



# 3D Studio Max Tools

by Taylor Mouse © 2020- 2022



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This is meant as a hobby project and NOT for making profit or any kind of money!

# Introduction

Thank you for downloading my Warcraft III Reforged Tools for 3D Studio Max.

## System requirements

You must have a valid 3D Studio Max 2011 or above license, student license or trial license. The scripts have been created with 3D Studio Max 2016 on a Windows 10 Pro x64 (19042.804 build) and tested up to 3D Studio Max version 2022.

### Note:

this is a work in progress and is not officially supported by Blizzard. Check the github page often for updates!

# Installation & Preparation

# Installation

## Installation

Download the latest scripts from my github page: [Taylor Mouse's Github Page](#)

You can download everything, or just the scripts you need for WC3Reforged.

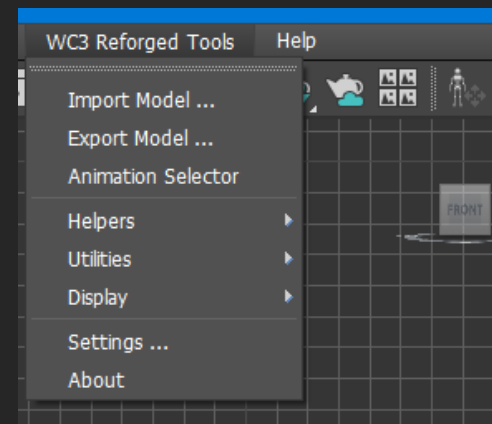
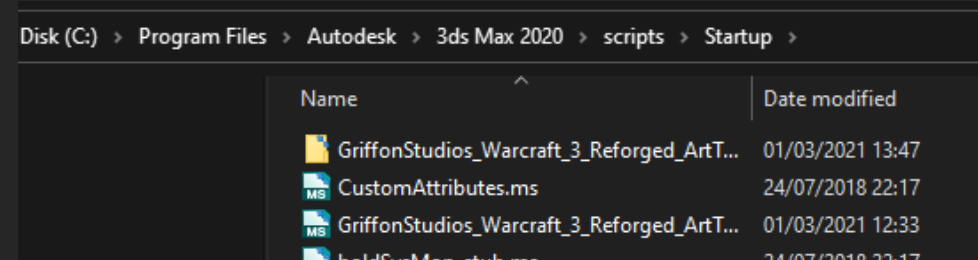
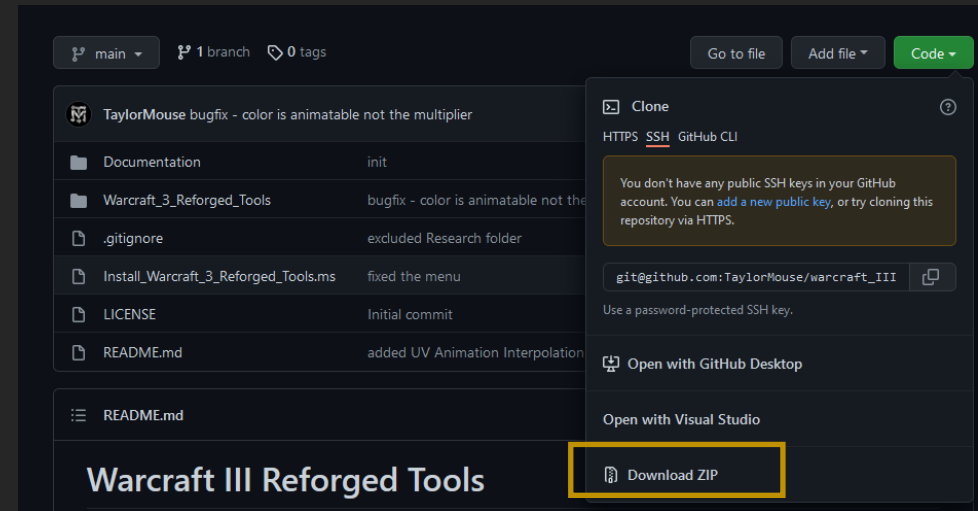
You need at least the [Warcraft\\_3\\_Reforged\\_Tools](#) folder (and content) and then [Install\\_Warcraft\\_3\\_Reforged\\_Tools.ms](#) script.

Or download the full zip package:

Once downloaded, copy the .ms file and the folder in your scripts/Startup folder of 3D Studio Max.

Example Max 2016:

Run 3D Studio Max and an additional Menu will be available.

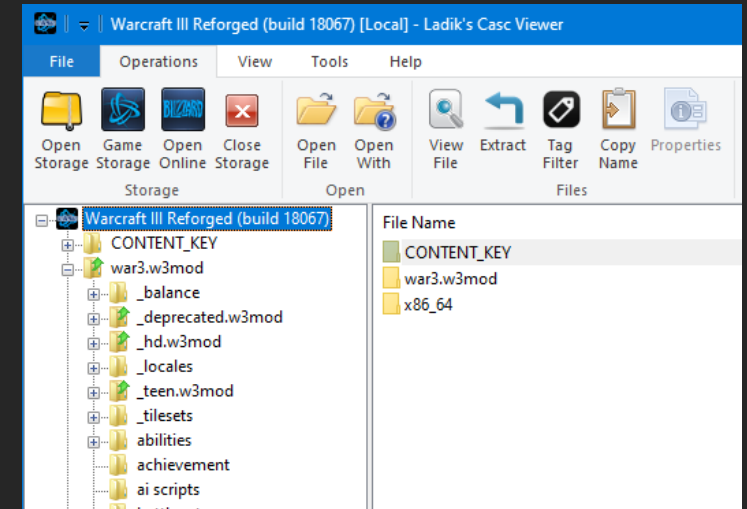


# Preparation

Make sure you extracted all the assets from the game. To achieve this, I use Ladik's Casc Viewer.

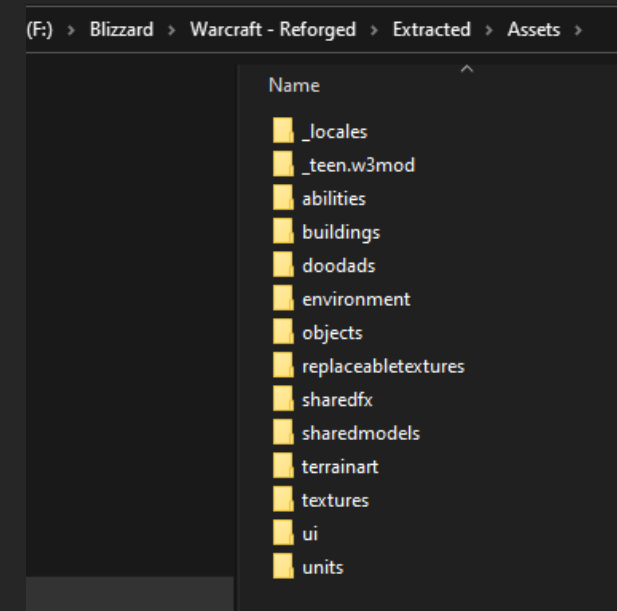


[Download Casc Viewer](#)



The export folder looks like this and is essential to import everything correctly in 3DS Max.

It is beneficiary that the folder named Assets and everything below it remains unchanged!



# Tools & Plugins

# Tools & Plugins List

- Import Model
- Export Model
- Animation Selector
- User Properties
- Helpers
  - Ribbon
  - Event
  - Face FX
  - Attachment
  - Particle Emitter
  - Popcorn FX
- Display
  - Collapse Hit Tests
  - Expand Hit Tests
  - Collapse Attachment Points
  - Expand Attachment Points
- Warcraft 3 Reforged Standard Material

Each of these tools & plugins are described next



# Import model

Select Import model ... from then menu.

Select the mdx file you want to import by pressing the ellipsoid button (...)

## Debug Mode:

If you want a full dump of what is imported, check this box, note that this is process consuming and Max may freeze for a period of time.

## LOD's:

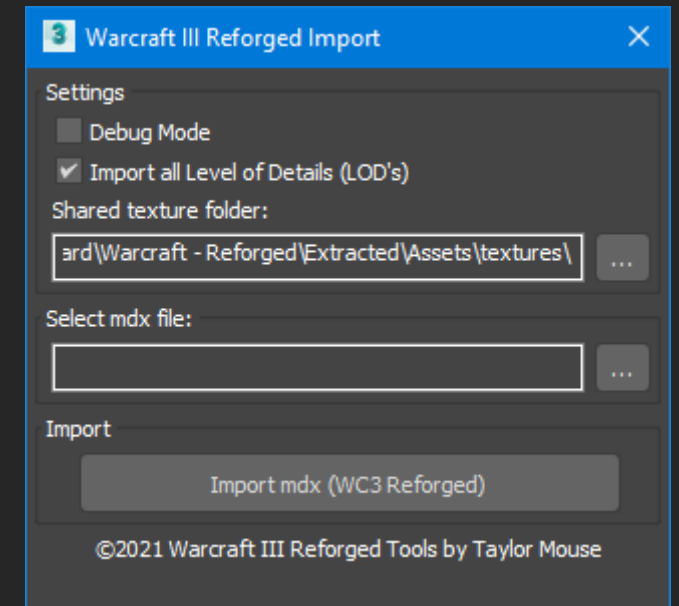
By default this is checked, almost all models have different Level of Details in the model. This could take some time to import, so you can uncheck if you prefer not to import them. When unchecked only LOD 0 is imported

## Shared texture folder:

Many textures are shared amongst models, so there is a shared textures folder that you must pinpoint to. The code looks for a folder with the name **Assets**

## Import

Imports the selected model, if any error may occur, please let me know. You can also open the listener (F11) and take a look what the error is.



# Export model

Select Export model ... from then menu.

Debug Mode:

If you want a full dump of what is exported, check this box, note that this is process consuming and Max may freeze for a period of time.

LOD's:

LOD are discussed later in the example.

NOTE:

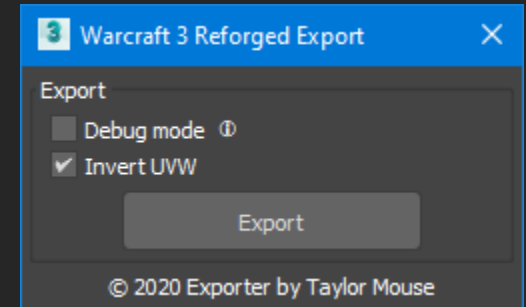
Meshes in the scene will be exported. Other objects will be exported even if they are hidden.

Invert UVW:

if original blp files are used, uncheck the box. For the Reforged DDS files, leave the box checked.

Export

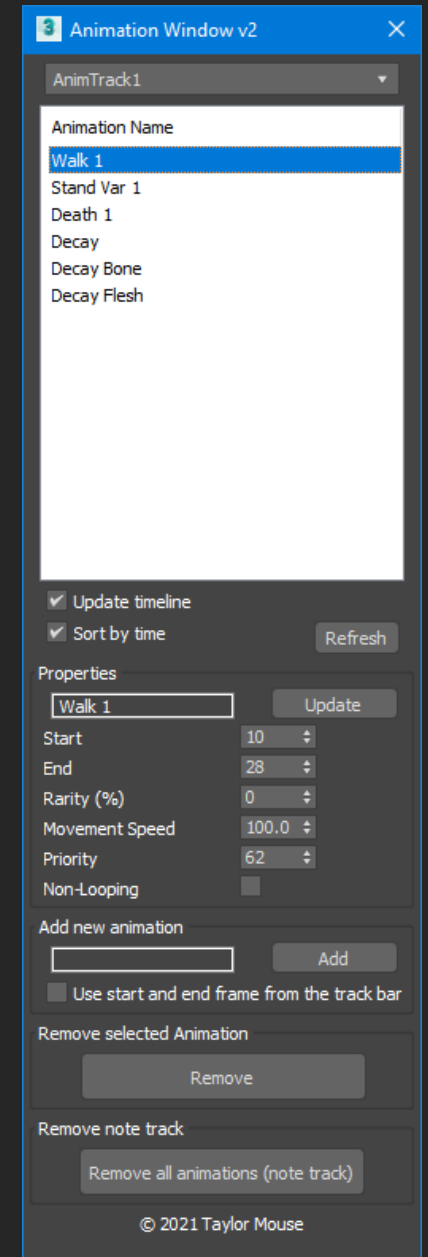
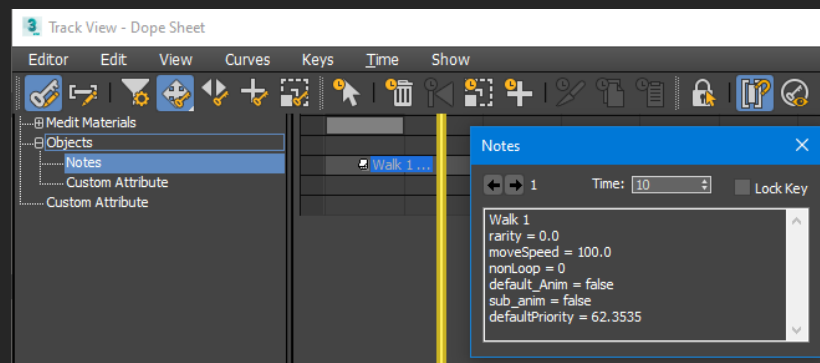
This will export the scene to mdx file format



# Animation Selector

- Open the Animation Selector from the WC3 Reforged Tools menu
- Animation Tracks: Some models have overlapping animation sequences, they can be found in the Animation Tracks drop down.
- Update timeline: When this is checked the animation track bar at the bottom will be adjusted to the correct start and end frame of the animation sequence
- Sort by time : Unchecking the box will sort the animations by name
- Refresh : Refreshes the list of animations
- Update: Update the selected animation. Note, changing the start and end frame may cause problems
- Properties : After selecting an Animation, it will fill the properties, changing them will update these properties
- Add New Animation : Fill in the properties, and a name for the new animation, then press the add button.
- Use Start and End Frame from the Trackbar: Checking this does not require you to fill in the Start and End frame.
- Remove selected animation: This removes the selected animation, but NOT the keys and frames of the animated objects in the scene
- Remove note track: Removes ALL animations and animation note tracks, does NOT remove the keys and animations of the animated objects

NOTE: The animations can be found in the Dope Sheet in a Notes track!



# User Properties

Select an object from the scene before opening the User Properties from the menu

Billboarding:

applies to Bones!

- Full : full billboarding of the bone
- Pivot on X Axis : billboarding on the X Axis
- Pivot on Y Axis : billboarding on the Y Axis
- Pivot on Z Axis : billboarding on the Z Axis

Collision Box:

Check this when a collision box is required. This is more of a legacy setting, in reforge, the naming convention is mandatory and must start with **B\_KGS\_**

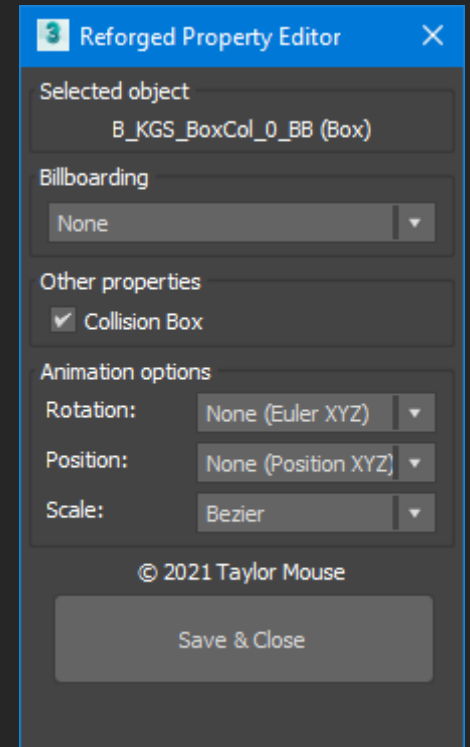
Animation options:

Change the way the animation works for position, rotation and scale animation.

- None ( Default Euler XYZ )
- Linear
- Hermite or TCB
- Bezier

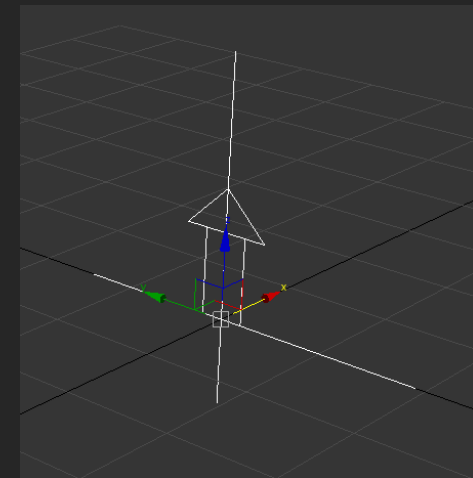
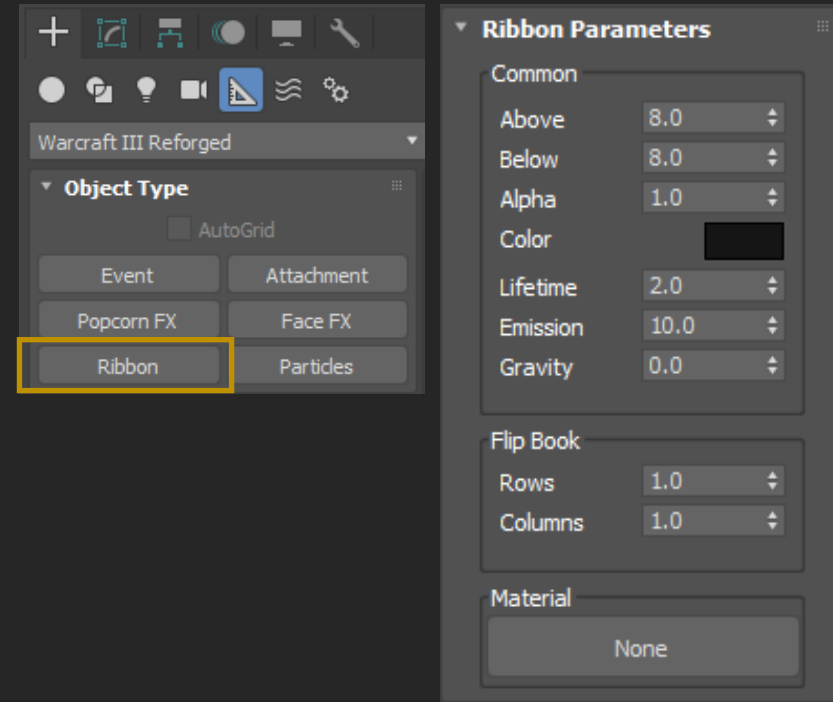
*Example: to animate a perfect rotating object, change this to Linear for Rotation*

Do not forget to press the Save & Close button before moving to another object!



# Ribbon Emitter

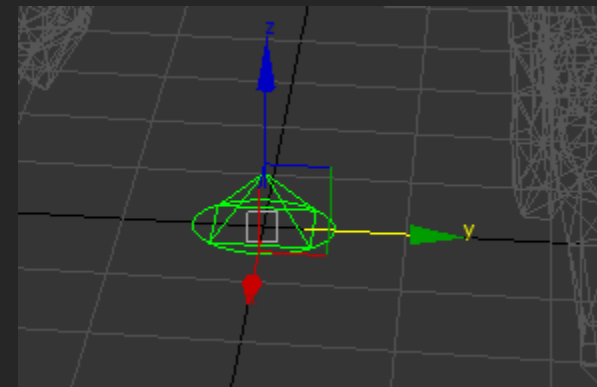
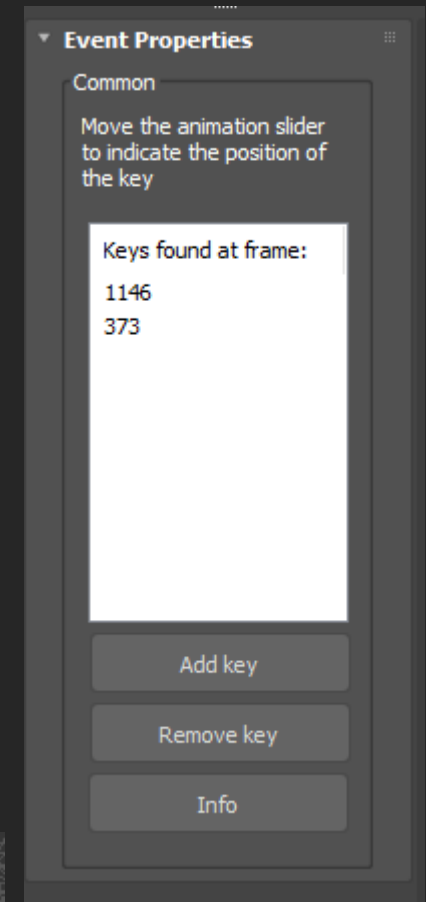
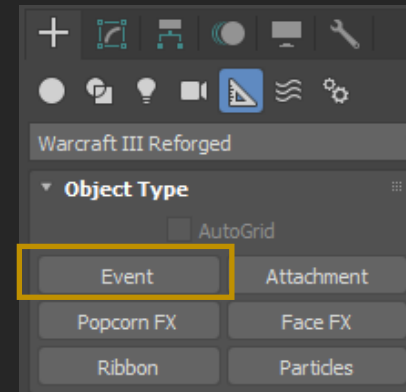
- Go to WC3 Reforged Tools -> Helpers menu and select Create Ribbon
- Ribbon Emitter ( Helper ) can also be found in the Create Tab in Helpers
- See the official Warcraft 3 Art Tools Documentation.pdf for detailed description
- Parameters
  - Above & Below: define the width of the object, above and below the center of the object.
  - Alpha: fixed alpha value of the emitted particles
  - Color: fixed color of the emitted particles
  - Lifetime: number of seconds the particle stays alive ( Edge Life )
  - Emission: number of particles that are emitted in total ( Edges/sec )
  - Gravity: sink or raise the particles additionally
  - Flipbook Rows & Columns: using a texture that has a particle strip, identifying the number of rows and columns in the texture
  - Material: create a WC3RefStandard Material first and select this to apply the material.



# Events

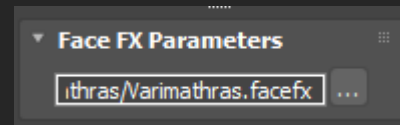
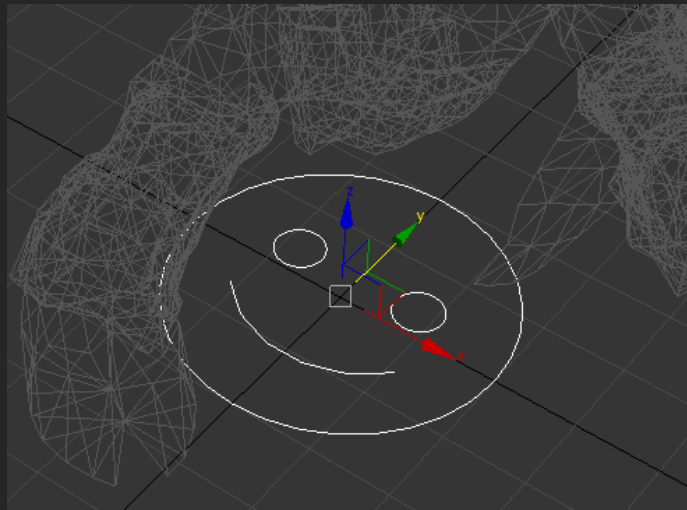
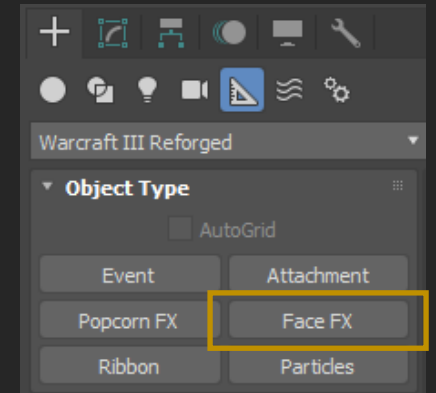
- Go to WC3 Reforged Tools -> Helpers menu and select Create Event
- Event helpers can also be found in the Create tab, Helpers
- Selecting the event brings up an additional property window where you can add the keys when the event will happen ( when means, on what frame )
- Move the animation trackbar (at the bottom ) to the required key and press the add key to add it in the list
- In the example, the FPTxFCL1 event is selected and has 2 keys ( 1146 & 373 ) at these frame, this event will happen.
- An event cannot be animated
- Please refer to the official Warcraft III Art Tools documentation.pdf
  - (Appendix C to F) for a full list of supported names

Footprints	FPTxyyyy	Appendix C
Blood splats	SPLxyyyy	Appendix C
Uber Splat	UBRxyyyy	Appendix D
Sound Events	SNDxyyyy	Appendix E
Spawn Objects	SPNxyyyy	Appendix F



# Facial Effects (FX)

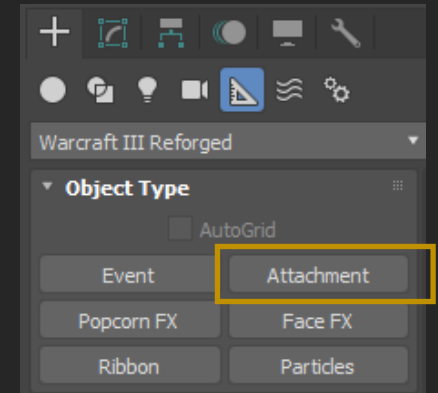
- Go to WC3 Reforged Tools -> Helpers menu and select Create Face FX
- Face FX helpers can also be found in the Create tab, Helpers
- It allows the usage of facial effects of the model. However it is nothing more than a reference to the .facefx file
- Usually only one .facefx file is used and is called "Node"
- In 3DS Max the FaceFX plugin looks like a smiley with a parameter pointing to an external .facefx file



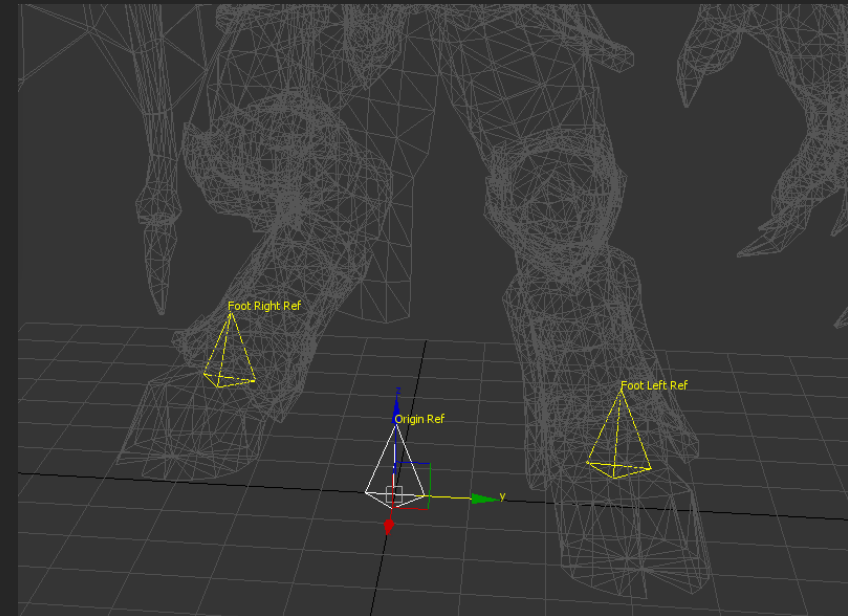
- NOTE: at the time of writing no research is done in unravelling the content of the file (probable contains animations linked to the facial bones)

# Attachments

- Go to WC3 Reforged Tools -> Helpers menu and select Create Attachment
- Attachment helpers can also be found in the Create tab, Helpers
- Select it and rename it
- No additional properties are required
- An attachment can be animated, however this is not supported in the exporter.
- To animate it, create a separate bone for it and link the attachment to the bone using the “Select and link” tool in 3DS Max.
- Please refer to the official Warcraft III Art Tools documentation.pdf page 22 (Appendix B) for a full list of supported names
- Example from the Varimathras model

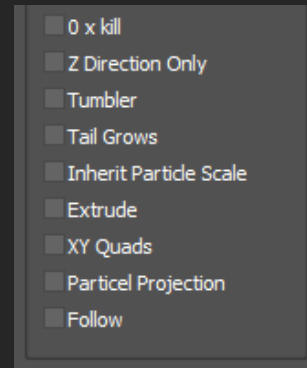
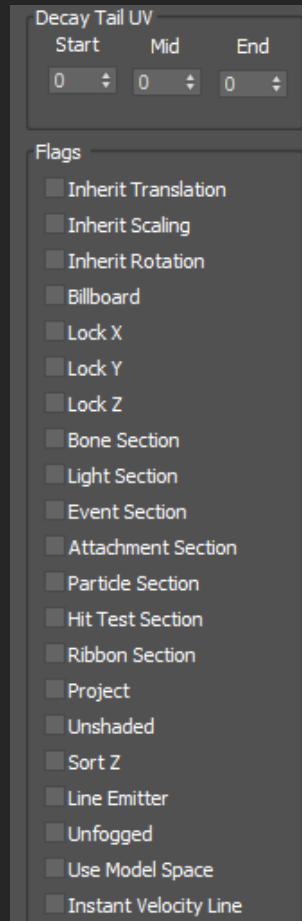
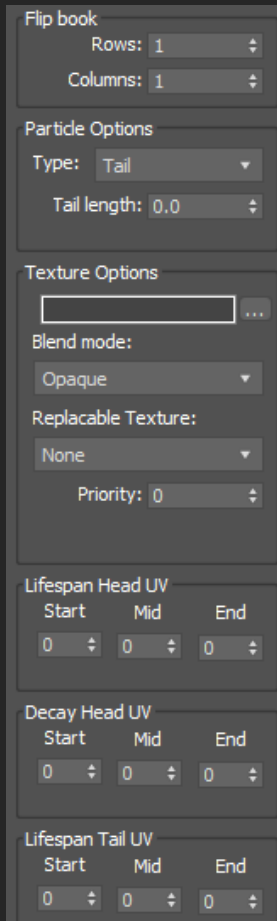
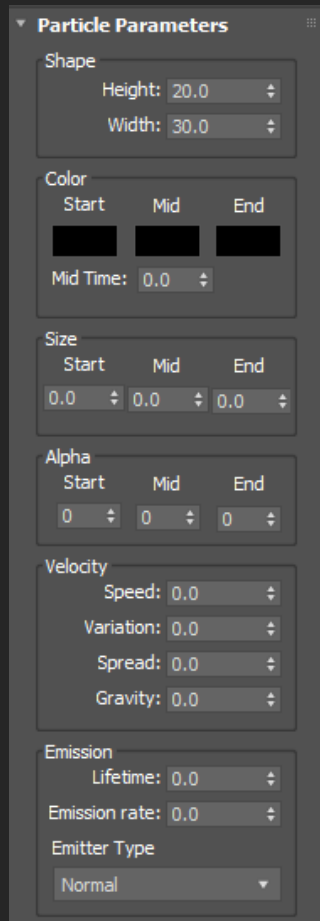


Name (Sorted Ascending)	Fr...	R...	Display as Box
0 (default)	*	*	☒
Attachments	*	*	☒
Chest Ref	*	*	☒
Foot Left Ref	*	*	☒
Foot Right Ref	*	*	☒
Hand Left Ref	*	*	☒
Hand Right Ref	*	*	☒
Head Ref	*	*	☒
Origin Ref	*	*	☒
OverHead Ref	*	*	☒
Weapon Left Ref	*	*	☒
Weapon Right Ref	*	*	☒

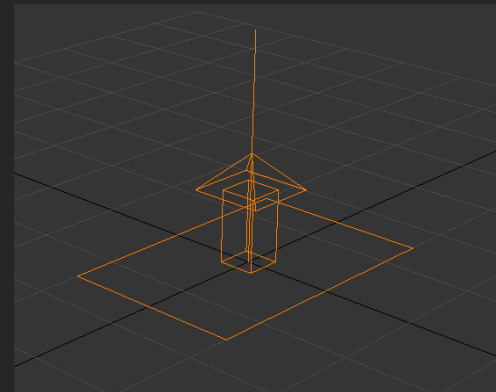
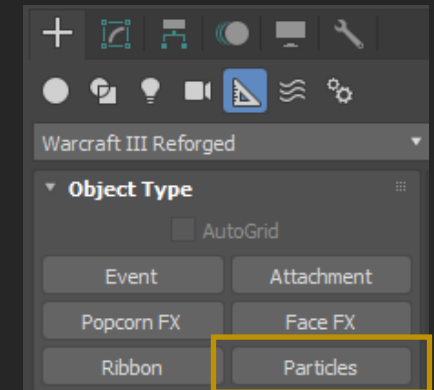




# Particle Emitter



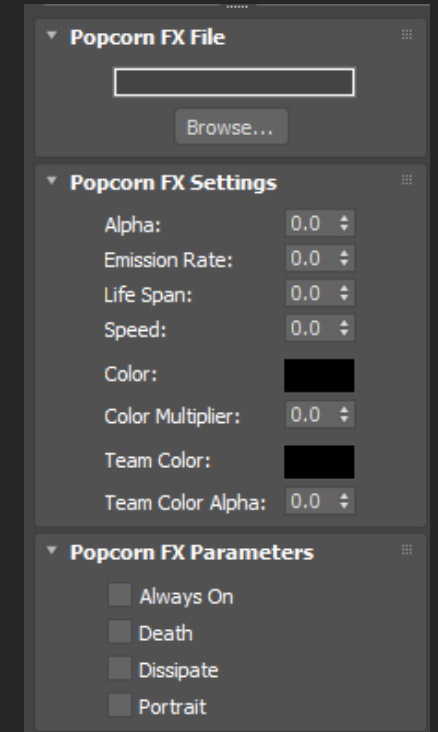
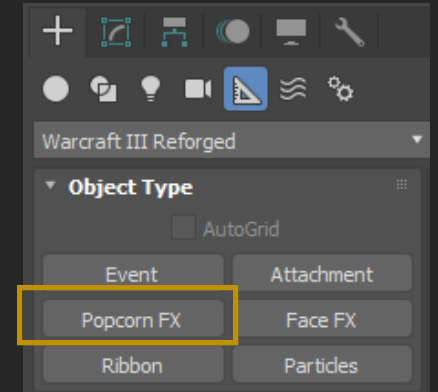
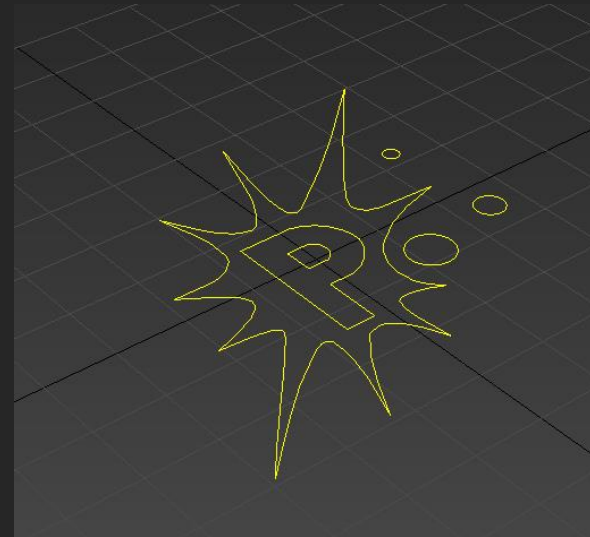
- Go to WC3 Reforged Tools -> Helpers menu and select Create Particle Emitter
- An attachment will be created in the scene at position [0,0,0]
- See the official Warcraft 3 Art Tools Documentation.pdf for a full detailed description
  - ( page 12 – 14 )



# Popcorn FX

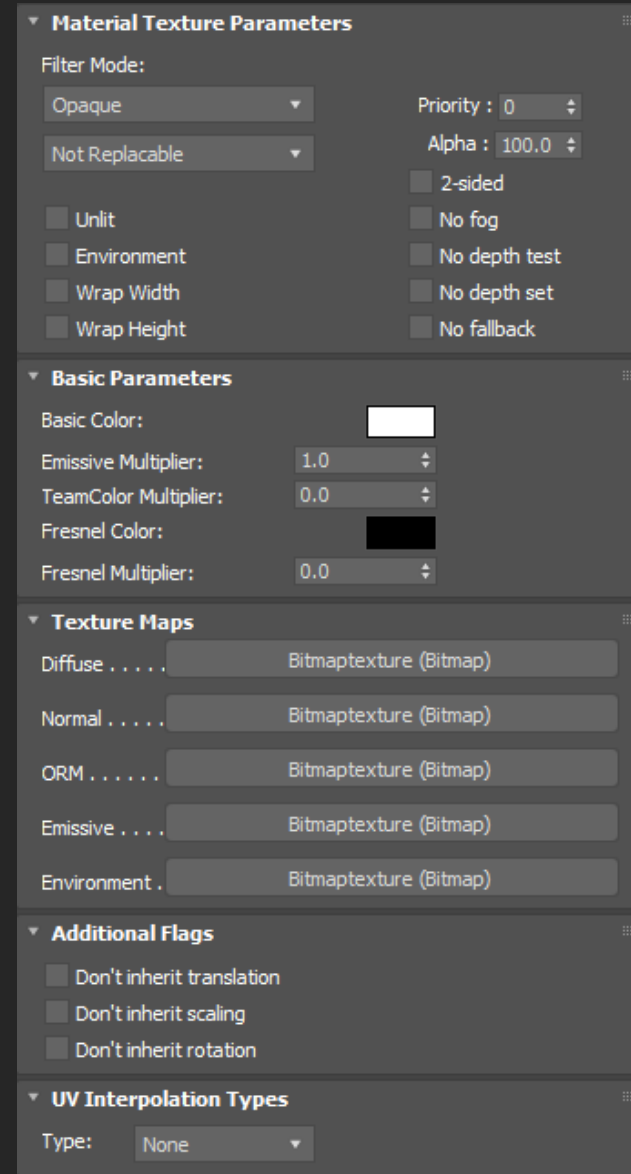
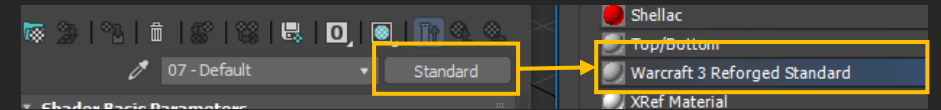
- Popcorn FX is a multi platform real time effects solutions for particle effects.
- You can read more about it here: <https://www.popcornfx.com/>
- Although the website allows you do download their Editor, it is, at this moment, impossible to import the Popcorn FX files from WC3 Reforged.
- Go to WC3 Reforged Tools -> Helpers menu and select Create Popcorn FX

- Popcorn FX helpers can also be found in the Create tab, Helpers
- Popcorn FX File: select the file from WC3 Reforged used for the effect
- Popcorn FX Settings: Additional properties that are used on top of the existing effects in the file.
- Popcorn FX Parameters: indicates when the effect needs to take place



# Material

- Open the Material editor ( press M ), select a material slot and change the Standard type to a Warcraft 3 Reforged Standard material
- Warcraft III Reforged materials are PBR material ( Physical Based Rendering )
- Material Texture Parameters
  - Filter mode
    - Opaque: model is drawn solid
    - Mask: the transparent alpha mask from the diffuse map is used
    - Blend: depth set is turn off
    - Add: additive drawing, has a ghost effect mode
    - BlendAdd: both blend and additive is used
    - Mod: make the semi transparent darken the background, opacity has no effect
    - Mod2x: depth is turned off, no sort order error
  - Replacable texture
    - Not Replacable: default
    - Team Color: team color mask from the ORM map is used
    - Team Glow: material serves as a team glow
  - Unlit: no light effect are used, giving a flat texture look
  - 2-sided: backface culling is not used, drawing both sides of a polygon
  - No fog: model ignores the darkening of the distant fog
  - No depth set: the model's polygons are not written to the depth buffer
  - No depth test: the model's polygons will not test the sort order from the depth buffer
  - Alpha: can be animated to make the model transparent
  - Priority: prioritizes the writing to the depth buffer
  - Wrap Width & Height: allows texture tiling in the horizontal and vertical axis
  - Environment: specifies if the model is impacted by the reflection of the environment map
- Texture Maps
  - Diffuse map ( is more an albedo map ) -> U & V can be animated for this map
  - Normal map
  - ORM map
  - Emissive map Replaceable map
- Additional Flags
  - Don't inherit translation: if the model is moved, don't translate the texture
  - Don't inherit scaling : if the model is scaled, don't scale the texture
  - Don't inherit rotation : if the model is rotated, don't rotate the texture



- Basic Parameters:
  - Basic Color
  - Emissive Multiplier
  - Team Color Multiplier
  - Fresnel Color
  - Fresnel Multiplier
- UV Interpolation Types:
  - None
  - Linear
  - Hermite
  - Bezier

**Import**

# Import Example

Material Editor - MAT\_Varimathras...

Modes Material Navigation Options Utilities

Material Texture Parameters

Filter Mode: [Dropdown] Priority: 0

Mask: [Dropdown] Alpha: 100.0

Not Replacable [Dropdown]

2-sided [Checkbox]

Unlit [Checkbox] No fog [Checkbox]

Environment [Checkbox] No depth test [Checkbox]

Wrap Width [Checkbox] No depth set [Checkbox]

Wrap Height [Checkbox] No fallback [Checkbox]

Basic Parameters

Basic Color: [Color Picker]

Emissive Multiplier: 1.0

TeamColor Multiplier: 0.0

Fresnel Color: [Color Picker]

Fresnel Multiplier: 0.0

Texture Maps

Diffuse: .Bitmaptexture (Undead\_Varimathras\_Main\_Diffuse...)

Normal: .Bitmaptexture (Undead\_Varimathras\_Main\_Normal...)

ORM: .Bitmaptexture (Undead\_Varimathras\_Main\_ORM...)

Emissive: .Bitmaptexture (Undead\_Varimathras\_Main\_Emissive...)

Environment: Bitmaptexture (EnvironmentMap.dds)

Additional Flags

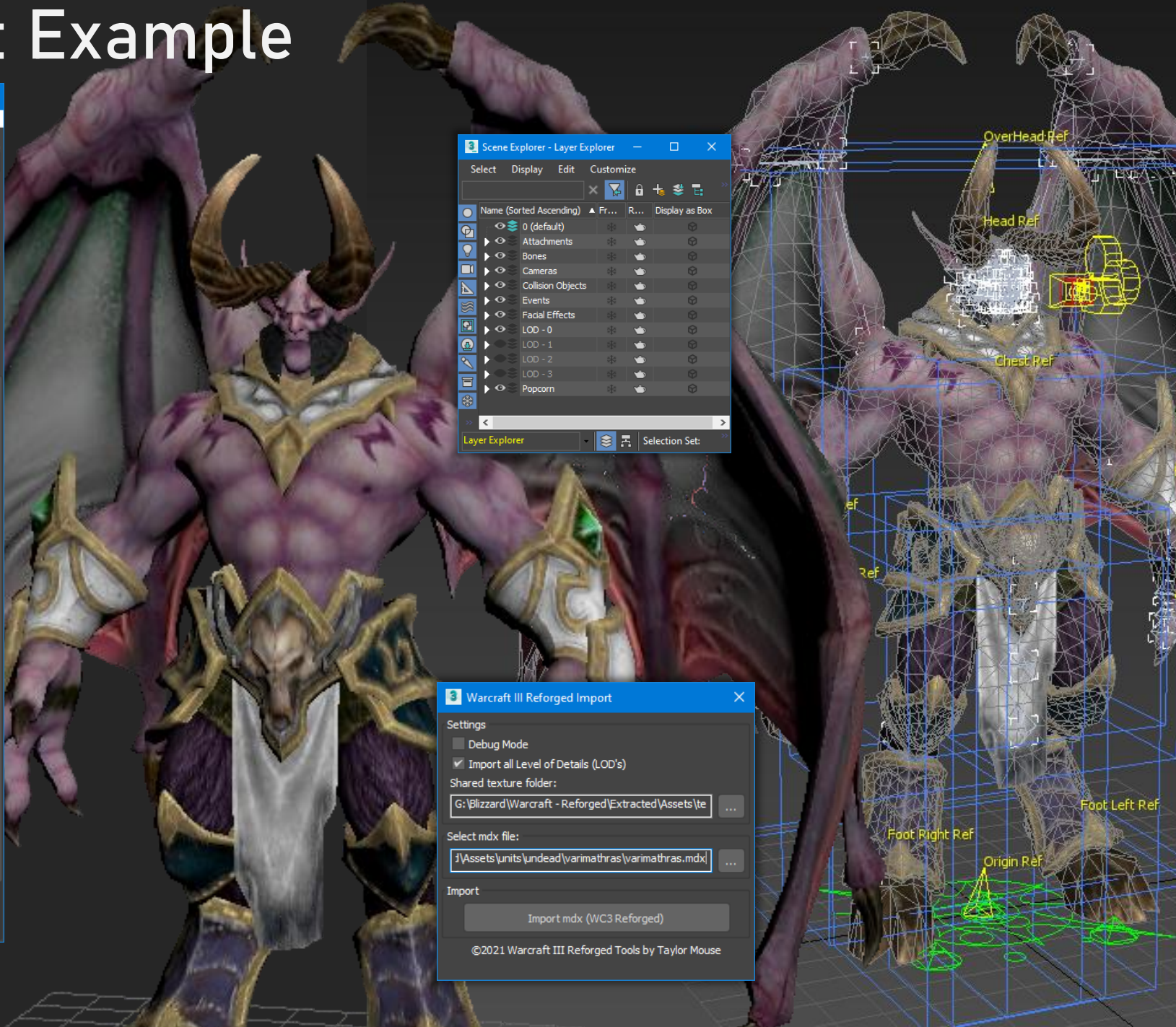
Don't inherit translation [Checkbox]

Don't inherit scaling [Checkbox]

Don't inherit rotation [Checkbox]

UV Interpolation Types

Type: None



Scene Explorer - Layer Explorer

Select Display Edit Customize

Name (Sorted Ascending)	Fr...	R...	Display as Box
0 (default)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attachments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cameras	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collision Objects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facial Effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOD - 0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOD - 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOD - 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOD - 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Popcorn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Layer Explorer Selection Set:

Warcraft III Reforged Import

Settings

Debug Mode [Checkbox]

Import all Level of Details (LOD's) [Checked]

Shared texture folder:

G:\Blizzard\Warcraft - Reforged\Extracted\Assets\te ...

Select mdx file:

J:\Assets\units\undead\varimathras\varimathras.mdx ...

Import

Import mdx (WC3 Reforged)

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Animation Window v2

AnimTrack1

Animation Name

- Stand 1
- Stand 2
- Spell Third
- Spell 1
- Walk 1
- Spell Slam 1
- Death 1
- Attack 1
- Attack 2
- Cinematic Frustrated One
- Cinematic Headnod One
- Cinematic Headshake One
- Cinematic Listening One
- Cinematic Standard One
- Decay
- Cinematic Walk One

Update timeline [Checked] Sort by time [Checked] Refresh

Properties

[Text Field] Update

Start 0

End 0

Rarity (%) 0

Movement Speed 0.0

Priority 0

Non-Looping [Checked]

Add new animation [Text Field] Add

Use start and end frame from the track bar [Checked]

Remove selected Animation [Text Field] Remove

Remove note track [Text Field] Remove all animations (note track)

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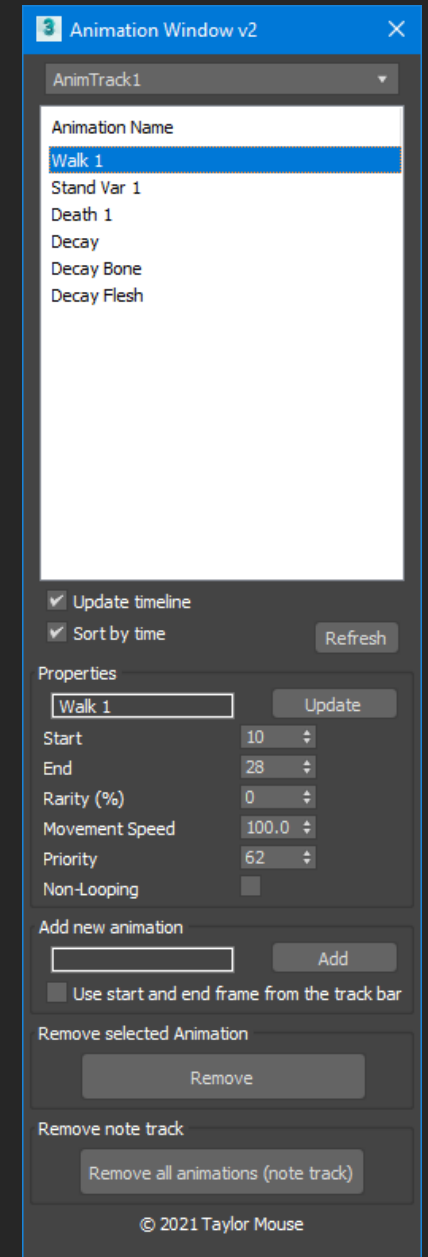
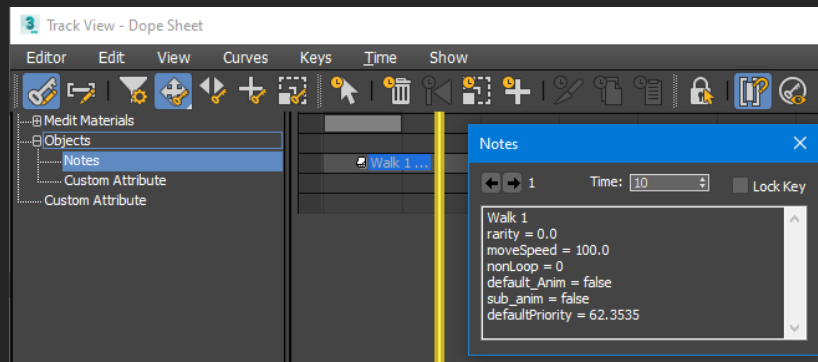
# Export

Animation Sequences Setup

# Animation Selector

- Open the Animation Selector from the WC3 Reforged Tools menu
- Please refer to the official Warcraft III Art Tools documentation.pdf for supported naming conventions of the animation names
- If no animations are created, the exporter will create a standard Stand animation

NOTE: The animations can also be found in the Dope Sheet in a Notes track!



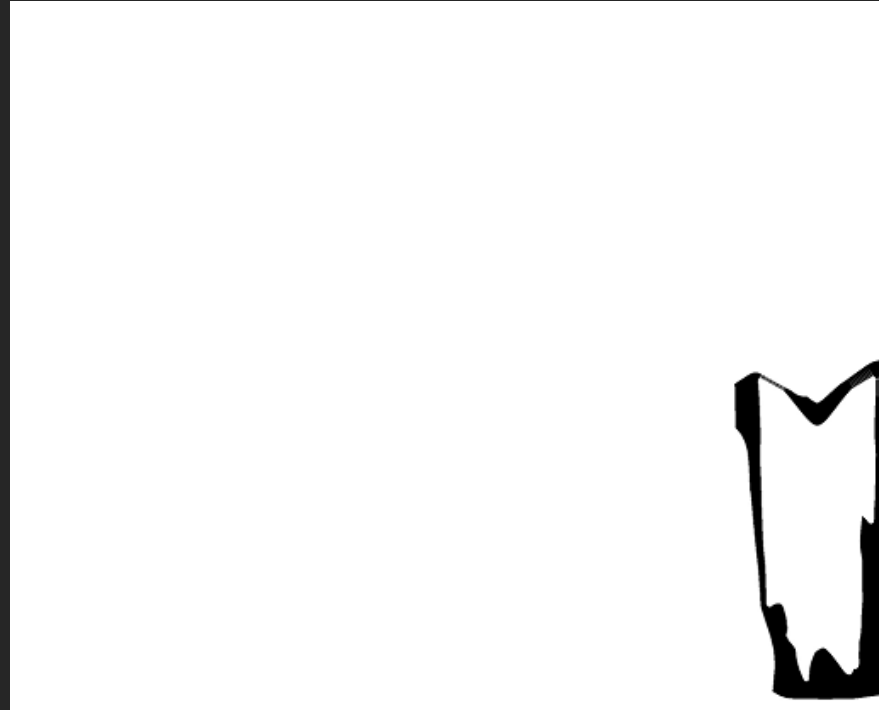
# Export

Material Setup



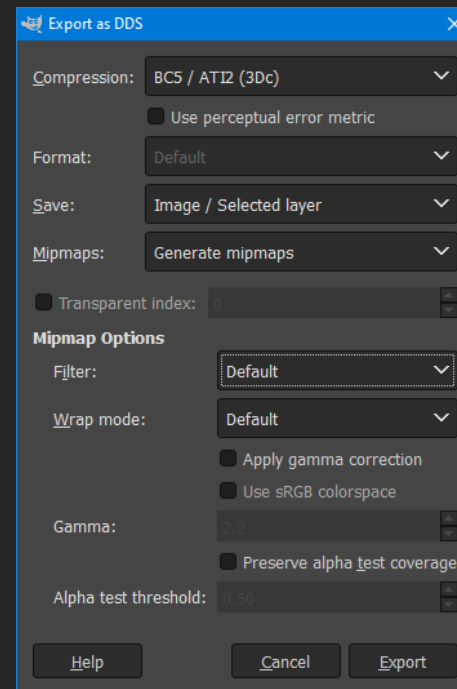
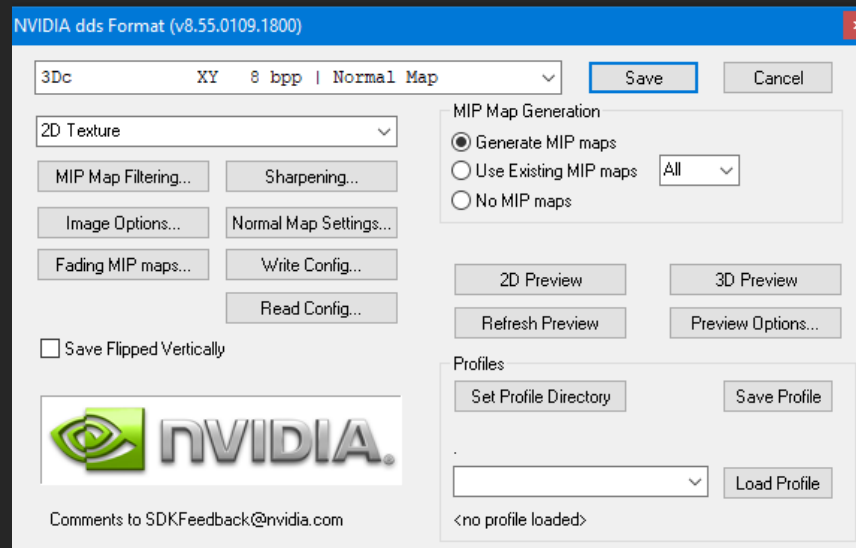
# Diffuse map

- The diffuse map ( should be called albedo map ) should not contain any light information, only color information
- The alpha channel contains the transparent information and is used in the Alpha Mask map
- Use Mask as filter mode to use the alpha layer
- Team Color is WHITE(ish)
- DXT5 .dds image type ( the texture shown, is just a piece of it, not the whole texture)



# Normal map

- This is a ATI2N .dds file, prior to 3DS Max 2019, it cannot display this type of file, if you want to use this, save the file first to a DXT1 .dds image, select it in Max, and convert it to ATI2N, this can be done in Photoshop and GIMP
- Alpha channel is white ( not used ) or none existing
- Blue channel is white
- R & G are the channels used for the normal map
- If you want to create an empty normal map, take the rgb colors 128 128 255.



# ORM Map

- The ORM map stands for occlusion roughness and metal reflection and the alpha channel holds the team color alpha map
- Use white for full metal reflection and black for no metal reflection.
- Use white for no shadow and black for full shadow in the ambient occlusion
- Use black for no roughness, white for full roughness, mostly this is grey'ish
- Use white for team color and black for no team color, in the diffuse map, keep the team color parts white
- DXT5 .dds image type

R channel : Ambient Occlusion



G channel : Roughness



B channel : metal reflection



A channel : team color



# Emissive Map

- An emissive map is a texture that is used to make certain parts glow.
- This can be a color texture.
- The emissive alpha parameter is used to make it more or less glow.
- Example:
  - for Varimathras's pouldrons, there is a emissive map.
  - The black parts do not emit anything, where the green will give a nice glow in the game
- DXT1 .dds image type



# Reflection map

- A reflection map is used to add as a reflection on the metal and roughness map
- It is a cubical or spherical map the emulates the surroundings
- For Warcraft III Reforged, the most common map used it's the EnvironmentMap.dds

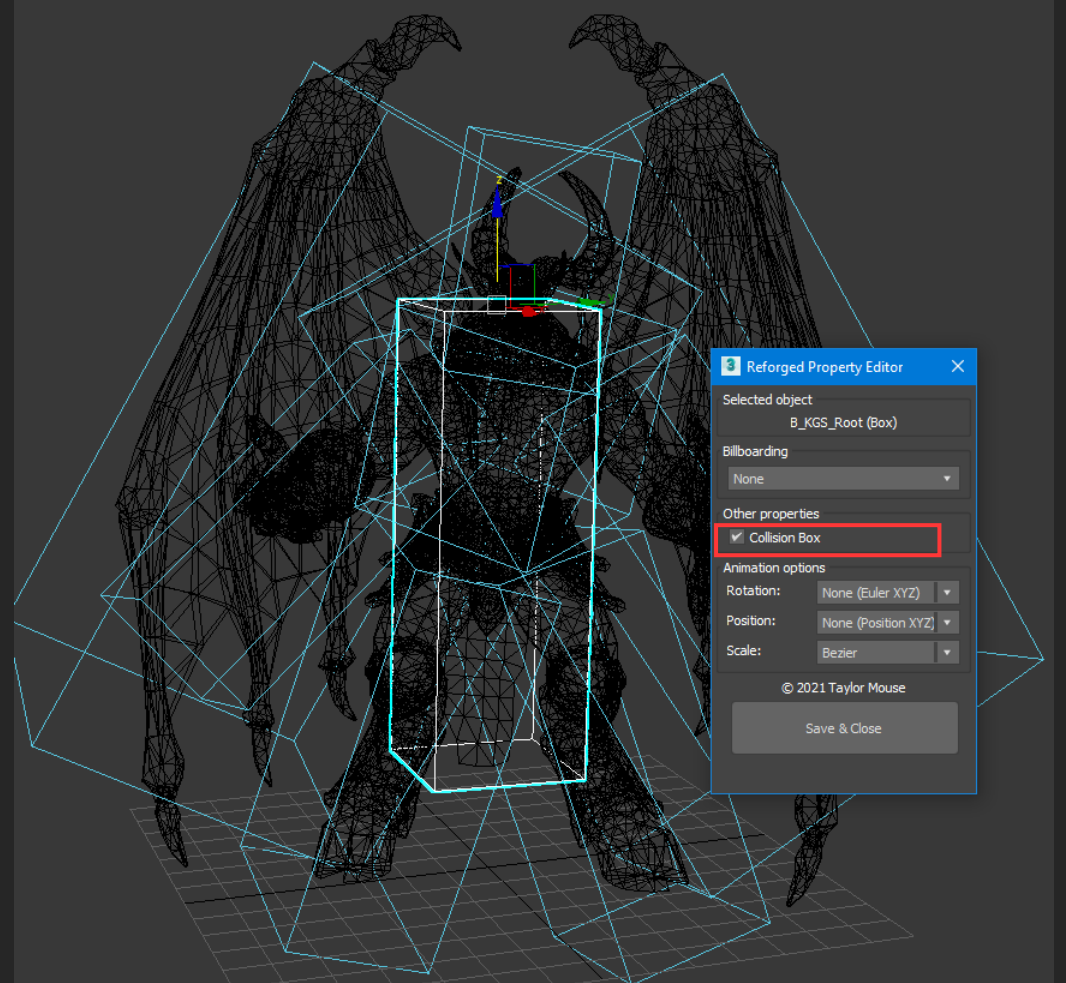


# Export

Collision Objects Setup

# Collision Objects

- Supported objects Boxes, Plane (?), Spheres and Cylinders
- A collision object always starts with the prefix
  - **B\_KGS\_**
- In the mdx, these objects have their own animations
- When creating new ones, they can be linked to a parent bone
- Mark them as collision objects using the User Property window
- There must always be ONE B\_KGS\_ROOT object



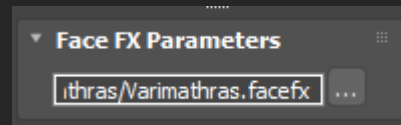
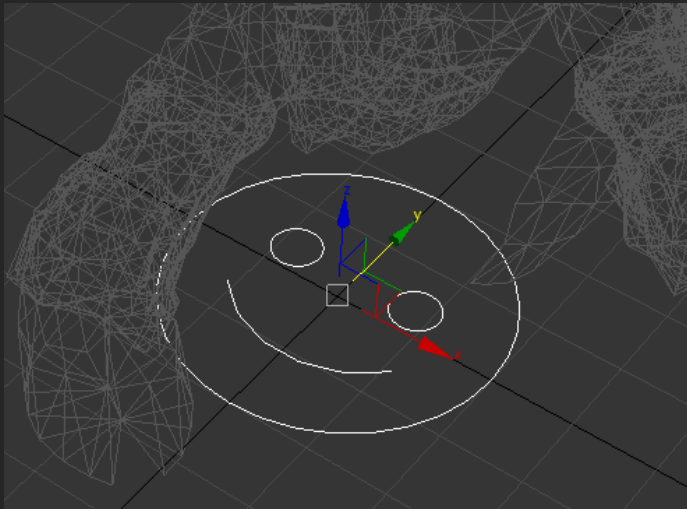
# Export

Facial FX Setup



# Facial Effects (FX)

- Go to WC3 Reforged Tools -> Helpers menu and select Create Face FX
- The name of the object **MUST** be "Node" and cannot have 2 FaceFX in the scene
- It allows the usage of facial effects of the model. However it is nothing more than a reference to the .facefx file
- In 3DS Max the FaceFX plugin looks like a smiley with a parameter pointing to an external .facefx\_ingame file



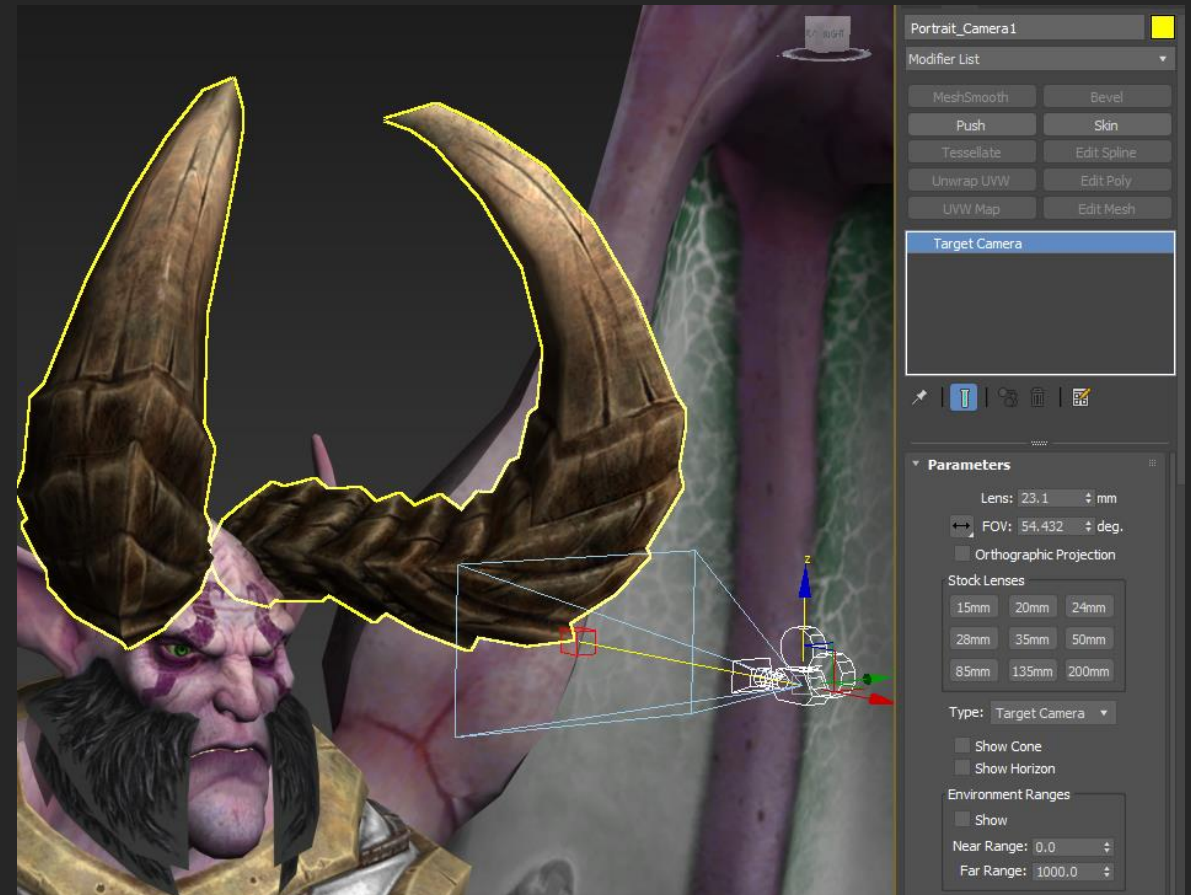
- NOTE: at the time of writing no research is done in unravelling the content of the file ( probable contains animations linked to the facial bones )

Export

Camera Setup

# Cameras

- A camera **must** be of type **TargetCamera**
- The Position of the Camera can be animated ( KCTR )
- The Position of the Target of the Camera can be animated ( KTTR )
- The Camera Roll can be animated ( KCRL )
- Other animations are not exported
- The following properties are taken into account:
  - FOV ( Field of View)
  - Near Clip ( usually 0)
  - Far Clip ( usually 10,000 )
  - Name of the camera
- Other properties in Max are not taken into account



Export

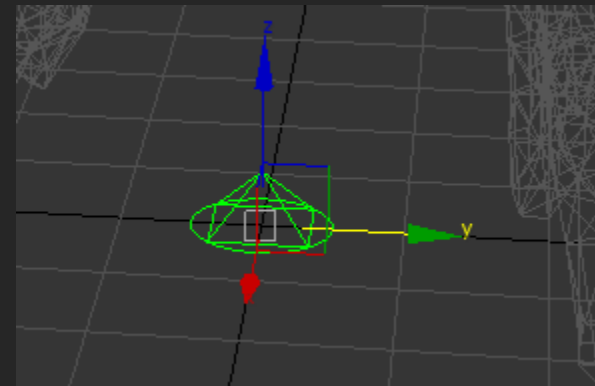
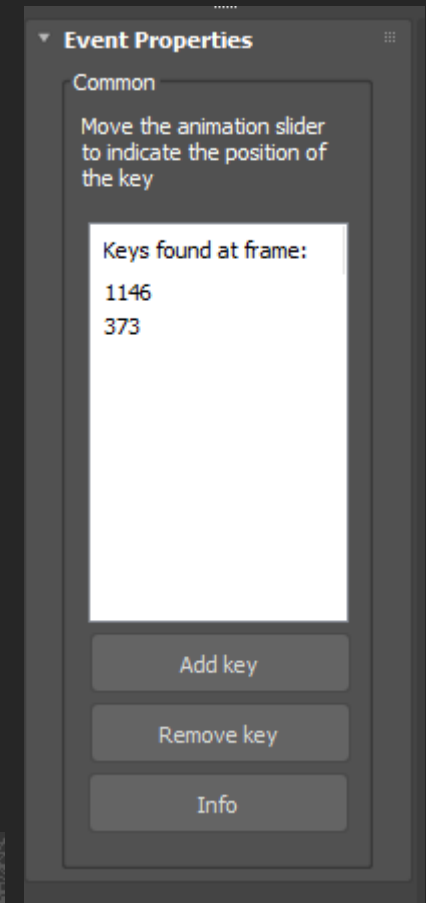
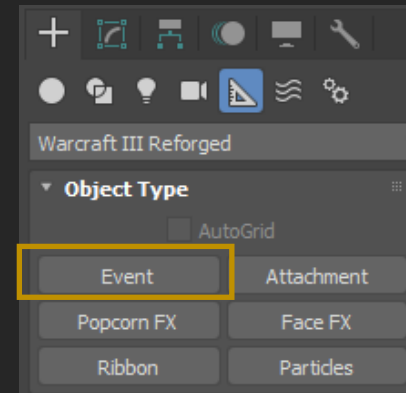
Events Setup

# Events

- Go to WC3 Reforged Tools -> Helpers menu and select Create Event
- Event helpers can also be found in the Create tab, Helpers
- Selecting the event brings up an additional property window where you can add the keys when the event will happen ( when means, on what frame )
- Move the animation trackbar (at the bottom ) to the required key and press the add key to add it in the list
- In the example, the FPTxFCL1 event is selected and has 2 keys ( 1146 & 373 ) at these frame, this event will happen.
- An event cannot be animated but the position is taken into account!
- Please refer to the official Warcraft III Art Tools documentation.pdf
  - (Appendix C to F) for a full list of supported names

Footprints	FPTxyyyy	Appendix C
Blood splats	SPLxyyyy	Appendix C
Uber Splat	UBRxyyyy	Appendix D
Sound Events	SNDxyyyy	Appendix E
Spawn Objects	SPNxyyyy	Appendix F

- **NOTE:** The exporter does NOT validate the name of the events!

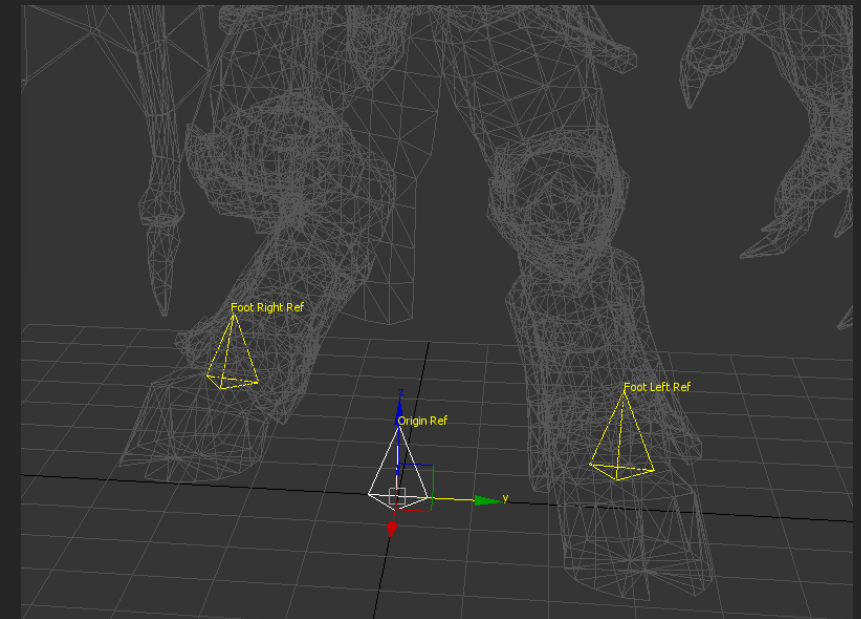
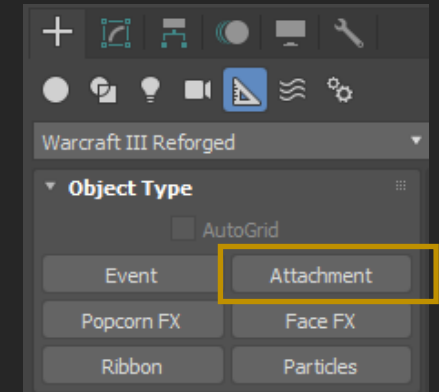


# Export

Attachment Setup

# Attachments

- Go to WC3 Reforged Tools -> Helpers menu and select Create Attachment
- Attachment helpers can also be found in the Create tab, Helpers
- To animate it, create a separate bone for it and link the attachment to the bone using the “Select and link” tool in 3DS Max.
- Please refer to the official Warcraft III Art Tools documentation.pdf page 22 (Appendix B) for a full list of supported names
- At least 1 attachment with the name Origin Ref must be present
- Example from the Varimathras model



Name (Sorted Ascending)	Fr...	R...	Display as Box
0 (default)			
Attachments			
Chest Ref			
Foot Left Ref			
Foot Right Ref			
Hand Left Ref			
Hand Right Ref			
Head Ref			
Origin Ref			
OverHead Ref			
Weapon Left Ref			
Weapon Right Ref			

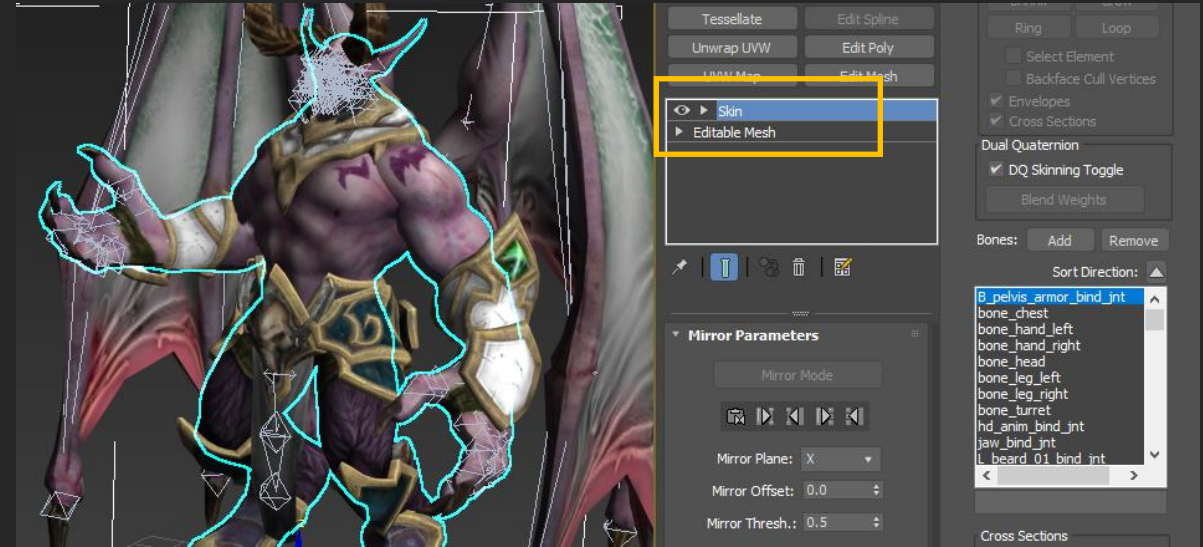
# Export

Meshes Setup



# Meshes

- Invisible meshes will not be exported
- Meshes for different LOD's must be suffixed with the correct LOD name
  - Supported LOD names are **\_LOD1**, **\_LOD2** and **\_LOD3**
  - Mesh names without any of these 3 are exported as LOD level 0 ( highest level of detail )
  - Mesh names cannot be longer than 80 characters
- Mesh deformation is support through the use of the SKIN modifier on a EDITABLE\_MESH
- The maximum supported bones per vertex is 4
- A root bone with NO WEIGHTS should be present in the bone list as this will be used as the ZERO bone for ZERO weights
- Helpers ( like in Warcraft 3 are often used for animation but not linked to a mesh ) are not found in the reformed mdx files for mesh deformation
- Bone names should not exceed 80 characters

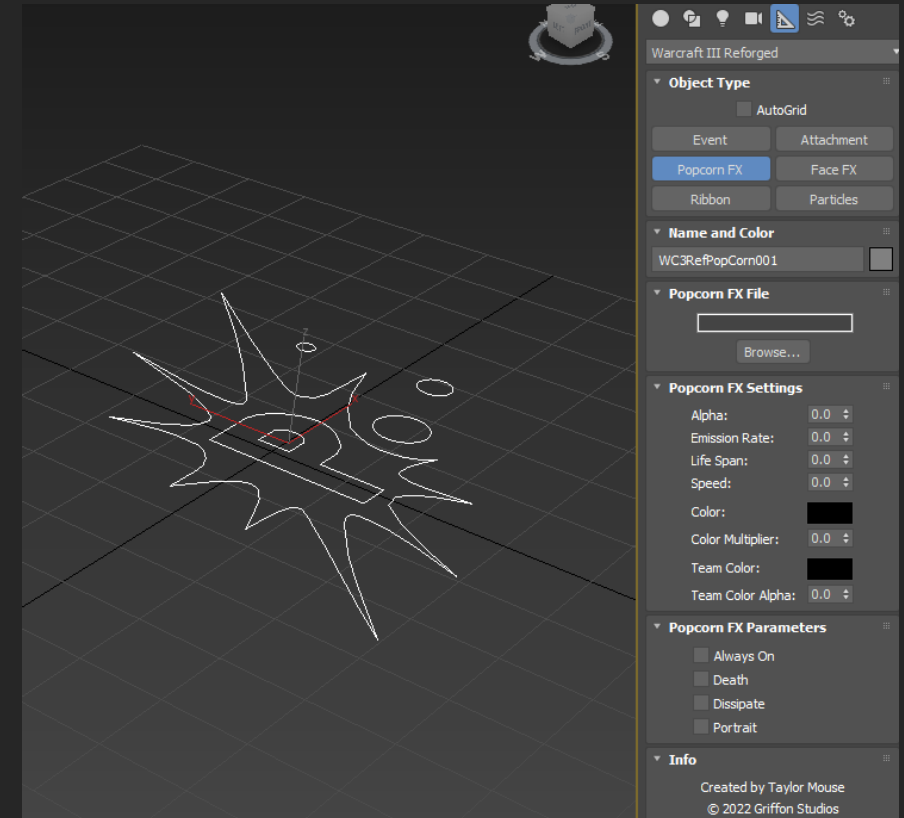


Export

Popcorn FX

# Popcorn FX

- At this point there is no wait to create your own Popcorn FX that is useable in Reforged.
- You can however add the existing Popcorn FX files from the game to the scene.
- Go to the **create** panel and select **helpers**, select **Warcraft III Reforged**
- Add the Popcorn FX to the scene
- In the Popcorn FX File, select the desired file.
- The Settings add specific extra properties to the file.
- You can add a visibility track to the object.
- At this point, no animation on these settings is supported

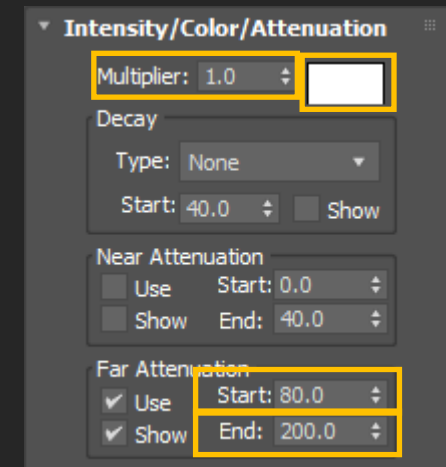
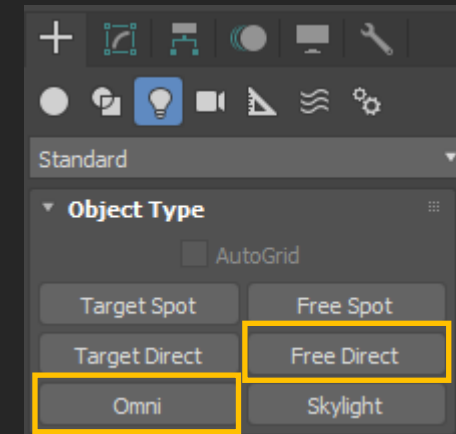


Export

Lights

# Lights

- To create lights, select the **Create** panel, **Lights** and select **Standard** in the dropdown.
  - Only **Free Direct** and **Omni** are supported
  - Visibility track is supported
  - Light Intensity animation is supported
- 
- Properties supported in the Intensity/Color/Attenuation section
    - Multiplier (animatable)
    - Color
    - Far Attenuation ( Start & End )

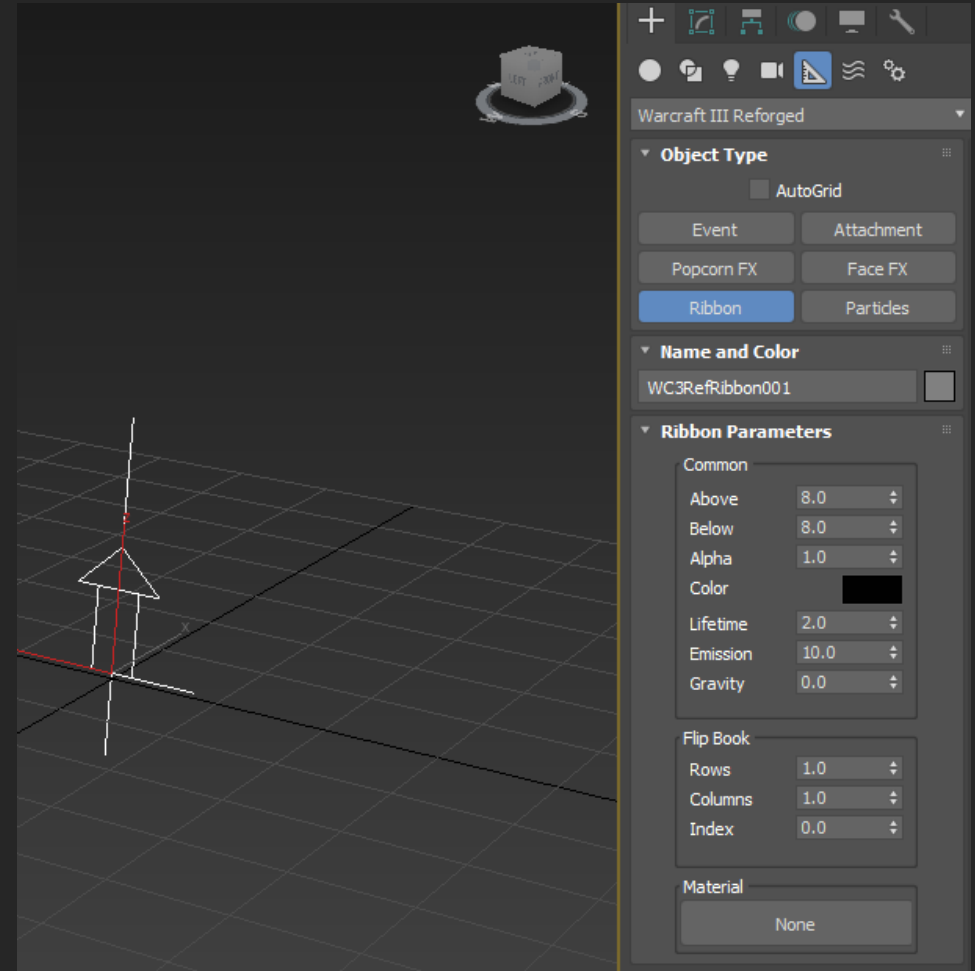


# Export

Ribbon Emitters

# Ribbon Emitters

- Go to the **Create** panel, select **Helpers**, and select **Warcraft III Reforged** from the dropdown.
- Select **Ribbon**
- A **Visibility track** is supported for ribbons
- Ribbons support the following animatable properties:
  - **Above** (line above the center)
  - **Below** (line below the center )
  - **Alpha**
  - **Color**
  - **Index** of the flipbook
- Material must be a **Warcraft III Reforged Material**



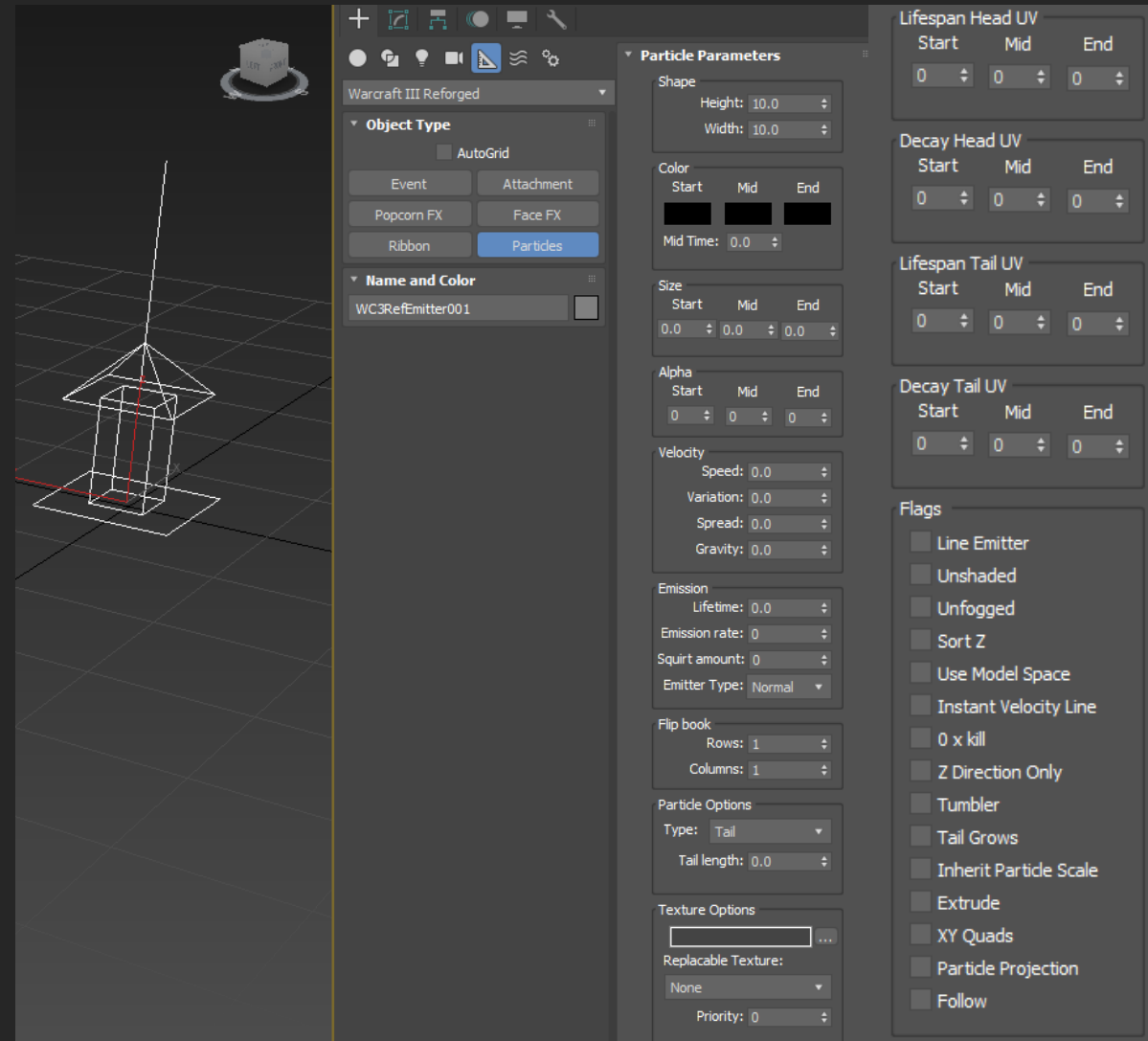
# Export

Particle Emitters



# Particle Emitters

- Find **Particle Emitters** in the **Create** panel, **Helpers**, select **Warcraft III Reforged** from the dropdown and select **Particles**
- **Visibility** track is supported
- Animation is only supported on the **Emission Rate**
- NOTE: **Texture** is a reference to a file



# Appendix

# Interesting url's

- [My Github page](#)
- [Official Starcrat II Art Tools](#)
- [SC2ArtTools2016.zip](#)
- [My Modded models](#)
- [Autodesk 3D Studio Max](#)
- [Casc Storage Explorer \(Required to open Blizzard archive game files\)](#)
- [Warcraft III Art Tools Documentation.pdf](#)