

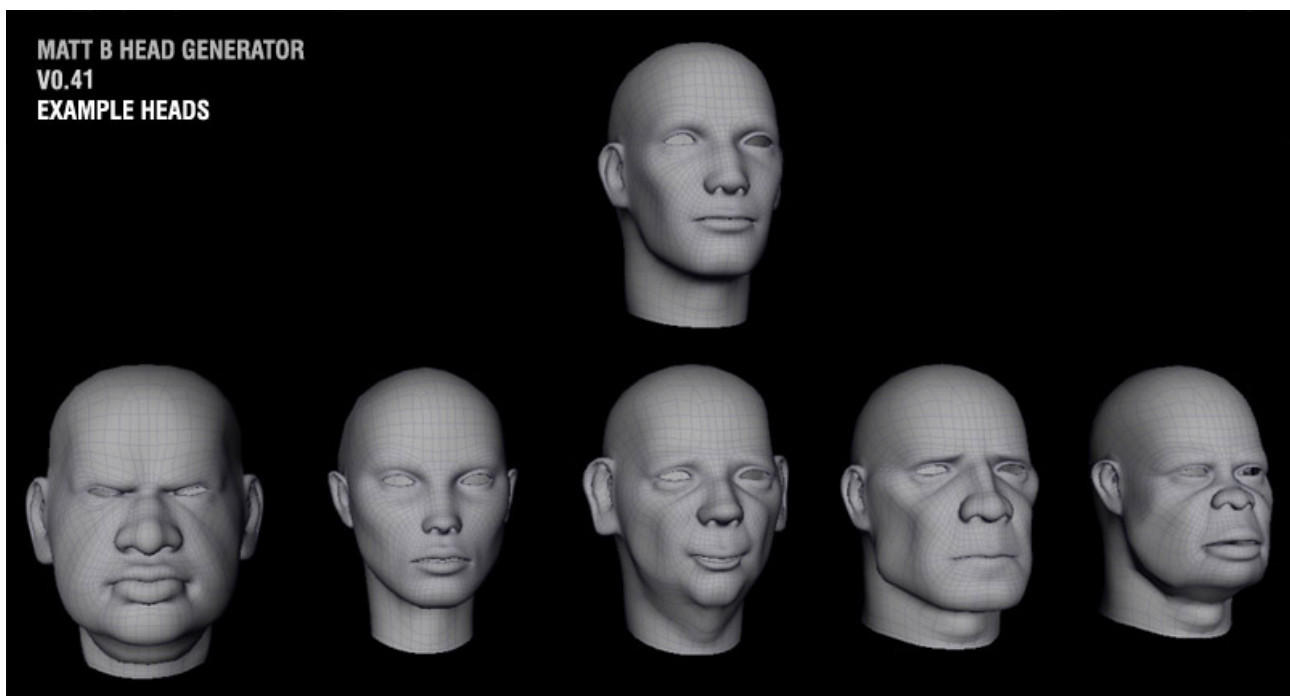
## Blendshape based Headgenerator. Version 0.41 Documentation

### Aims

This tool is a general purpose blendshape based head creator which is designed to vastly speed up the initial modelling phase of head creation, leaving only minimal manual tweaking and detailing necessary to finalise a head. It also contains basic animation features and a set of essential facial animation blendshapes which can be applied to help the otherwise tedious task of making all the poses necessary to animate a head.

The idea is based on the fact that whenever a new character's head needs to be created a lot of artists start from scratch each time, it was my intent to explore the possibility of providing a flexible, general purpose topology and base mesh so that content can be continually reused.

Overall the aim of this tool is to automate a lot of the tedious low level tweaking work necessary when creating a head and leave the user free to operate on higher level, fast controls.



*A sample picture of some of the heads that are creatable within a fairly limited time given the tools available. The upper model is the reference base mesh.*

## Features

- Blendshape based head creator, all meshes share the same base topology and are pre UVed
- Topology is designed for cleanness and extreme flexibility, it should be suitable for virtually any facial type
- High level adjustments – Controls for high level large scale tweaking
- Premade heads - Example heads with variable amounts of detail, the majority of these example heads were made within this tool
- Tweak level adjustments – Each area of the face has a subset of tweak controls which supported virtually any possible facial tweaks required.
- Expressions - A set of basic keyable facial expressions based on the Jason Osipa blendshape setup which may be helpful for crude facial animation or may instead be used to help speed up the creation of more detailed blendshapes. Morphing sequences can be easily achieved by keeping facial animation consistent and then blending between different facial shapes.
- Randomiser – All settings can be randomised based on a global "random factor" value, this can be used to randomise all global controls or just for randomisation of small sections or subsets of the face
- Easily keyable Controls – All controllable attributes can be keyed with one button. Facial expressions have a separate keying function if required so that less unnecessary keys are generated. All keys can be easily deleted if required plus reset commands are readily accessible.
- Fully collapsible GUI – The user interface includes a lot of controls but all of these are completely collapsible so you never have to be swamped by lots of controls on screen at any one time.
- Eye controls – Eyes are aim constrained to a locate which is parented to a camera, meaning you can look through the camera and watch as the eyes track you as the camera moves. The eyelids are automatically dialed in to move along with the eyes so that the eyes look as believable as possible.
- Other facial parts - Includes geometry for eyes, teeth, gums and tongue, at the moment these extra features aren't fully integrated into the blendshape controls so they often have to be replaced by hand.

## Necessary files

The 4.6mb zip file contains two files, these are:

headgen041.ma – a 19.5mb Maya ascii file which should run on virtually any version of Maya. This file contains all the actual geometry and blendshape data.

Uiscript.mel – a small 60kb MEL script which handles the interface elements for interacting with the blendshapes.

## Instructions

Unzip and open the file, the GUI will need to be loaded so open up the script editor and source the script called "Uiscript.mel" from the location you unzipped the file.

Generally things should be pretty self explanatory, however there are some cautionary notes:

1. I've made it so that all blendshape controls go from -2 to +2 as this allows a lot of flexibility. However values should only go to this kind of extreme range in very rare situations, the vast majority of blendshapes work best in values between -1 to 1 or lower. If you start putting all shapes up to extreme values then your head is going to start looking pretty ugly.
2. When you click on a randomise function it will base it's randomness on the current "random factor" setting, if this is set to zero then nothing will happen, if it is set to 1 then the results will be pretty extreme.
3. Blendshapes can be easily keyable, this is for two purposes. Firstly it enables you to do basic facial animation. Secondly it lets you save values of heads that you like to a given frame in case you need to go back to them.

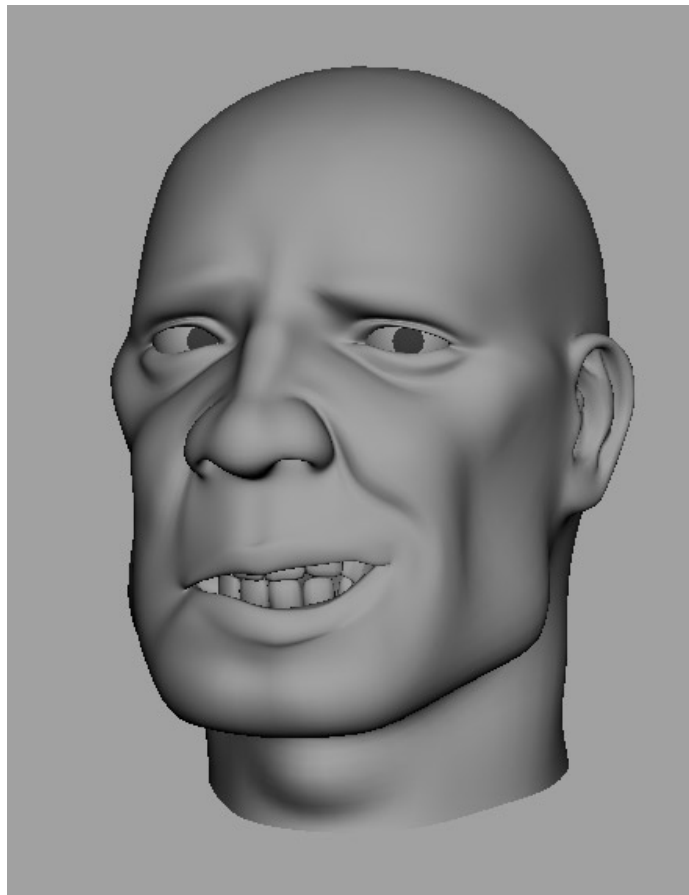
## Explanation of Functions

As stated the tool should be by and large fairly intuitive to use, however I should briefly explain the differences between some of the key functions.

Reset Tools – Each subgroup has a reset tool which resets all values in that group to zero, on top of this there is a global reset all command which resets everything to zero.

Randomise Tools – Again each subgroup has a randomize option for that group. All randomize functions look up the “random factor” variable to see how much values should be randomized, 0 means nothing will happen, 1 means the randomization will be too extreme (and probably too far out of a usable range). On top of randomize tools for each subgroup there are different types of global randomization. As expected randomize all will affect everything, randomize face will affect everything apart from facial expressions/animations – this can be handy for generating facial morphs. Randomize tweaks will maintain the current High level, Example, and Facial expression values but will randomize all tweak level attributes. This is good for getting random subtle variations of basic face type. One other thing to note about the randomize functions is that none of them directly affect secondary objects like eyes and the teeth, it is assumed that these are better placed by hand.

Keying tools – Key all will key every possible attribute, Key expressions will key anything in the expressions/facial animations tab. There is also a function for deleting all keys applied to an object. Partial deletion of keys is an awkward process which involves selecting all current blendshapes and making the necessary adjustments in the graph editor.



*An example of a quickly constructed facial expression from Gunther, one of the sample heads*

## Known Bugs/Issues

- It was originally my intention to have the GUI embedded within the scene file so it didn't have to be manually loaded through the script editor, unfortunately late on in the project a user spotted an export bug which was caused by this so this feature had to be removed at a late stage. Loading the GUI manually is functionally fine but is it a bit clunkier than I had intended.
- There are some flaws in how the blendshapes for the interior of the lips are created which causes odd popping either through the jaw or in front of the mouth when certain combinations of blendshapes are applied in extremities. This is a tricky problem to fix as there is no one blendshape that is the culprit, rather it is a lot that are slightly off that cause a cumulative effect when all are applied.
- Currently the eyes, teeth, gums and tongue do not follow the dialing in of blendshapes, this is a limitation of them being separate geometry, it is possible to apply blendshapes to them too to correct their placement but unfortunately their pivot point remains unchanged which causes problems in eye and jaw rotations. There is a possible solution involving a very complicated switch statement in an expression but applying this wasn't seen as a priority.
- The teeth and gums are still relatively crude in their modeling and have been created with inefficient poly counts, of particular note is the fact that the teeth are a bit too large for the mouth.
- The facial expressions sub group is so large that the buttons have been moved to the top of the group which is inconsistent with other subgroups but is necessary for functionality. Ideally the facial expressions group should be further split up into smaller sub parts.

Demonstration video of the tool in action

<http://www.vertpusher.com/files/headgen04demo1.avi>

Development and testing thread for the tool

<http://forums.cgsociety.org/showthread.php?t=319571>

Download link for version 0.41

<http://www.vertpusher.com/files/headgen041.zip>

Homepage for the tool

<http://vertpusher.com/tools/head-generator/>