intro
Introduction

Welcome

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Welcome to the *3ds Max User Reference* This reference contains detailed information about all the features and capabilities of Autodesk 3ds Max®, which brings 3D modeling and animation to your desktop system.

The reference is organized by functional areas. The "User Interface" chapter gives you a guide to program controls and where to find them.

If you've already used previous versions of this program, you might want to start with a description of *what's new in this version (page 1–xiv)*.

If you're new to this software, this would be a good place to start: *Getting Started with 3ds Max (page 1–1)*.

Here's where you can get an overview of the entire documentation set: *3ds Max Documentation Set (page 1–xviii)*.

You can find a *guide to using the electronic version of this reference (page 3–965)*.

And here's a list of other important introductory topics:

Managing Scenes and Projects (page 3–397)

Viewing and Navigating 3D Space (page 1–21)

Selecting Objects (page 1–61)

Object Properties (page 1–111)

Creating Geometry (page 1–149)

Moving, Rotating, and Scaling Objects (page 1–401)

Creating Copies and Arrays (page 1–455)

Using Modifiers (page 1–479)

Surface Modeling (page 1–945)

Precision and Drawing Aids (page 2–1)

Space Warps and Particle Systems (page 2–51)

Creating Animation (page 2–271)

Lights and Cameras (page 2–1125)

Advanced Lighting Panel (page 3–43)

Material Editor, Materials, and Mapping (page 2–1239)

Rendering (page 3–1)

Effects and Environments (page 3–213)

User Interface (page 3–717)

Customizing the User Interface (page 3–829)

Default Keyboard Shortcuts (page 3–911)

What's New in 3ds Max 8

The new features in 3ds Max are meant to improve the way you use it, and to improve the quality of work it helps you create.

You can also find a wealth of information about new features in the printed New Features Guide provided with your copy of 3ds Max. An electronic version of this guide is available by choosing Help menu > New Features Guide.

Note: This topic don't comprehensively list all the changes that have been made to 3ds Max. As you proceed through the documentation, keep an eye out for the 👁 icon, which designates a new

feature. You can also identify topics containing information on new features in the program using the index in this reference. For topics describing new program features, check the index entry "new feature in v8". For changes in existing features, check the index entry "changed feature in v8".

Following is a list of major new features with brief descriptions and links to the relevant reference topic:

The 3ds Max User Reference

- Most of the documentation relating to network rendering is now available in the Backburner Reference, available from the Help menu > User Reference > Contents panel.

- The mental ray documentation from mental images, with specifics on shaders and related topics, has been combined into a single reference file, available from the 3ds Max Help menu.

Character Animation

- The *Skin modifier (page 1–781)* provides enhanced default settings; for example, vertices are now assigned to a bone by default to prevent unwanted stretching and minimize the need to edit envelopes. Also, the new *Weight Tool dialog (page 1–796)* makes it easier to assign and blend weights.

- True Euler rotation and position curves are now available for biped animation. See *Working with Euler Curves on Biped Animation (page 2–861)*.

- The biped pelvis can now be rotated on all three axes, like a ball joint. See *Pelvis as Ball Joint (page 2–750)*.

- Additional available neck, spine, ponytail, and tail bones for the biped. See *Structure Rollout (page 2–837)*.

- The *bone twist controls (page 2–839)*, previously limited to the biped's forearm, have been expanded to include all limbs and a twist bias setting has been added. These new settings allow better mesh deformation on skinned models (using Physique or Skin) when twisting occurs on animated limbs.

- With expanded support for motion-capture data on fingers, toes and neck, finer motion detail can be captured for hands and feet, allowing for more subtle animation in a notoriously difficult area of animation, including bendable toes.

- Support for new motion capture formats including HTR Import and Export, support for 3ds Max bones, and TRC data import. TRC data, an excellent format for capturing subtle details such as facial animation, can also be converted via a utility to CSM, the biped motion format.

- The new Map Animation dialog for loading XML animation data includes *retargeting (page 3–486)* functionality for assigning animation between very different types of characters.

- The biped's Figure Mode posture is now independent from the biped's animation. Figure Mode spine, tail, and ponytails postures are no longer added as offsets to the biped keys.

General Animation

- The new *Limit Controller (page 2–319)* lets you layer a limit on top of a motion curve with the ability to ease and out of the limit.

- Numerous Track View improvements, including *Track Sets (page 2–568)* (like named selection sets), new *Auto Expand (page 2–502)* options, and new *Hierarchy right-click menu (page 2–495)* commands.

- The *Motion Mixer toolset (page 2–580)* from character studio has been fully integrated into 3ds Max, letting you create nonlinear animation with all objects.

- You can save and load XML-based animation data for any number of objects separately from the actual scene, with versatile mapping options. See *Saving and Loading Animation (page 3–477)*.

- You can now set an animation track with a parametric controller, such as Noise, to *apply only to the current animation range (page 2–527)* or to *ignore it (page 2–526)*, thus repeating infinitely.

- Set *Default In/Out Tangents for new keys (page 3–764)* in the main program interface.

- Import and export motion-analysis files in the HTR format and import TRC-format motion-analysis files.

Mapping

- The *Unwrap UVW* modifier has been substantially modified to provide new features and enhanced workflow, including the powerful new Pelt mapping feature. For a list of significant changes, see *What's New in Unwrap UVW (page 1–868)*.

Rendering

- The *Batch Render tool (page 3–200)* provides an efficient, visual approach to setting up tasks when you want to render without having to be in front of the computer.

- *mental ray 3.4 (page 3–77)* delivers numerous optimizations, including faster final gathering performance, double precision computation for ray tracing and fast rasterization for first-generation rays. mental ray 3.4 also adds Satellite Rendering, which lets you deploy up to eight slave CPUs to render an image with distributed bucket rendering; see

Distributed Bucket Rendering Rollout (mental ray Renderer) (page 3–121).

- Network rendering of 3ds Max scenes (MAX files) with mental ray via Backburner and the command line is no longer bound to a single license. Therefore an unlimited number of CPUs can be used, effectively behaving exactly as with the 3ds Max default scanline renderer. Standalone licenses are still required when rendering MI files (using *ray.exe*).

- Support for *OpenEXR (page 3–671)*, a versatile file format for high-dynamic-range images.

- Tighter integration with Combustion by providing material ID and render ID elements allows for quick masking inside Combustion based on the material or node ID from 3ds Max. Also, enhanced support for *lookup-table (LUT) data (page 3–873)* from Combustion and other Autodesk Media and Entertainment software.

- Support for *IMSQ files (page 3–669)*. IMSQ is an XML-based image-sequence format that can potentially be used by third-party applications. You generate IMSQ files from the Render Scene Dialog's *Common Parameters rollout (page 3–27)*.

- Support for pre-render and post-render scripts. In addition to a pre-render script, you can now run a post-render script as well. Pre- and post-render scripts are specified on the new *Scripts rollout (page 3–33)*, as well as from the command-line rendering interface.

- New Illuminance and Luminance *render elements (page 3–126)* support creation of images for advanced lighting analysis, particularly in architectural applications.

- A new *Velocity render element (page 3–137)* lets you use your compositing application (such as Combustion) to generate motion blur. Other new render elements for Combustion integration are Material ID and Object ID.

- New Illuminance HDR Data and Luminance HDR Data *render elements (page 3–126)* let you perform advanced analysis of your scene's lighting.

- New rendering options for spline objects and NURBS curves include settings for radial and rectangular cross-sections. See *Editable Spline (page 1–284)* for details; the same controls are available for NURBS curves.

Modeling

- The *Hair and Fur modifier (page 1–506)* and *Cloth system (page 1–551)*, previously available only by subscription, are now standard features. For new features in Cloth since the subscription release, see *What's New in Cloth (page 1–552)*.

- Enhancements in Editable Poly and Edit Poly modifier include:

  - Grow, shrink, and move edge sub-object selections along rings and loops. A faster way to modify selections and move them along a surface. See *Editable Poly Surface (page 1–1012)*.

  - Create rows of new faces between edges with the new *Bridge* feature. This is useful for creating edge loops.

  - When *removing edges*, the new Clean Remove option lets you delete associated vertices, simplifying the resulting geometry.

  - When *chamfering sub-objects (page 1–1071)*, the new Open option lets you create holes instead of new faces.

  - Change spacing and positioning of new edges with the Pinch and Slide settings. See *Connect Edges Dialog (page 1–1072)*.

  - The *Show Cage* function now uses two colors to show both selected and unselected sub-objects.

  - You can convert a selection to only sub-objects that border the selection by

pressing SHIFT as you change the sub-object level.

Scene and Project Management

- Project-management functionality is implemented via the new *asset tracking system (page 3–492)*. Asset tracking works with a variety of source-control tools, but optimal support is provided for Autodesk Vault, included free with 3ds Max.

- A number of improvements have been made to external references. The *XRef Objects dialog (page 3–408)* and rollouts have been redesigned to make them easier to use. You can now XRef materials as well as objects, either when you XRef objects in general, or by using the new *XRef material (page 2–1425)*.

  For XRef Scenes, the new *Overlay feature (page 3–417)* lets you create more complex XRefing while avoiding circular XRefs.

  XRefs to cameras are now correctly saved with the scene, so you can use them with network rendering.

  The performance of XRefs has also been improved.

- The Material Editor > Utilities menu includes several new functions for managing materials. For example, you can remove all materials not used in the scene from the editor, and condense the remaining materials. See *Material Editor Menu Bar (page 2–1272)*.

- *Repathing and retargeting (page 3–495)* of assets and their locations allows for control over many dependencies that rely on the path of an asset.

- You can collect *Path configuration files (page 3–852)* in a project-specific manner for all assets. This file can be loaded, saved, etc. and transferred with the scene file. This eases management of projects by providing a text

(ASCII) file that lets users define paths for asset locations.

Design Visualization Functionality

- New adaptive subdivision options enable higher-quality, more accurate, and more efficient radiosity processing. See *Radiosity Meshing Parameters Rollout (page 3–66)*.

- Support for *real-world measurements (page 2–1429)* lets you apply physically scaled materials to objects in the scene more easily and accurately.

- The new *Sweep modifier (page 1–839)* lets you "loft" a shape or profile along lines or polylines imported from AutoCAD or linework created in 3ds Max, even applying preset shapes to simple linework. This modifier is useful for creating structural steel details, molding details, or in any situation where you need to extrude a section along a spline.

- Capture object, layer, material, camera, and light information as a *scene state (page 3–519)* that can be saved and restored at will.

- Autodesk Revit® 7 interoperability: Autodesk Revit users can now create high-quality images of their models with 3ds Max by importing or linking a Revit model via the DWG format, and having the scene objects correspond directly to individual Revit objects. See *Working with Drawing Files (page 3–425)*.

- *Autodesk Inventor® interoperability (page 3–553)*: Access the Inventor file option directly within the Import function.

- *DWF export (page 3–556)*: Convey ideas and share designs by exporting 3D models from 3ds Max for viewing with Autodesk DWF Viewer and Autodesk DWF Composer.

Scripting

- Analyze and correct problem scripts with the new *MAXScript debugger (page 3–826)*, which follows the industry-standard method for debugging scripts. Set breakpoints and isolate issues in any script.

- Rewritten expression and scripted controllers now have full MAXScript support. Name dependencies have been removed so that scripted controllers can be merged, XRefed, and copied in the same way as other controller types.

- MAXScript SQL Connect and Queries lets programmers and TDs build scripts to query a database, permitting increased automation within a complex pipeline.

3ds Max Documentation Set

The documentation set for 3ds Max® combines online and printed material.

- **3ds Max 8 Installation Guide:** Contains complete installation and configuration instructions, as well as Read This First information to help you get started.

  The *Installation Guide* includes information about system requirements and troubleshooting. It also tells you how to uninstall 3ds Max.

  For 3ds Max, the *Installation Guide* is available printed, as well as in PDF format on the product disc, in the \manuals folder.

- **3ds Max 8 New Features Guide:** This printed document presents the new features of 3ds Max 8. While intended primarily for upgraders already familiar with 3ds Max, we also hope that users new to the program will be able to profit from the visual approach and tips for usage of these new features.

A PDF version of this guide is also available electronically; choose Help menu > New Features Guide to view it online.

- **3ds Max 8 User Reference:** The online reference covers fundamental concepts and strategies for using the product, as well as details about the features of 3ds Max. In this version of the product, the *User Reference* is available online only.

  Access the reference online by choosing Help > User Reference.

- **3ds Max 8 Tutorials:** Contains tutorial information and detailed procedures to walk you through increasingly complex operations. This is the best source for learning 3ds Max.

  Access the online version of the tutorials by choosing Help > Tutorials.

  Note: All the sample files required to do the tutorials are found on the program disc. None of these files are installed automatically.

  The printed *3ds Max Tutorials* book duplicates a subset of the online tutorials.

  Note: Due to print time requirements, some topics in the printed tutorials could differ slightly from the online version. Where there is a difference, the online version is more current.

- **Backburner Reference:** Describes procedures for rendering with networked computers. Available from the 3ds Max Reference online Contents tab.

- **reactor Reference:** Describes the reactor system for physical simulation. Available from the 3ds Max Reference online Contents tab.

- **MAXScript Reference:** Describes the *MAXScript scripting language (page 1–xx)*. This reference is available online only. Check out the "Learning MAXScript" chapter there if you're new to MAXScript.

Access the *MAXScript Reference* by choosing Help > MAXScript Reference.

- **Readme.rtf:** Contains the latest information about 3ds Max 8. Find this file in electronic format in the program install directory.

Additional Help Files

In addition to the main documentation components described above, these additional online documents describe various features available in 3ds Max 8.

- The 3ds Max 8 SDK Help system documents the software development kit (SDK) for:

  - 3ds Max

  - Game Export Interface

  - Particle Flow

  - mental ray

  - Character Studio

  - MAXScript

  Using the SDK, you can create new 3ds Max features and tools by writing your own plug-ins.

  Note: To install the SDK and the SDK documentation, choose 3ds Max 8 SDK under the Install Supplemental Tools section of the 3ds max 8 Installer. You can do this the first time you install 3ds Max, or run the setup program to add them at a later time. See the Installation Guide for more information. You can also find SDK downloads, sample solutions, and documentation updates on the [sparks Web site](#).

- **Additional mental ray® Help Files:** Documentation from mental images® is available from Help menu > Additional Help. There, you'll find the *mental ray 3.4 Documentation*, comprising the *mental ray Manual*, *mental ray Shader Reference*, and *LumeTools Collection*.

  Note: Third-party shaders are documented in the *mental ray Shader Reference*, and

LumeTools Collection documents, but the *3ds Max User Reference* documents all other mental ray components available in the 3ds Max user interface. This includes documentation for lights for mental ray and specific shadow types, controls for adding mental ray shaders to lights and cameras, mental ray materials, custom shaders for 3ds Max, and the mental ray renderer controls.

- **Autodesk License Borrowing Utility Help:** Available as the file *adsk_brw.chm*, installed in the *\program files\common files\autodesk shared\enu* folder on your local drive.

- **Portable License Utility Help:** Available as the file *adsk_plu.chm*, installed in the *\program files\common files\autodesk shared\enu* folder on your local drive.

- **Network Licensing Guide:** Available as the file *adsk_nlg.pdf*, on the product disc, in the *\Manuals* folder.

- **Network Administrator's Guide:** Available as the file *adsk_nag.pdf*, on the product disc, in the *\Manuals* folder.

- **Network Installation Guide:** Available as the file *NetInstallGuide.pdf*, on the product disc, in the *\Manuals* folder.

- **SAMreport-Lite User's Guide:** Available as the file *SAMlite_UG.pdf*, on the product disc, in the *\Manuals* folder.

- **3ds Max Software Development Kit Help Files:** Available as the files *sdk.chm*, *sparks_archive.chm*, and *igamehelp.chm*, installed in the *3dsmax8\maxsdk\help* folder on your local drive. The file *index.chm* is installed in the *3dsmax8\maxsdk\samples\howto\xrefutil* folder.

  You can find updated SDK documentation on the [sparks Web site](#).

Note: By default, the SDK and its document files are not installed. You can choose to add them when you first install 3ds Max, or you can run the setup program to add them to your installation at a later time. See the *Installation Guide* for more information.

• The *3dsMaxSDKHelp.chm* file is installed in the *3dsmax8\maxsdk\help* folder on your local drive. The Help system documents the SDKs for 3ds Max, Game Export Interface, Particle Flow, mental ray, and Character Studio. (Note that mental ray still has a separate Help for reference information.)

You can find updated SDK documentation on the [sparks Web site](#).

Note: By default, the SDK and its document files are not installed. You can choose to add them when you first install 3ds Max, or you can run the setup program to add them to your installation at a later time. See the *Installation Guide* for more information.

## How to Print from the Online Documentation Files

If your computer is connected to a printer, you can print single help topics or entire chapters.

To print a topic or chapter, highlight the topic or chapter title and click the Print button at the top of the help display. A dialog appears.
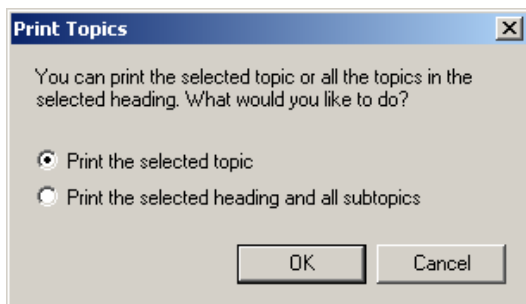
Choose to print only the selected topic, or to print all topics in that chapter. After you make your

selection, another dialog appears where you can choose your printer and other options.
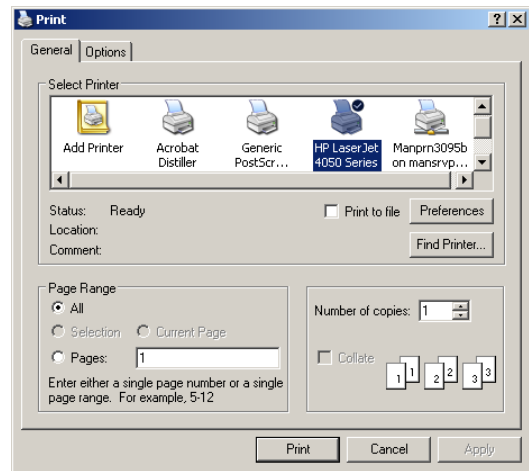
The tabs available at the top of the dialog depend on the selected printer. Choose options for the print job, and click OK to begin printing.

How to Contact Us

We are also interested in hearing your views about 3ds Max. We'd like to hear ways you think we can improve our program, features you're interested in, as well as your views on the documentation set.

Please send us email about the documentation set at: me.documentation@autodesk.com

About MAXScript

MAXScript is the built-in scripting language for 3ds Max. It provides users with the ability to:

• Script all aspects of 3ds Max use, such as modeling, animation, materials, rendering, and so on.

• Control 3ds Max interactively through a command-line shell window.

- Package scripts within custom utility panel rollouts or modeless windows, giving them a standard 3ds Max user interface.
- Build custom import/export tools using the built-in file I/O.
- Write procedural controllers that can access the entire state of the scene. Build batch-processing tools, such as batch-rendering scripts.
- Set up live interfaces to external system using OLE Automation.

The MAXScript language is specifically designed to complement 3ds Max. It is object-oriented, and has several special features and constructs that mirror high-level concepts in the 3ds Max user interface. These include coordinate-system contexts, an animation mode with automatic keyframing, and access to scene objects using hierarchical path names that match the 3ds Max object hierarchy.

The syntax is simple enough for non-programmers to use, with minimal punctuation and formatting rules.

Visual MAXScript

Visual MAXScript is a powerful addition to MAXScript, making the MAXScript feature easier to learn and use. With Visual MAXScript, you can quickly create UI elements and layouts for scripting.

For detailed information about Visual MAXScript, open the MAXScript Reference, available from Help menu > MAXScript Reference.

See also

MAXScript Menu (page 3–823)

Procedure

To access MAXScript, do one of the following:

- On the menu bar, choose MAXScript. The MAXScript menu appears.
- Choose Utilities panel > MAXScript.

  From here, you can either write new scripts, edit or run existing scripts, open the MAXScript Listener, or use the Macro Recorder.

  To access the MAXScript Listener, you can also right-click in the Mini Listener and choose Open Listener Window from the right-click menu.

  For detailed information about the MAXScript utility, open the MAXScript Reference, available from Help menu > MAXScript Reference.