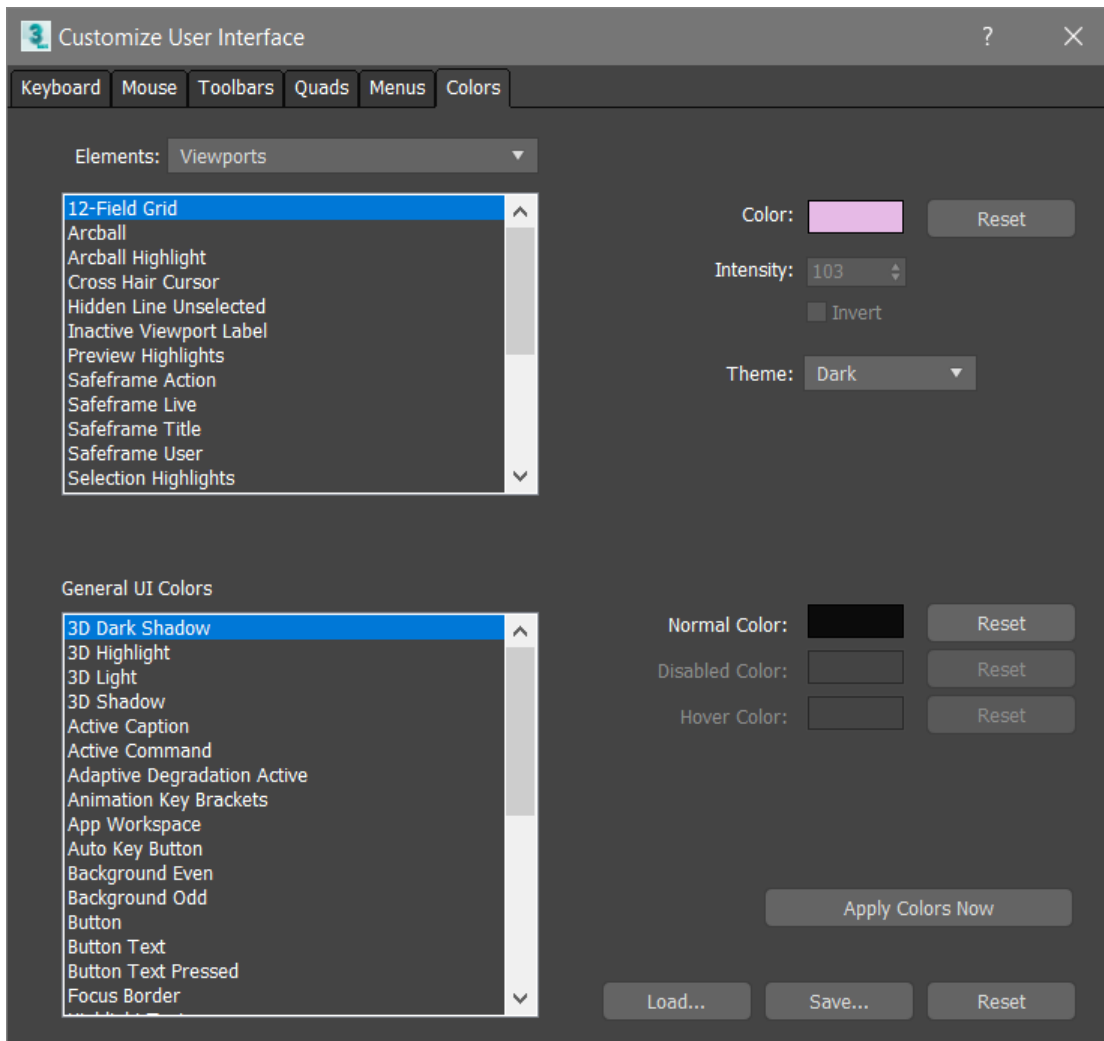
Elements drop-down list

Lets you select from the various high-level groupings: Character, Geometry, Gizmos, Viewports, and more.

[UI elements list]

Lets you chose an element in the active group. After doing so, its color appears to the right of the list; click the swatch to change the element's color.

The viewport elements Viewport Background Gradient Bottom and Viewport Background Gradient Top provide the colors for viewports with gradient backgrounds. This option is the default for Perspective viewports.

General UI Colors list

Displays all the elements in the user interface that can be changed. After you click an element, its color appears to the right of the list; click the swatch to change the element's color.

Color

Displays the color for the selected category and element. Click to display the Color Selector, where you can change the color. After choosing a new color, click Apply Colors Now to make the change in the interface.

Reset

Resets the color of the highlighted element to the value that was active when you opened the dialog.

Intensity

Sets a grayscale value for the display of the grid lines. 0 is black and 255 is white.

This control is available only when you choose the Set By Intensity option from the Grids element, and affects the intensity of the grid lines in the viewports.

Invert

Inverts the grayscale value for the display of grid lines. Dark gray becomes light gray and vice-versa.

This control is available only when you choose the Set By Intensity option from the Grids element.

Theme

Sets the background color of the Graphite Modeling Tools interface elements. Choose Light or Dark from the drop-down list.

Normal Color

Displays the color for the selected item. Click to display the Color Selector dialog, where you can change the color. After choosing a new color, click Apply to make the change in the interface.

Disabled Color

Sets the color for when the selected item is disabled in the UI.

This control is only available for specific items in the General UI Colors list.

Hover Color

Sets the color for the selected item when hovering over it.

This control is only available for specific items in the General UI Colors list.

Reset

Restores the highlighted item to its color when you first opened the dialog.

Apply Colors Now

Activates any changes in the user interface.

Load

Displays the Load Color File dialog. Allows you to load custom color (CLRX) files to use in the 3ds Max interface.

Save

Displays the Save Color File As dialog. Lets you save changes to the user interface colors in a CLRX file.

Reset

Restores the default setup (*defaultui.clrx).*