

3DS Max 7 Primer for Torque Artists

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Introduction:

So what exactly is the “3DS Max 7 Primer” about you wonder? Well it is essentially a short mini-guide that briefly covers the new features and enhancements that are available in 3DS Max 7 and how exactly they can and will benefit your art development pipeline and processes with the Torque Game Engine (TGE) or Torque Shader Engine (TSE).

This guide should allow you to get a better understanding of the new features and enhancements that have been made to this great application that you might not otherwise know of or be aware of from the default marketing materials that are provided by Discreet, or without having to slog through a bundle of documentation. Where ever possible I have tried to document the hows and whys a particular feature is important to game development with Torque.

Like all of the documentation and guides that I write, this document will not cover tutorials or documentation on how to use these new features, since I feel that this has been best done with the excellent documentation that ships with 3DS Max. Nor will it cover in-depth development with Torque such as using the DTS exporter, loading files into the game engine or modifying, editing shaders and tweaking the game engine.

If you have any questions, comments or concerns about this document please email me at loganfoster@shaw.ca

Quick Reference

Listed below is a quick reference to the various new or enhanced features in Max 7 that I personally feel benefits Torque Artists. For an expanded version of what these new features do and how they can benefit an artist using Torque, please see the expanded entries found later in this document.

View Ports, Camera and UI Changes

View port Display Performance - Enhanced view port display updates faster, is more responsive to changes and handles larger amounts of scene data more readily.

DX Display Within the View port – Display any standard Max material in the view port as a DirectX 9 shader. This allows for WYSIWYG interactivity so that you know how the model will appear in the game engine including shader effects.

Improved Snapping – Snaps have been greatly enhanced to be more accurate and more responsive similar to what you would find in a leading industry application such as Autocad.

Quick Align – A new alignment tool that aligns your selected object's transforms onto a target object's XYZ transform center.

Clone & Align – Duplicate a selected object and align it to one or multiple target objects within your scene.

Paint Selection – Select nodes or sub-object level items on your screen by painting what you want to select.

First Person Camera Controls – You can now control your camera or view port display as if you were viewing from a camera found in a First Person style game.

Smart Object Culling – An tool that intelligently culls data out of the view port display to ensure that you meet a certain performance level.

Modeling Enhancements

Edit Poly Modifier – All of the features of the Editable Poly base shape are now available in the much demanded modifier version.

Turbosmooth – An enhanced version of the Meshsmooth modifier which allows you to quickly subdivide your mesh without putting a great deal of strain on the system. Perfect for generating high resolution models.

Edit Poly - Preserve UVWs. – Make transformations to sub-object selections without distorting, stretching or pulling existing UVW data.

Edit Poly - Paint Deformation - A new methodology in 3DS Max for pushing, pulling or relaxing sub-object levels of your mesh quickly and easily using a simple brush based control scheme.

Edit Poly – Relax - Similar to the relax modifier, this tool allows you to normalize the position of sub-object selections.

Edit Poly - Turn Edges - Similar to the Edit Mesh tool, turn edges allows you to flip a particular edge within a Polygon face at the click of a button.

Edit Poly - Bridge Tool – Connect open edges and faces.

Edit Poly - Cut Tool – Optimized so that it no longer created unwanted edges.

Edit Poly - Select Polygon by Angle – Select multiple faces that share a similar co-planar angle to the face that you choose.

Edit Poly - Make Planar - Makes any sub-object selection transform position planar to a particular Axis.

UVWs, Materials and Rendering

Unwrap UVW - Highlight Seams – Shows in the view port any seams that you have from your UVW coordinates.

Unwrap UVW - Display Open Edges – Shows you in the view port where open edges are in your UVW data.

Projection Modifier - Transfer various vertex level data from a target model onto your current model.

Materials

Copy & Past Materials, Maps and Colors - Copy, paste and clear ability for map channels from within the Medit Material Editor.

Save As FX - Save any standard Max material as a FX (or HLSL) file.

Rendering

Render to Texture - Generate Normal Map - Quickly generate accurate normal maps without having to resort to a 3rd party tool or application.

Render to Texture - Mental Ray 3.3 Integration - Use Mental Ray to generate Render to Texture results.

Character Studio, Skinning & Animation

Character Studio - Now Included by Default

Character Studio Save Bones & IK as a BIP - Now its even easier than before to setup custom rigs that you can reapply in any other scene.

Skin Wrap Modifier – Apply data from an existing model with a Skin Modifier to your selected model regardless of size, scale or differences between the model data.

Skin Morph Modifier – Allows you to setup easier Joint Angle Deformations.

Parameter Collections – Define notes and information regarding your scene for easier animation.

Reaction Controller (Revamped) – Define min/max transform data from nodes in your scene and then easily control or manipulate this data.

View Ports, Camera and UI Changes

When you first load up 3DS Max 7 you will notice that nothing has really changed from a UI standpoint over the previous release of 3DS Max. Everything is where you would expect to find it and nothing has been adjusted or rearranged. Most of the changes that you will find here for the UI, View ports and other related items are behind the scenes changes for the most part that I will discuss below.

View ports

View port Display Performance

After loading up 3DS Max you will probably instantly notice some changes and differences to the application. The most significant change that you will probably notice when you start to work with the program is a general speed improvement with the view port display.

What you are seeing are the results of "Project Quicksilver", which was an internal project within Discreet to enhance the rendering and drawing that 3DS Max does. Virtually every display mode that you can use, you will see very noticeable speed improvements. The most significant display mode that you will see this improvement in is when you are using a DirectX display (due to some enhancements Max now does when creating D3D caches).

How does this benefit Torque development? This should greatly improve your ability as an artist to have a more robust and interactive display as well as throw more data at the display and have it not lag as a result.

DX Display Within the View port

If you are running Max 7 in Advanced Direct X mode you will have an option to display any "Standard" max material in the max view ports and have it drawn via a DirectX shader. The benefit that this gives you is that you can see almost all of your material based effects and bitmaps applied to your model interactively. Thus as you change an option in the material it will update what you visually see.

How does this benefit Torque development? The DX view port display will allow you to have a WYSIWYG display of your model and its shaders that it is using and know what it will look like in a game engine such as TSE. This will save you time as you do not need to fiddle around with settings or values or rely on loading as TSE as much to check out your work until you really need to.

For more information on this feature, please see the UVW, Materials & Rendering section found later in this document.

UI Tools

Improved Snapping

There have also been some other changes and enhancements to the rest of 3DS Max's UI or ways that it runs the application in general. One of the most significant enhancements has been the snaps. No longer do you have to deal with a dodgy snap tool that would sometimes miss align or drop items in the wrong location.

The new snaps in 3DS Max are incredibly accurate. You should notice them grabbing and finding valid targets all over the place now as well as the results from snapping are better than ever before.

I personally found that the default snapping options were a bit more than I was used to though and as such when you are working with them here are some recommendations that I have:

1. Alternate having the Snaps (S) and the Transform Gizmo (X) on and off. This way you can move and snap without worrying about the transform gizmo being in the way nor with having to worry about a snap triggering when using an axis constraint.
2. If you do have to use the transform gizmo to do a axis constraint move while using snaps, I recommend that you turn on the "Use Axis Constraints" option found in the Options tab of the Grid and Snap Settings options.
3. Since we work at such a small world space when modeling for Torque, it's a good idea to turn down the snap threshold radius from the default values. This can be done in the Options tab of the Grid and Snap Settings dialogue.

For an added improvement it is also recommended that you activate the "use axis constraints" option in the Snap Option dialogue. This is beneficial because if you are applying a transform to a particular axis it will prevent the snap tool from jumping your transform that you are applying off of that axis constraint.

How does this benefit Torque development? As you will soon discover after a short minute or two of usage the new snapping tools certainly do make things a breeze now and allow you to definitely work a lot faster and more reliable than ever before.

Quick Align

"Quick Align" is a new alignment tool that has been added to Max 7. The basic premise of this tool is that it will move your selected object(s) onto a target object that you choose, you are not given any XYZ alignment nor rotation options.

How does this benefit Torque development? Sometimes you need a quick and dirty alignment tool that centers your current object onto your target object without needing to make 3 or 4 clicks.

Clone & Align

Found in the tools pull-down, this new alignment tool that is primarily used when you need to copy, paste and then align one object onto multiple other target objects.

An example of this would be taking a Torch model and having it clone, paste and align multiple times to 20 or 30 dummy targets that you populated in your scene.

How does this benefit Torque development? As you can probably already guess this new alignment tool is a real time saver when it comes to populating your scene with the same object multiple times.

Paint Selection

A new selection method has been added to Max 7 that allows you to paint or draw on your screen to make node selections. This is something that any previous user of Maya will be familiar with and find incredibly handy.

Note: There is also a paint selection option available too when you are working within an Edit Poly or Edit Mesh modifier or shape as well that I will cover later.

How does this benefit Torque development? Essentially this gives you a new method to select objects in your view port, which always comes in handy.

Camera and Display

First Person Camera Controls

3DS Max 7 now allows you to control any assigned camera in your scene or even your current view port as if you were using a camera or view from within a FPS game. To do this, simply press the Up Arrow key on your keypad, from there you will see that your mouse cursor changes to a circular shape. Now use the WASD keys to navigate around and your mouse + left mouse button to look around.

How does this benefit Torque development? This option is an obvious benefit as you can begin to use your cameras more interactively in your scene to view or sample objects from various angles that you will encounter in-game.

Smart Object Culling

This new utility can be used to create a set of clipping planes that exists around a particular object or item that you choose in your scene. The benefit of this is that you can now have Max scale down what it displays to try to ensure that you keep a standard playback performance when using the application.

How does this benefit Torque development? Complex scenes can be handled easier.

Modeling Enhancements

Inside of 3DS Max 7 there have been a variety of changes done to enable you to model quicker and faster. Most of these changes have been done on the Polygonal/Mesh tools which I will list below:

New Modifiers For Modeling

Edit Poly

Users of 3DS Max have been asking for a Edit Poly modifier since the new poly tools came out in version 5 of 3DS Max and Discreet has delivered here in version 7. Much like the Edit Mesh modifier the Edit Poly modifier can be placed anywhere on an objects modifier stack and can be used to do all the functions that the Editable Poly base object can do.

How does this benefit Torque development? This allows you to continue to use the modifier stack as it is intended to push data up through the stack and make changes without being destructive. Thus changes that you need to make to your model itself no longer require collapsing to an Editable Poly shape.

Turbosmooth

Turbosmooth is a highly enhanced version of the Meshsmooth modifier that has been built specifically to bring in some amazing view port enhancements and optimizations. Unlike the Meshsmooth modifier though, Turbosmooth only performs subdivisions on the entire object.

How does this benefit Torque development? Although you might be thinking “so what”, the Turbosmooth modifier is a great method to use when using Max 7 to generate Normal Maps or higher detail models for hi-resolution rendering.

Enhancements & New Tools

Editable Poly/Edit Poly Modifiers

Preserve UVWs.

This option allows you to apply transforms onto sub-object levels while still keeping mapping coordinates and UVWs correct. For example you can move vertices around on your model that has preexisting UVW data without corrupting the scale of the mesh. Another example would be collapsing vertices on the model and not causing a pinching effect.

How does this benefit Torque development? The primary benefit of this is that you can make transform adjustments to your sub-object level items on your model after applying UVW mapping and don't have to worry about your texture getting screwed up and distorted. If you create new faces though, the mapping will not automatically adjust for them.

Note: This is very similar to the Map Scaler modifier that was introduced long ago but works more intelligently on sub-object level transforms than the Map Scaler ever did.

Paint Deformation:

Another really cool feature that has been added to Max 7 is the ability to do paint deformations. This allows you to do a push, pull or a relax on your models sub-object levels in order to adjust

the model as you paint on its surface, it is great for refining a model without having to spend a lot of time getting in close and manually moving everything about. If your model is symmetrical, you can have the Paint Deformation mirror its effects on the opposite side of the model that you are working on.

How does this benefit Torque development? Aside from doing small touchup or more natural adjustments to deform your game model in a faster and more natural way, one of the biggest benefits that this offers the Max user is the ability to create some strikingly detailed and complex models in no time (especially if you combine it with the Turbosmooth modifier). This tool also comes in handy when you are creating your high resolution target mesh for Normal Mapping as you can define a lot of fine detail very quickly.

For those of you who are asking, yes this tool is pressure sensitive. So if you have or use a graphics tablet you can have the pens pressure control a variety of abilities such as brush size, strength and falloff.

Paint Selection

You can use the new paint selection tools to select sub-objects. This tool also works in a soft-selection type as well.

How does this benefit Torque development? Paint the sub-object selections that you want to make with or without the soft selection tool.

Relax

This tool works just like the Relax modifier that you have in Max.

How does this benefit Torque development? Essentially its here to make things a bit easier on you when you want to normalize a sub-object selection that you have made so that the result is more rounded. This way you can minimize the boxy look that many low poly modeling methods can give you if you don't have the time to be super careful.

Turn Edges

For those of you who might remember, inside of the Editable/Edit Mesh UI there was a handy option entitled "turn edge" that would let you manually click on an edge to change what it was linked to. This functionality has now been added to the Poly base objects.

How does this benefit Torque development? Essentially this tool gives you a faster method to edit the faces that are contained within a polygon so that they are aligned the way that you want them to be.

Bridge Tool

This tool allows you to connect open edges in your model on either an Edge or Face sub-object level with full control over taper, bias, smoothing and twist.

How does this benefit Torque development? This gives you an easier method of collapsing open areas on your model. It is also handy when you are modeling your character segmented and need to join the various parts or appendages together onto one mesh.

Cut Tool

Discreet has made a minor change to how the cut tool works so that it will no longer create unwanted edges as it did in previous versions of 3DS Max.

How does this benefit Torque development? Less need to perform a clean-up after performing a cut operation.

Select Polygon by Angle

This tool allows you to select multiple faces with a single click based on their co-planar angle threshold that exists between each face.

How does this benefit Torque development? Once again this is another great tool that will allow you to select faces faster for modeling and UVW mapping.

Make Planar

In previous version of 3DS Max, if you wanted to make a selection planar you would have to manually apply a scale value of 0 to one of the axis's. Now in Max 7 you have a simple UI option that allows you to specify at the click of a button if you want your selection to be planar on an X, Y or Z axis.

How does this benefit Torque development? An easier method for getting vertices, edges and even faces lined up on the same X, Y or Z axis when modeling.

UVWs, Materials and Rendering

UVW Mapping

Unwrap UVW Modifier

Highlight Seams

New to 3DS Max 7 is the ability for the Unwrap UVW modifier to visibly show you in the view port where seams are on your UVW map.

How does this benefit Torque development? This will help you visually see where problem areas are with your UVW maps that you have applied to your model so that you can correct them.

Display Open Edges

Clearly view where edges are open in UV Unwrap window, giving artists an easy to read interface for troubleshooting the UV process.

How does this benefit Torque development? Allows you to easily see in the view port open edges and seams that you have in your UVW mapping so that you can do a better job setting up your UVW coordinates.

Projection Modifier

The projection modifier is a new modifier to 3DS Max 7. What it does is it allows you to project any data stored in vertex channels such as skin weights, vertex colors, vertex alpha, UVW coordinates, textures etc. from one model onto another.

How does this benefit Torque development? There are multiple benefits for this modifier depending on what you are doing:

1. Normal Mapping. When you generate normal maps from within 3DS Max 7, you will need to use the Projection modifier in order to tell Render to Texture what the normal map generation should be sampling its data from.
2. Transferring UVW mapping. Custom UVW mapping for models that have over 3000 polygons can become increasingly difficult the more complex the model get. With the projection modifier what you can now do is have a low poly sample model that you use to setup UVWs and then project the UVW data from the low poly model onto the high poly model.
3. Transferring other vertex data. You can also transfer other vertex data using the previously mentioned methodology.

As you can see, there are numerous benefits to using the Projection modifier to speed up your workflow and ability to do your job reliably and on time regardless if you need multiple models with multiple detail levels for a project.

Materials

Copy & Past Materials, Maps and Colors

Use the common Copy & Paste approach as well as the option of clearing a Material Map when working within the Medit Material Editor of 3DS Max.

How does this benefit Torque development? This new UI method should allow you to help streamline your editing of materials within 3DS Max.

Save As FX

With 3DS Max 7 you can now save out and “standard” Max Material type as a Direct X 9 FX file. Written out to this XML file form is various information including: Diffuse, Ambient, Specular, Opacity, Bump/Normal, Reflection, Self Illumination, Lighting Data, Light Attenuation, Light Color, Diffuse Color, Glossiness and Specular Amount. Thus allowing you to setup a shader material within 3DS max and export the information out for use in your game engine.

How does this benefit Torque development? Although TSE cannot natively use the FX material format (since it is DirectX specific and TSE is trying to be a cross-platform engine), there is a hidden bonus when you choose to save as a FX file as Max also generates two other files, an ATI Ashli (.PP) file and more importantly a HLSL file (which TSE uses).

The HLSL file will require a bit of massaging to make it usable in TSE (mainly with adjusting the shader semantics used to match TSE), but it does allow you to define a custom material shader in Max that you want and export it without requiring your programmers to write this code themselves or use a 3rd party program.

Rendering

The rendering enhancements to 3DS Max with regards to the concerns of a Torque artist are primarily confined to the Render to Texture utility.

Render to Texture Enhancements

Generate Normal Map

You would have to live under a rock to not know what a Normal Map is in regards to games, but in case you have been, Normal Maps are a per-pixel based shader that visually affects and distorts the pixels that are rendered to make a model look more complex and detailed than it is.

In previous versions of 3DS Max, you needed to use the Sparks Normal Map tool in order to generate and use Normal Maps and this tool involved a somewhat convoluted process to generate Normal Maps from. This unfortunately left the 3DS max artist with 3rd party plug-ins such as Kaldera or utilities such as Melody to generate Normal Maps to use in your game engine.

Now in 3DS Max 7, Discreet has enhanced and redone the process of Normal Map generation that now allows it to be light years beyond what its competition can do, making it a simple and painless process to setup and use (when combined with the Projection Modifier).

How does this benefit Torque development? You can now quickly generate proper normal maps that will work in any game engine that supports the Normal Map shader within a few short minutes. There is no longer any need to rely on a 3rd party plug-in or utility to perform this task.

Mental Ray 3.3 Integration

You can now use the shaders and render from Mental Ray, a high end 3rd party rendering tool, when using the Render to Texture utility from within 3DS Max.

How does this benefit Torque development? You can now utilize the awesome power of Mental Ray to generate texture data through Render to Texture.

Other Enhancements

Render multiple passes of "Render to Texture" in a single session, independent of the map channels used. There is also now support for individual unwraps and channels, giving added flexibility to processing specific texture maps for character and environment components.

How does this benefit Torque development? Faster work flow and productivity.

Character Studio, Skinning & Animation

Animation enhancements are one of the core features of 3DS Max 7 and have been done under the direct supervision and request of many of the industries top animation experts. This has allowed 3DS Max 7 to become even more powerful than ever before with regards to animation and its versatility doing it.

Character Studio

The latest version of Character Studio that is included in 3DS Max 7 includes a plethora of bug fixes, tweaks and enhancements most of which are too numerous and small to completely list here in this document. As such I have only listed the most important features that most Torque artists and 3D users will be interested in learning about.

Now Included by Default

As many of you already know, Character Studio is a premier character animation tool that is used with 3DS Max. Previously Character Studio was a separate 3rd party utility that needed to be purchased separately, but now with 3DS Max 7 Character Studio is now bundled with the application.

How does this benefit Torque development? All 3DS Max users now have the ability to benefit from the features and abilities that Character Studio can offer in order to help craft and create more believable and animations and behaviors for their in-game work.

Save Bones & IK as a BIP

One of the many new features of the new Character Studio that comes bundled with 3DS Max 7 is the ability to save out bones and custom IK data (along with a character studio biped) to the standard BIP format used by Character Studio.

How does this benefit Torque development? If you need to extend the abilities of a Standard CS Biped or have a custom skeletal rig that you wish to reuse, you can now do that with the touch of a button and have the ability to reapply that setup anywhere else in 3DS Max.

Skinning

Contrary to popular modding community belief, the term “skinning” in 3D actually refers to the task of binding your model to bones that will be used to deform it and not the misused term regarding texturing a model.

Within 3DS Max 7 there are a pair of great new modifiers that help make this process much easier to handle than ever before.

Skin Wrap Modifier

The Skin Wrap modifier is probably one of the greatest new modifiers to ever come to 3DS Max. This incredible modifier allows you to apply Skin data from a target model onto your current model at the quick touch of a button irregardless if the models are the same size, or have to same face or vertex count.

How does this benefit Torque development? Character bone deformation weighting has never been easier. Now you simply need to spend your time setting up a proper bone deformation for one model instead of every model in your game. Simply use the first model as the target and

have its rigging information applied to another model at a simple touch of a button. This method is completely accurate and works regardless of model sizes, face order or polygon counts thus allowing you to have a new model setup in a matter of minutes as opposed to hours.

You could also quickly setup damage decals such as scars on your player model and have them deform properly with the mesh.

Skin Morph Modifier

The Skin Morph Modifier is a brand new modifier to 3DS Max that allows an animator to set and tween joint angle deformations more cleanly than ever before. For example you can control the bicep of a character model as the arm flex so that it bulges and stretches.

How does this benefit Torque development? Create multiple joint angle deformation quicker and easier than ever before.

Animation

Parameter Collections

Parameter Collection allows you to define collections of notes, common parameters and custom attributes that are commonly used when animating a particular object in your scene.

How does this benefit Torque development? This tool is primarily beneficial when you need to share art assets between developers and/or have a Tech Lead who can define information and setup the art to be handed off to subordinates.

Reaction Controller (Revamped)

The Reaction Controller has actually been around 3DS Max since version 4 but it was unfortunately a highly under utilized tool. For those of you who may not know, the Reaction Controller is essentially a simplified Non-Linear Animation (NLA) system where the end user defined a Min and Max state for an object or group of objects. The end user can then animate this data to perform looping or repeating actions or control a common and repetitive task such as an arm curling or eyelids opening and closing.

In Max 7 Discreet has revamped the Reaction Controller to make it not only more user friendly but also the abilities to tie it in easier to events in your scene (ie. You get close to a door and the door automatically swings open as you get closer without needed to animate this action by hand).

A second added bonus to the Reaction Controller is an easy to use and configure UI tool that can allow you to gain access to and control all Reaction Controllers in your scene.

How does this benefit Torque development? Once again this is another great tool that can be used to set and break down common actions in animation and then have a simple and easy to use UI to control each of these animations. As such it greatly benefits character animation when you need to repeat a common task such as the player bending his arm, lifting up his arm or others.