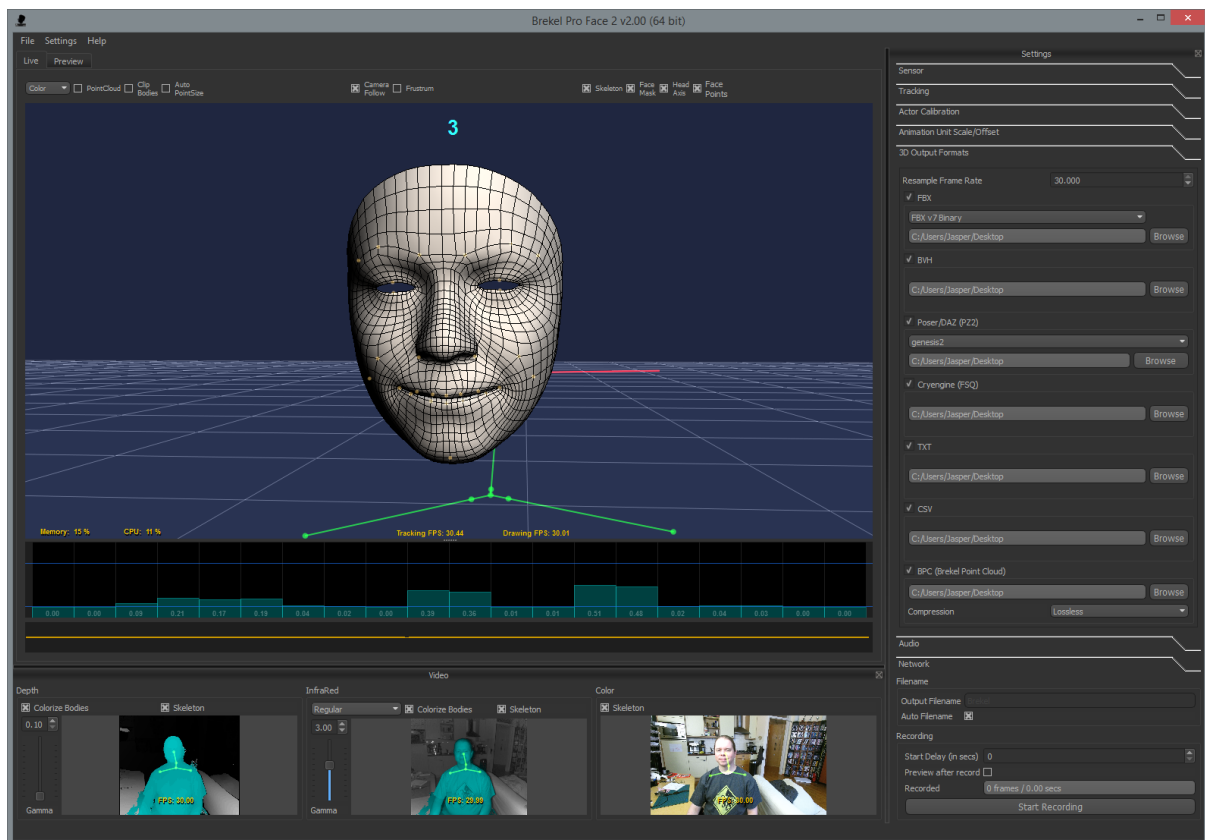


BREKEL

FACE

V2

WHAT IS “BREKEL BODY”



“Brekel Face” is a Windows application that does markerless facial Motion Capture of up to 6 people from your living room or office using a Kinect sensor.

It can track people without the need for calibration but can also build a tracking model calibrated specifically for a particular person to improve accuracy.

It is written by Jasper Brekelmans, so in case you’re wondering that’s what “Brekel” refers to.

“Brekel” is pronounced as “Break-uhl”.

The following data can be tracked per face:

- Neck position and rotation
- Head position and rotation

And the following 20 expression shapes

- Brow Up Left
- Brow Up Right
- Brow Down Left
- Brow Down Right
- Eye Closed Left
- Eye Closed Right
- Cheek Puffed Left
- Cheek Puffed Right
- Lips Pucker
- Lips Stretch Left
- Lips Stretch Right
- Lip Lower Down Left
- Lip Lower Down Right
- Smile Left
- Smile Right
- Frown Left
- Frown Right
- Jaw Left
- Jaw Right
- Jaw Open

REQUIREMENTS

- Kinect for Windows v2 sensor or Kinect for Xbox One with separately available adapter
- Windows 8 / 8.1 (USB stack of Windows 7 or below can't handle bandwidth requirements of v2 sensor and is NOT supported)
- USB 3.0 port, Intel and Renesas chipsets only! (others brands may or may not work)
- DirectX 11 capable GPU (Intel HD4000, AMD Radeon HD6470M / HD6570, NVIDIA Geforce 610M or above)
- 4 GB or more RAM
- Dual Core 3.1Ghz i7/i5 CPU or equivalent (slower should work but may drop frames)
- 1280×1024 screen (recommended: 1920×1080 or higher)

Note: when using a Kinect for Xbox One you will need to purchase a separately available power adapter to connect it to your PC.

Note that tracking quality is best when the subject is lit with flat, frontal, even lighting with minimal amounts of shadowing on the face.

A photographer's soft box like below will work very well, but any light source with diffusion material in front of it can work, as well as sitting in front of a window.

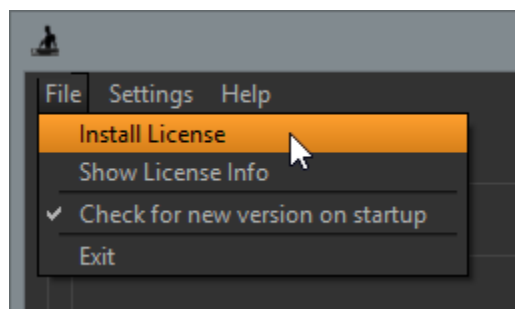


LICENSING

With your purchase you should have received a download link for the retail version of the software and an email with your license code. (Please allow up to 24 hours for processing your request and double check your spam filter)

The retail version will work immediately and with no restrictions even without a valid license, but will need activation within 5 days for continued operation.

You can activate your copy by using the “File > Install License” option from the menu.

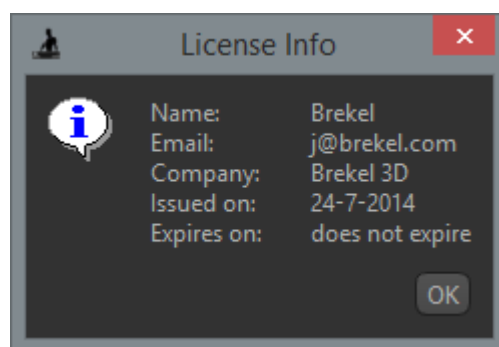


It will ask you to browse for your license file (which was attached to the mail).

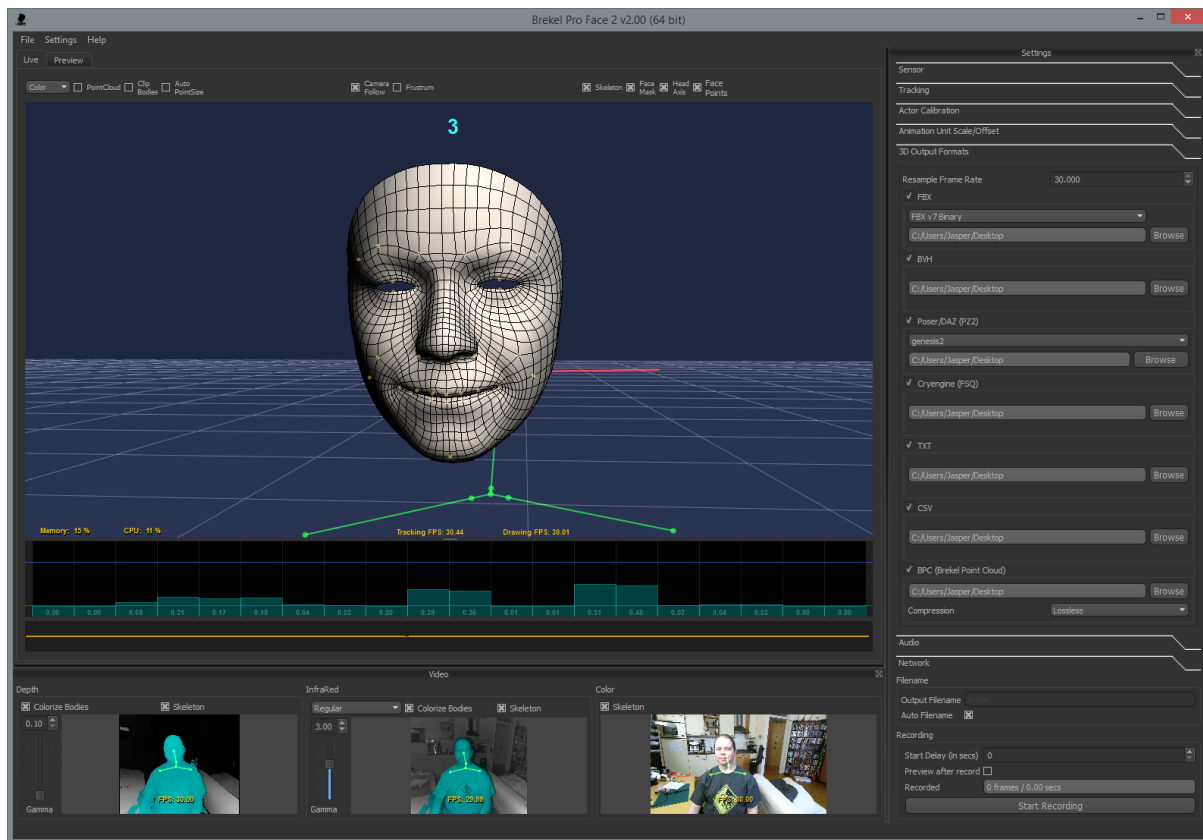
The license will automatically be copied to your “C:\ProgramData” folder and be active upon restart of the application.

If license installation fails (for example due to user permissions) you also manually extract the .zip file and copy the .key file manually to the “C:\ProgramData” folder.

To display the current license info use the “File > Show License Info” option from the menu to display a window like the following:

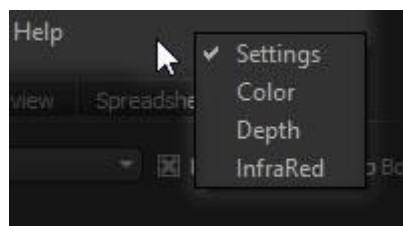


THE MAIN INTERFACE

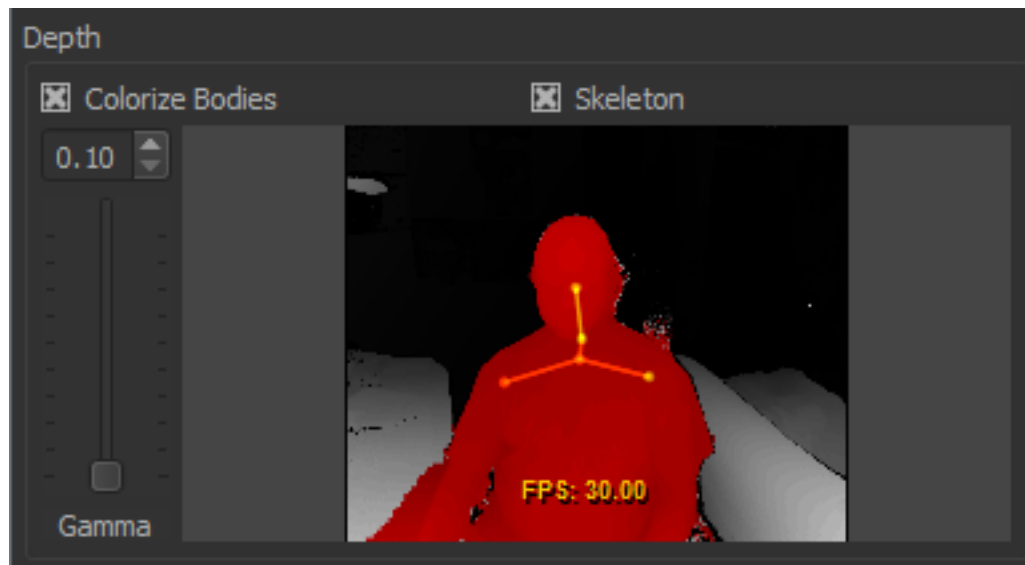


The interface is divided into 3 main docks:

- Bottom: Video
 - Middle: 3D Viewport
 - Right: Settings
-
- These docks can be undocked and turned into a floating window by dragging from their title bar.
 - Double clicking on the title bar of a floating window will dock it back into the main window.
 - The overall GUI state will automatically be saved on exit and reloaded on start.
 - Right Clicking on the title bar of the main window (next to Help) will popup a list that allows showing hidden windows again.



VIDEO - DEPTH



This window visualizes the Depth stream used for tracking, Internally this is calculated from the InfraRed stream, it has a resolution of 512x424 at 30 fps.

In the visualization pixels closer to the camera have a lighter color, pixels further away have a darker color.

Black pixels indicate that the sensor wasn't able to measure depth, which can be due to being too close from the sensor (< 50cm), too dark, too reflective material, or too light. (for example strong sunlight)

Gamma

Adjusts the gamma of the Depth stream, you can use this to make it lighter/darker.

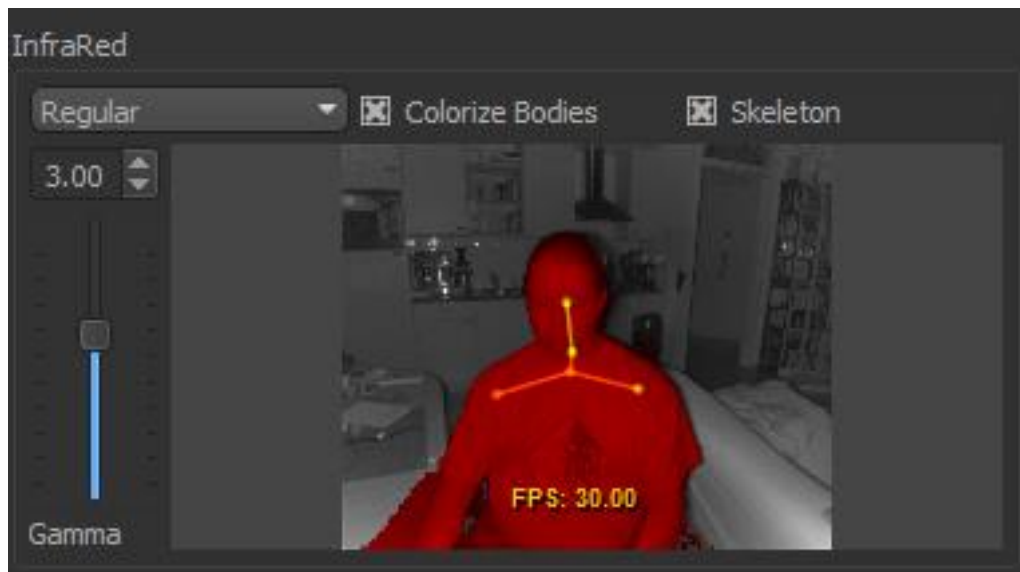
Colorize Bodies

Will color the pixels of detected bodies (up to 6).

Skeleton

Draws the raw joints and bones of detected bodies in the 2D view.

VIDEO - INFRARED



This window visualizes the InfraRed stream used for tracking and the source for the Depth stream.

Internally this extracts all ambient lighting and should provide a very stable image as a base.

It has a resolution of 512x424 at 30 fps.

Gamma

Adjusts the gamma of the InfraRed video stream, you can use this to make it lighter/darker.

Regular / Long Exposure

Regular uses a single exposure frame with as little motion blur as possible but possibly some extra noise.

Long Exposure internally averages 3 frames (from the raw 300 fps stream) to reduce noise at the cost of slightly more motion blur.

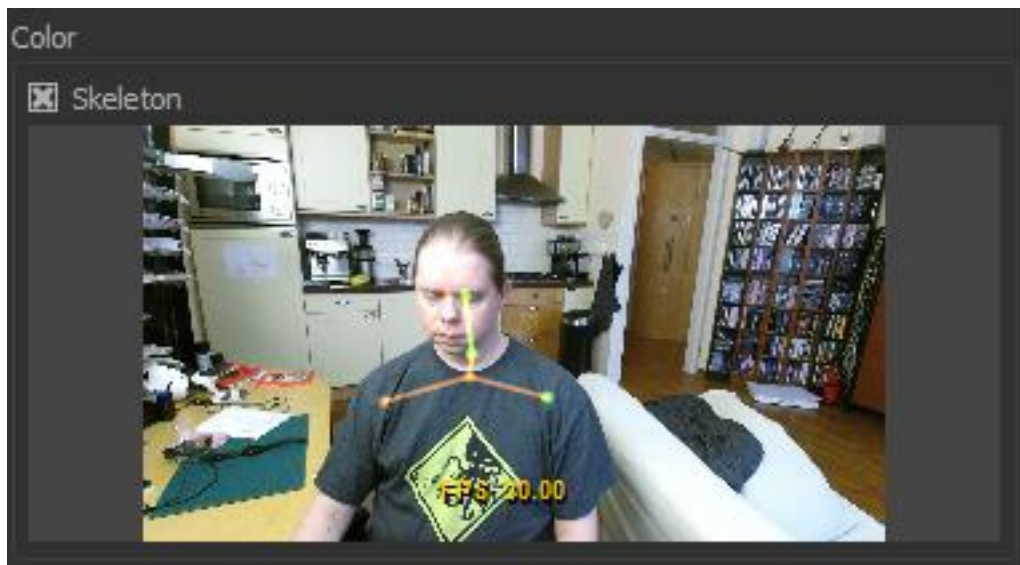
Colorize Bodies

Will color the pixels of detected bodies (up to 6).

Skeleton

Draws the raw joints and bones of detected bodies in the 2D view.

VIDEO - COLOR



This window visualizes the Color stream as used for tracking.

Note that this has a wider aspect ratio than the InfraRed and Depth windows and so it may show areas where tracking will not occur.

When the sensor detects the image is too dark it automatically switches to a "Low Light" mode by lengthening the exposure and lowering the framerate to 15 frames per second (instead of 30). This will negatively impact tracking performance.

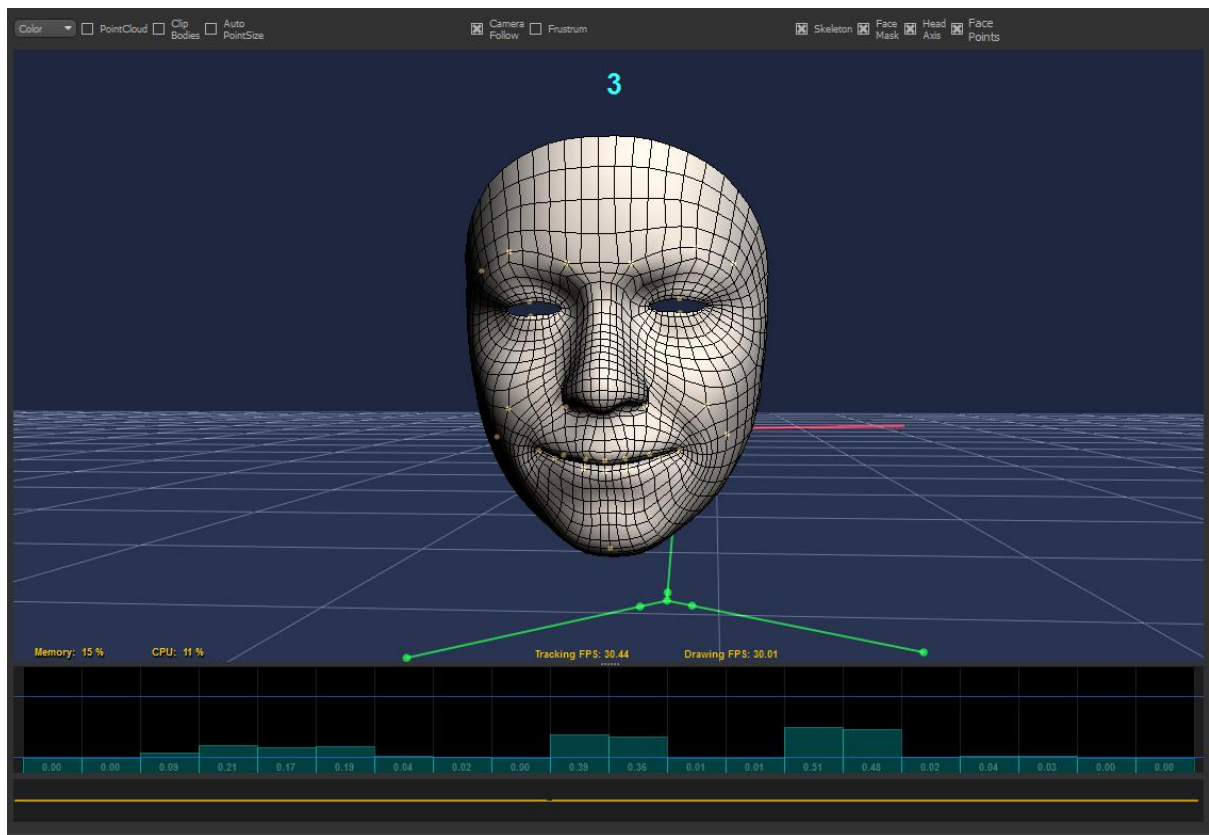
This mode is triggered automatically by the drivers, it seems to look at the darkest pixels in the image, so make sure you have enough light on everything the camera can see.

A small softbox (as used by photographers) can provide very nice and flat illumination over a big area at a low cost.

Skeleton

Draws the raw joints and bones of detected bodies in the 2D view.

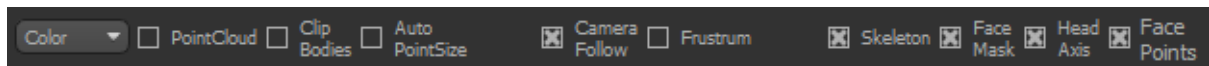
3D VIEWPORT



The 3D viewport visualizes the tracked faces as well as 3D pointclouds and relevant skeleton joints.

Below that the animation units percentages are shown for the individual poses/shapes that are tracked.

Below that the audio waveform is shown if an audio input is selected.



Texture Selection, selects how to texture the pointcloud for visualization as well as recording in BPC format.

- None: do not use a texture but visualize white points
- Color: use the color camera to texture the pointcloud
- Infrared: use the infrared camera to texture the pointcloud
- Depth: use a depth gradient to texture the pointcloud, the further away a point is the darker

Note that Infrared and Depth are sampled from the same lens but Color is not. Color is automatically mapped to compensate for this but there may be small artifacts on object edges.

PointCloud

Toggles pointcloud rendering, note that on slow machines turning this OFF can gain extra performance.

Clip Bodies

Only pixels that belong to detected bodies are displayed, the background is clipped out in a 'greenscreen' like effect.

Auto PointSize

Tries to adjust the size of the points depending on the distance of the camera. (for visualization only)

Camera Follow

Turning this ON will automatically keep the camera centered on any tracked faces.

Frustrum

Toggles drawing the camera frustrum in the viewport to give an indication of the field of view of the sensor.

Skeleton

Toggles drawing of joints & bones for tracked bodies, note that only the bones relevant for face tracking are shown.

Face Mask

Visualizes the tracked faces with a face mask polygonal mesh.

Clicking this toggle multiple times cycles between hidden, mesh-only and mesh with wireframe on top.

Head Axis

Toggles drawing of the head transform.

Face Points

Toggles drawing of the face points, which are strategically chosen points of the face mesh whose positions are also exported to some of the output formats.

3D VIEWPORT NAVIGATION

To orbit:

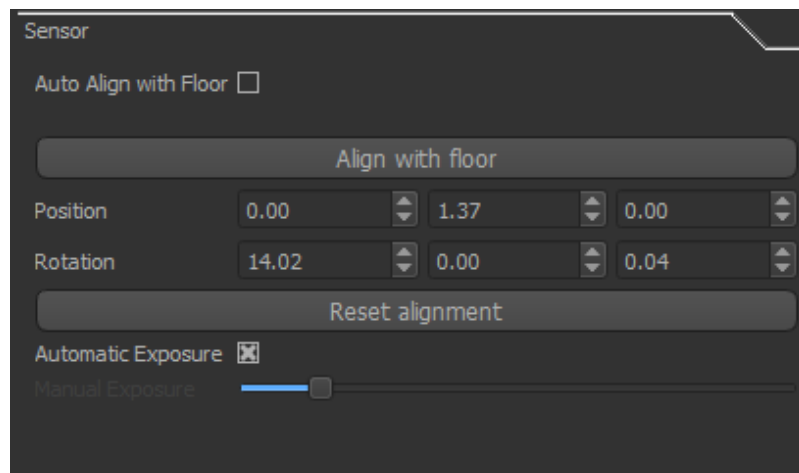
- Left mouse button, click & drag

To dolly in/out:

- Middle mouse button, click & drag
- Shift + Left mouse button, click & drag
- Mouse wheel

To pan:

- Right mouse button, click & drag
- CTRL + Left mouse button, click & drag



Auto Align with Floor

Automatically tries to align the sensor with the floor at every frame (a body needs to be seen in order to estimate where the floor is), not that this sometimes can result in some jitters so it's better to align once manually.

Align with floor

Tries to detect the floor and automatically adjust the Position/Rotation fields once.

(a body needs to be seen in order to estimate where the floor is)

Position

Adjusting these XYZ values will translate the data, the main value of interest is the Y value depicting the height of the sensor above the floor.

Rotation

Adjusting these XYZ values will rotate the data, which can be of use when the sensor is tilted.

Reset Alignment

Resets the Position and Rotation values back to 0

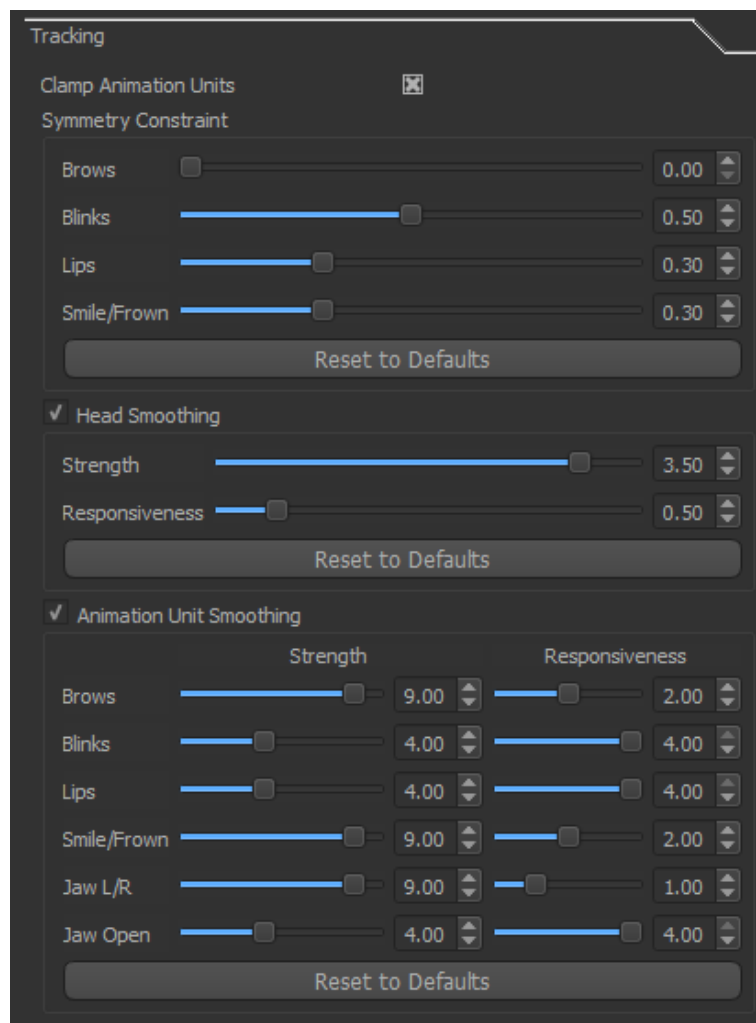
Automatic Exposure

When turned ON the color camera will automatically adjust exposure depending on the amount of light it sees.

Note that the color camera is not used for body tracking.

Manual Exposure

Allows for manual exposure adjustment when Automatic Exposure is turned OFF.



Clamp Animation Units

Turning this ON will clamp values to the 0.0 – 1.0 range.

Turning it OFF allows values beyond those ranges.

Symmetry Constraint

0.0 tracks the left and right sides independently, 1.0 will keep faces symmetrical.

Enforcing a little bit of symmetry can help to make the results a bit more robust, especially in situations where the actor is far away from the sensor or lighting isn't optimal.

Since the sensor data and markerless tracking inherently contains noise there are specially designed filters to reduce the noise but retain the data as well as possible. Note that this will always introduce some lag.

The smoothing filters can be tuned individually for different portions of the face.

Head Smoothing

Toggles filtering of the neck and head motions.

Animation Unit Smoothing

Toggles filtering of the expressions also known as animation units.

Strength

The strength of the smoothing filtering that is applied.

Higher values smooth the data more but also increase lag and remove some detail.

Responsiveness

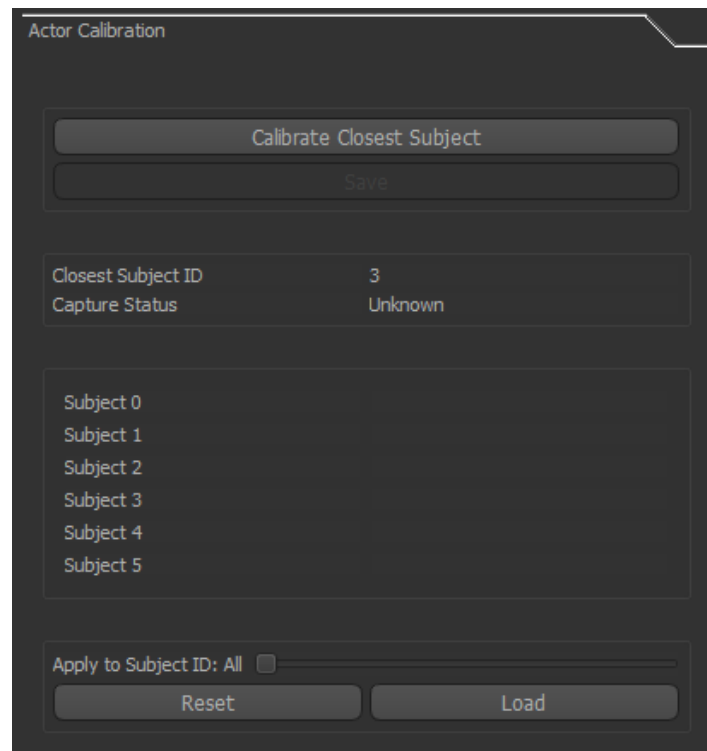
Works in conjunction with strength to try and reduce lag.

Higher values reduce lag but may reintroduce a bit of noise.

Reset to Default

Resets strength and responsiveness to their default values.

SETTINGS > ACTOR CALIBRATION

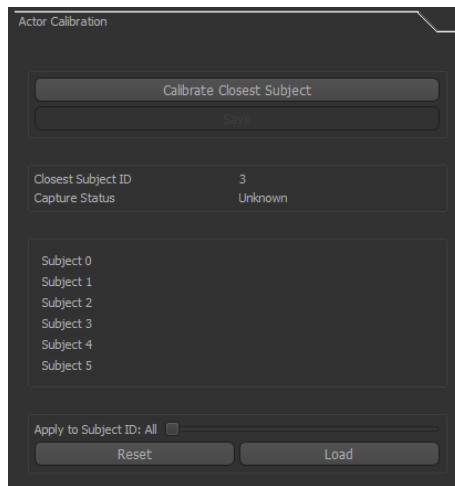


The image shows a software window titled "Actor Calibration". It contains several interactive elements:

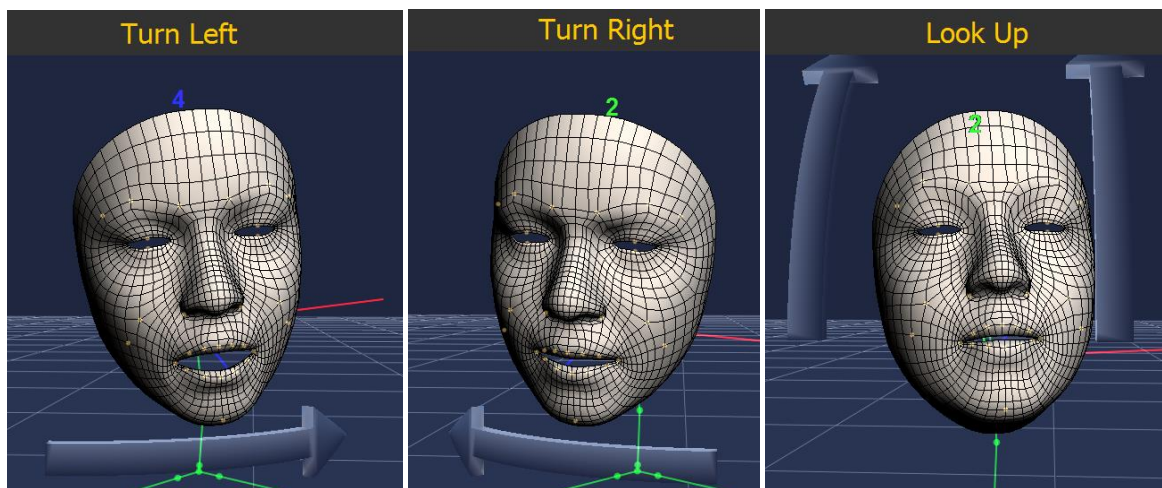
- At the top, two buttons: "Calibrate Closest Subject" and "Save".
- A section with two labels and values: "Closest Subject ID" with the value "3", and "Capture Status" with the value "Unknown".
- A list of subjects: "Subject 0", "Subject 1", "Subject 2", "Subject 3", "Subject 4", and "Subject 5".
- At the bottom, a checkbox labeled "Apply to Subject ID: All" which is currently unchecked, followed by a horizontal slider.
- Below the slider are two buttons: "Reset" and "Load".

The software can track people without the need for any form of calibration but tracking can be improved by calibrating a tracking model for a specific person.

This is done by sampling some frames of the front, left, right and bottom of the face resulting in a face mesh and internal tracking model that is deformed to match the person.



To start calibration hit the “Calibrate Closest Subject” button.



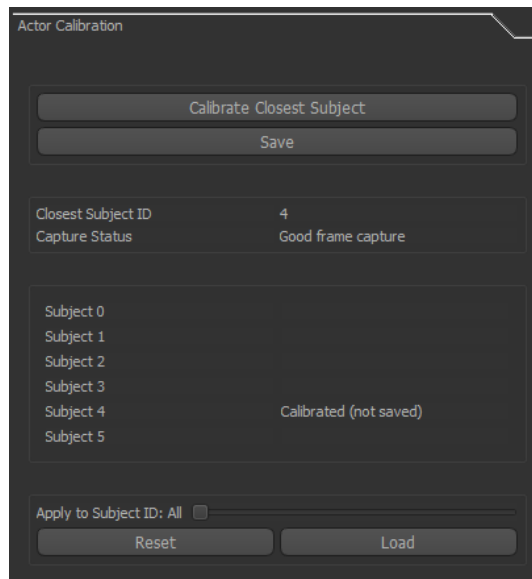
The software will guide you the actor closest to the sensor through the process by asking to see the face slightly turned to the left and right to see the sides.

Then slightly tilted up so it can see the underside of the chin and nose.

And if needed some more frames from the front by looking straight at the sensor.

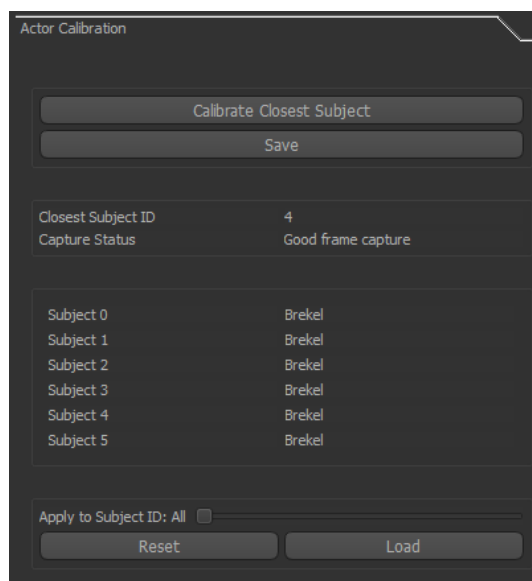
Be sure to stay still during these poses.

After calibration is complete tracking will freeze for a second while the face mesh is deformed so it resembles the data collected for the specific actor.



When calibration is done the GUI should say “Calibrated (not saved)” for the Subject ID that was calibrated. Note that this number corresponds to the Subject ID label that hovers above the face mask in the 3D viewport.

You can hit “Save” to give the subject a name and save the calibration to disk.



You can Load a calibration from disk or Reset an existing calibration.

The “Apply to Subject ID” slider allows you to apply this to all ID’s at once (useful when you’re only interested in tracking a single person) or to a specific subject ID (in case you’re tracking multiple people at once).

SETTINGS > ANIMATION UNIT SCALE/OFFSET

	Scale	Offset	AutoTune
Brow Up L	1.00	0.00	☒
Brow Up R	1.00	0.00	☒
Brow Down L	1.00	0.00	☒
Brow Down R	1.00	0.00	☒
Eye Closed L	1.00	0.00	☒
Eye Closed R	1.00	0.00	☒
Cheek Puffed L	1.00	0.00	☒
Cheek Puffed R	1.00	0.00	☒
Lips Pucker	1.00	0.00	☒
Lip Stretch L	1.00	0.00	☐
Lip Stretch R	1.00	0.00	☐
Lip Lower Down L	1.00	0.00	☐
Lip Lower Down R	1.00	0.00	☐
Smile L	1.00	0.00	☐
Smile R	1.00	0.00	☐
Frown L	1.00	0.00	☐
Frown R	1.00	0.00	☐
Jaw L	1.00	0.00	☒
Jaw R	1.00	0.00	☒
Jaw Open	1.00	0.00	☐

Each of the 20 tracked animation units (or expressions) can be tuned individually, either by setting the scale/offset manually or by running “Auto Tune” to automatically analyze the minimum/maximum values and set scale values.

Tuning allows to emphasize certain expressions and suppress others in order to balance things out.

These settings can be saved/loaded to disk so templates can be reused later.

Apply to Subject ID

This slider allows you to apply the settings to all ID's at once (useful when you're only interested in tracking a single person) or to a specific subject ID (useful when tracking multiple people at once).

Save

Saves the Scale/Offset/AutoTune settings to a file on disk.

Load

Loads the Scale/Offset/AutoTune settings from a file on disk.

Set Neutral

Sets all the offset values so that the current expression on the real life actor produces a neutral face with all animation values at 0.

Reset

Resets all Scale/Offset/AutoTune settings to their defaults.

Scale

Allows to emphasize or suppress an animation unit by multiplying the tracker's output with this value.

- 0.0 complete suppresses the animation unit so it will not be used.
- 1.0 uses the amount calculated by the tracker.
- Values above 1.0 emphasize a certain animation unit.

Offset

Offsets the animation unit by adding this value to the tracker's output, note that these can be set automatically using the "Set Neutral" button.

Auto Tune

Enables the specific animation unit for Auto Tuning.

Start Auto Tune

Starts an Auto Tuning session (hit the button again to stop).

During this session minimum/maximum values are measured based on observed expressions, after stopping the scale values are adjusted so that the range of expressions seen uses the 0-1 range of the animation unit outputs.

The idea is that the actor performs extreme faces (in no particular order) during the auto tuning session (brows up/down, jaw open all the way, slide jaw left/right, extreme smile, extreme pucker, extreme lip motions, puffing the cheeks etc).

The screenshot shows the 'Animation Unit Scale/Offset' window. It has a dark grey background with white text. At the top, there's a dropdown for 'Apply to Subject ID: All' and three buttons: 'Save', 'Load', and 'Set Neutral'. Below these are 'Reset' and 'Stop Auto Tune (Experimental)' buttons. The main area is a table with columns for the animation unit name, 'Scale', 'Offset', 'AutoTune' status, and a color-coded range indicator.

	Scale	Offset	AutoTune	
Brow Up L	1.00	0.00	☒	Min: 0.00 Max: 0.61
Brow Up R	1.00	0.00	☒	Min: 0.00 Max: 0.49
Brow Down L	1.00	0.00	☒	Min: 0.00 Max: 0.28
Brow Down R	1.00	0.00	☒	Min: 0.00 Max: 0.59
Eye Closed L	1.00	0.00	☒	Min: 0.00 Max: 0.11
Eye Closed R	1.00	0.00	☒	Min: 0.00 Max: 0.26
Cheek Puffed L	1.00	0.00	☒	Min: 0.00 Max: 0.04
Cheek Puffed R	1.00	0.00	☒	Min: 0.00 Max: 0.03
Lips Pucker	1.00	0.00	☒	Min: 0.00 Max: 0.48
Lip Stretch L	1.00	0.00	☐	
Lip Stretch R	1.00	0.00	☐	
Lip Lower Down L	1.00	0.00	☐	
Lip Lower Down R	1.00	0.00	☐	
Smile L	1.00	0.00	☐	
Smile R	1.00	0.00	☐	
Frown L	1.00	0.00	☐	
Frown R	1.00	0.00	☐	
Jaw L	1.00	0.00	☒	Min: 0.00 Max: 0.00
Jaw R	1.00	0.00	☒	Min: 0.02 Max: 0.26
Jaw Open	1.00	0.00	☐	

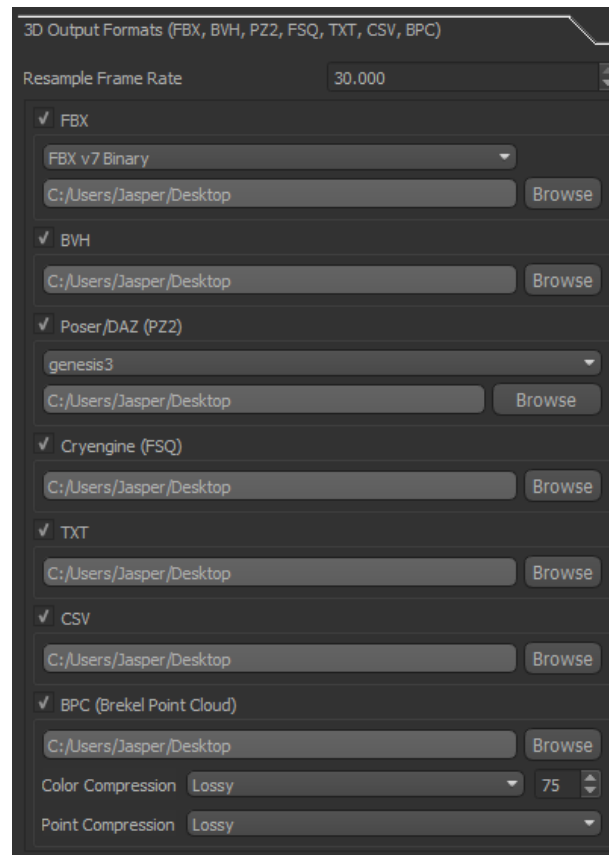
During auto tuning the minimum and maximum observed values will be displayed and a color indication will show if the observed range is reasonable.

Red: not much movement seen for this animation unit

Orange: could use some more movement

Yellow: probably ok

Green: enough motion observed



Resample Frame Rate

The sensor operates at 30 frames per second, by adjusting this value you can resample the animation data to a lower framerate. (Not supported for BPC files)

FBX

Exports to the FBX file format used by most 3D applications, this is the most versatile and accurate file format.

It includes a neck and head joint, joints for the face points, a mesh with blendshapes representing the animation unit data as well as the custom shape if an actor calibration was done and a row of nulls that move up/down based on the animation unit values.

A typical rigging workflow is to connect your character's blend/morph shapes to the face mask or the translate.y values of the row of animation unit nulls.

FBX version

You can choose between the current v7 and older v6 and between human readable Ascii files and the smaller Binary files. In case of a problem experiment with this to see what your favorite 3D application supports.

BVH

Exports to the BVH file format, this is a more limited format than FBX but still widely used.

Note that a BVH file can only contain skeletons so it will not include the face mesh like FBX does.

It contains joints for the neck, head and face points, as well as a row of nulls that move up/down based on the animation unit values.

A typical workflow is to connect your character's blend/morph shapes to the translate.y values of the row of animation unit joints.

Poser/DAZ (PZ2)

Exports the data to the PZ2 format used by Poser and DAZ.

Poser/DAZ Mapping Template

In order to support the various Poser/DAZ figures you need to choose (or create) a template that matches the structure of your figure. The application comes with a number of templates for popular figures.

This relates the 'Animation Units' of to the available face morphs on the figure. Please refer to the chapter in this manual dedicated to this topic for further information on modifying and creating templates.

Cryengine (FSQ)

Exports to the FSQ file format as used by the Cryengine game engine.

TXT

Exports to the Ascii text format which can for example be used if you want to read the files in your own code without too much hassle.

CSV

Exports to a Comma Separated Values file, this can for example be used to analyze the data in a spreadsheet.

BPC (Brekel Point Cloud)

Records the pointcloud data to the custom BPC file format used by Brekel Pro PointCloud 2.

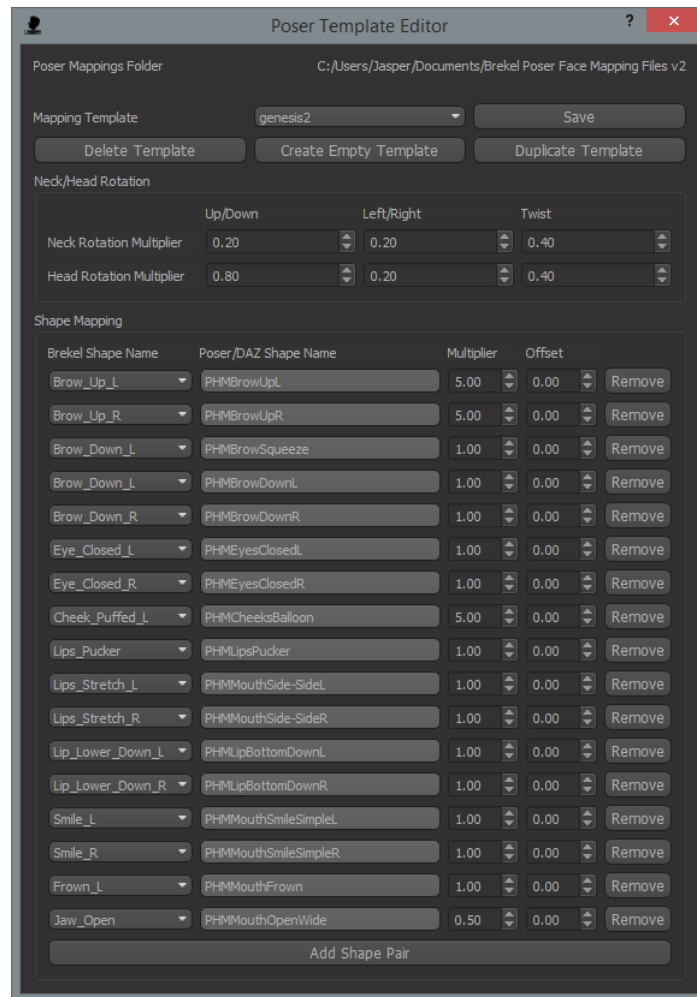
You can use this to record both the face tracking data and pointcloud data in sync and use Pro PointCloud 2 to export the pointcloud data to mesh and particle cache formats.

Compression

Lossless will result in the best quality but biggest filesize.

Higher amount of compression will produce smaller files at the loss of quality.

POSER TEMPLATE EDITOR



At the top you can select the template you want to edit, save any adjustments you did or create a new template.

In the second section you can specify how the captured head rotation is applied to your Poser/DAZ figure.

You can distribute the rotation onto the neck and/or head bone by adjusting the multipliers.

When all values are 0 no head rotations will be used which can be useful in case you want to keep existing head animation or poses.

It is usually a good idea to distribute the rotation onto both the neck and head bone and make sure they both add up to 1.0

The bottom section defines how 'Animation Units' from the face tracker are mapped to the available sliders on the Poser/DAZ figure.

In the first column, "Brekel Shape Name" you select one of the available 'Animation Units' from the tracker.

The following "Brekel Shapes" are available:

Brow_Up_L

Brow_Up_R

Brow_Down_L

Brow_Down_R

Eye_Closed_L

Eye_Closed_R

Cheek_Puffed_L

Cheek_Puffed_R

Lips_Pucker

Lips_Stretch_L

Lips_Stretch_R

Lip_lower_Down_L

Lip_Lower_Down_R

Smile_L

Smile_R

Frown_L

Frown_R

Jaw_L

Jaw_R

Jaw_Open

In the next column you need to specify the name of the slider in Poser/DAZ to drive.

These can be a bit tricky to figure out since what Poser/DAZ displays in the GUI isn't always what it uses internally.

A good way to figure these out is to look through an existing .PZ2 or .CR2 file and search for things like "Brow", "Mouth" or "Lips". Note that the "Poser Format Exporter (PFE)" plugins/scripts can export PZ2 files from Daz Studio.

You can also take a look at the existing templates and see how they are structured and start from there.

In the third column you can specify a multiplier, you can use higher numbers to exaggerate motion for a channel or even negative ones to flip the motion. This will also depend on how extreme the shape was modeled on the Poser/DAZ figure.

The fourth column allows you to specify an offset. (which internally is applied after the value is scaled by the multiplier)

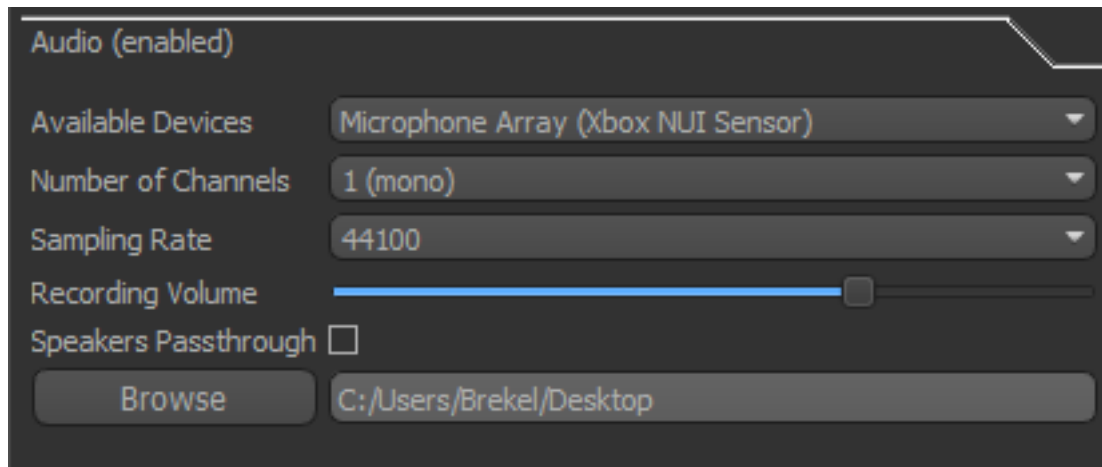
You can use this if you want a channels not to default to 0, for example you can give brows a negative offset to make your character's neutral expression to be angry.

The "Remove" button at the right of each "Shape Pair" allows you to remove a pair.

(Note that any pairs whose "Poser/DAZ Shape Name" is empty will be cleaned up when saving the template)

The "Add Shape Pair" at the bottom will add a new pair.

SETTINGS > AUDIO



Available Devices

List the available audio devices that can be used for recording and allows you to select one of them.

Number of Channels

Switches between Mono and Stereo recording.

Sampling Rate

Sample rate to record (in Hz).

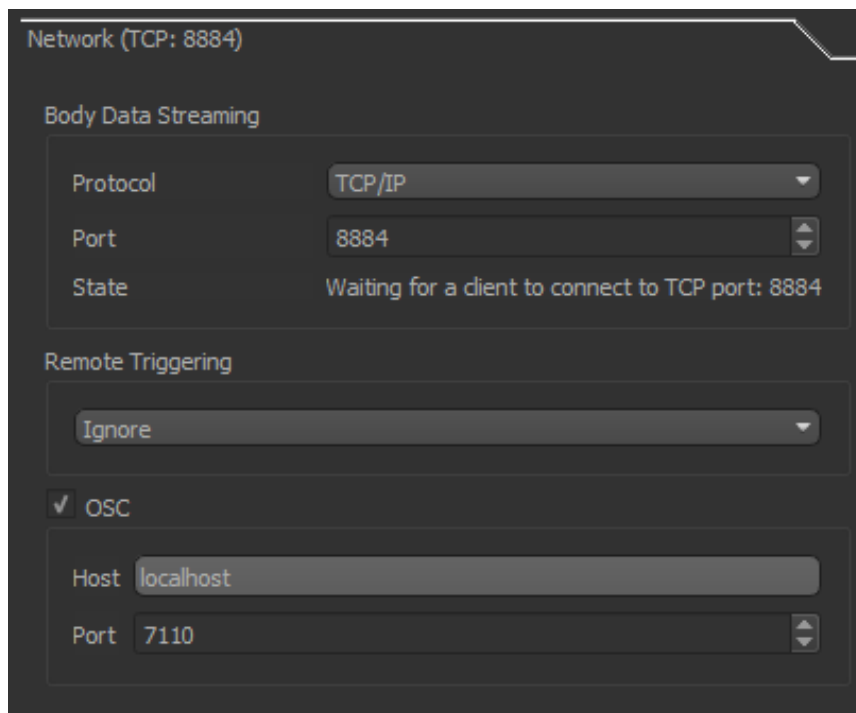
Recording Volume

Sets the volume used for audio recording

Speakers Passthrough

Playback the audio over the speakers while recording

Note that audio is always recorded in the WAV format.



The application has the ability to live stream the tracking data over a network port out to a different application (for example MotionBuilder). This can be done on the same machine, or across machines connected to the same network.

Protocol

Selects either TCP/IP or UDP as the streaming protocol, or turn streaming off.

Port

The network port over which data will be streamed. (default 8884)

State

The current state of the network streaming.

Please make sure security software (firewall) is not blocking the port/protocol.

Record Triggering

Allows synchronized recording across multiple Brekel applications.

One application can be in Primary mode, all others in Secondary or Ignore mode.

The Primary application will send a signal when recording is started and stopped so all applications start/stop at the same time and are using matching filenames.

Note that this works across multiple apps on the same machine and even across multiple machines on the same network.

Make sure your firewall isn't blocking port 8880-8890.

OSC

Enable/disable sending data out over UDP in OSC (Open Sound Control) format.

See chapter at the end of this manual for a description of the OSC messages that are sent.

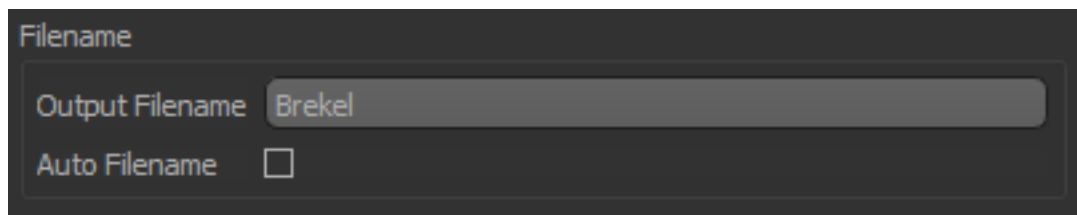
Host

Hostname / IP of machine to send the OSC data to (localhost if receiving application is running on the same machine as the Brekel application).

Port

Network port over which to send the OSC data.

SETTINGS > FILENAME

A screenshot of a settings window titled 'Filename'. It contains two options: 'Output Filename' with a text input field containing the word 'Brekel', and 'Auto Filename' with an unchecked checkbox.

Filename

Output Filename Brekel

Auto Filename ☐

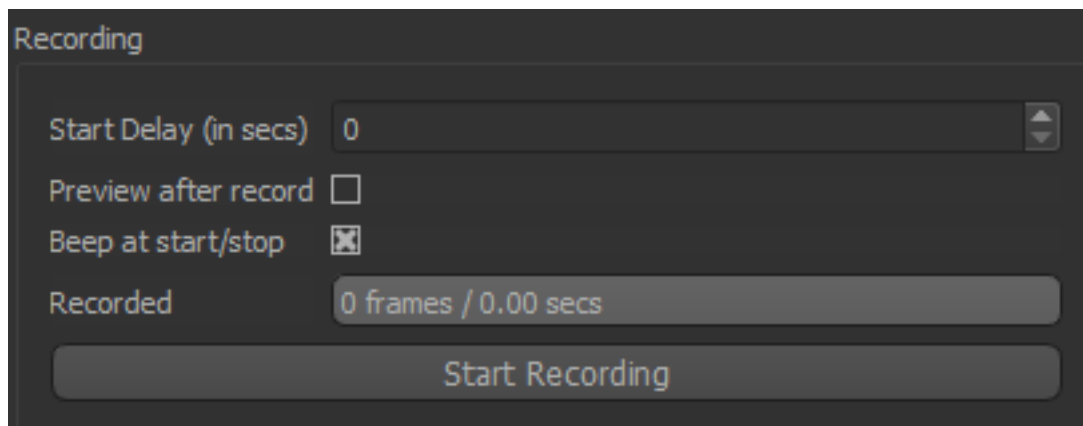
Output Filename

The name of the output file.

Note that the output folder(s) can be defined for each output format.

Auto Filename

When turned ON the filename will be automatically generated using the current date & time.



Start Delay (in secs)

When bigger than 0 a countdown will start after starting a recording, giving the actor a few seconds to get into position before capture will start.

During countdown beeps will be played over the speakers every second, and the amount of remaining seconds will also be shown visually in the 3D window.

Preview after record

Automatically switches to the Preview tab where you can replay the last take and decide to keep or delete it.

Beep at start/stop

Play a beeping sound when starting/stopping the recording.

Start/Stop Recording

Toggle button for starting & stopping the recording.

PREVIEW



The Preview tab shows the last recorded take.

With the standard video controls you can rewind, play and pause playback and scrub through the take.

Delete Take

Will delete the files of the last recorded take.

Keep Take

Will switch back to Live mode ready to record another take.

TOP MENU

File > Install License

Let's you browse to a license file and installs it to be used for the next time the application is run.

File > Manual License Installation

Open folder to which you can manually copy the license .key file.

File > Show License Info

Shows if a license is installed and who it belongs to.

File > Check for new version on startup

Checks for the availability of a new version upon startup, if a new version exists a summary of new/fixed features is shown and an option to take you to the download page.

Note that you will need a working internet connection for this.

File > Exit

Saves settings and exits the application (same as clicking the X in the top right corner)

Settings > Restore interface to default

Shows all hidden docking windows and places them back into their default positions.

Settings > Draw FPS

Toggle to draw the framerate in the bottom of the viewport.

Settings > Draw Memory/CPU usage

Toggle to draw the memory and CPU usage in the bottom of the viewport.

Settings > Don't enlarge video streams

When ON the 2D video windows will not enlarge beyond the raw data size.

When OFF the 2D video windows will proportionally stretch the content to match the window size.

Settings > Warn for Low FPS Streams

Will show a small system tray warning when detecting drawing is slower than the expected frame rate of the raw data stream. This can indicate your computer is too slow and may drop some frames to keep up.

Settings > Warn for File Overwriting

Toggle to warn for overwriting of existing files.

Settings > Warn for Delete Preview Take

Toggle warning when deleting a preview take.

Settings > Flash Sensor's LEDs during Recording

Flash the LED's on the Kinect sensor while recording.

Settings > DoubleClick 3D Viewport for Fullscreen

Allows making the 3D Viewport fullscreen when double clicking on it.

Settings > Viewport Settings

Brings up window to adjust some display settings like colors.

Help > Downloads Page

Opens your default browser and takes you to the Brekel download page.

Help > Forum

Opens your default browser and takes you to the Brekel forums. (hosted on Google Groups)

Help > Kinect v2 Configuration Verifier

Tries to start the Configuration Verifier (if you've installed the full SDK) which can help troubleshoot if your machine is capable of running a Kinect v2 sensor.

Help > Microsoft Troubleshooting Guide

Opens your default browser and takes you to the Microsoft Troubleshooting Guide page.

Help > Microsoft Forum

Opens your default browser and takes you to the Microsoft Kinect v2 forums.

Help > About

Shows the about window with version information.

HEADLESS MODE

You can run the application in a headless mode, without a GUI, in case you only want to stream data to other applications with minimal overhead.

To start in headless mode use “-headless” as one of the commandline options when starting the program, or use the start menu shortcut.

Upon startup settings will automatically be used from the last known startup of the GUI.

Furthermore the following commandline options are available to force particular settings:

`-synchronizeStreams 0`

Toggle stream synchronization (0 for OFF, 1 for ON)

`-autoAlignWithFloor 0`

Toggle automatic alignment with the floor (0 for OFF, 1 for ON)

`-sensorPosition 0.0 1.1 2.2`

Set sensor position where the 3 values are for X,Y,Z

`-sensorRotation 0.0 1.1 2.2`

Set sensor rotation where the 3 values are for X,Y,Z

`-clamp 0`

Toggle Animation Unit Clamping (0 for OFF, 1 for ON)

`-ignoreRecordTriggering`

When used the app will ignore Record Triggering signals from other Brekel apps in Master mode. (By default the headless mode will be in Slave mode)

-symmetry_brows 0.0

Set amount of Symmetry Constraint for the Brows

(0.0 for fully independent, 1.0 for fully symmetrical)

-symmetry_blinks 0.5

Set amount of Symmetry Constraint for Eye Blinks

(0.0 for fully independent, 1.0 for fully symmetrical)

-symmetry_lips 0.3

Set amount of Symmetry Constraint for the Lips

(0.0 for fully independent, 1.0 for fully symmetrical)

-symmetry_smileFrown 0.3

Set amount of Symmetry Constraint for Smile/Frown

(0.0 for fully independent, 1.0 for fully symmetrical)

-smoothHead 1

Toggles head smoothing (0 for OFF, 1 for ON)

-smoothHead_strength 3.0

Sets head smoothing strength (0.0 for OFF, 4.0 for maximum)

-smoothHead_responsiveness 0.5

Sets head smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-smoothAU 1

Toggles animation unit smoothing (0 for OFF, 1 for ON)

-smoothAU_strength_brows 9.0

Sets brows smoothing strength (0.0 for OFF, 10.0 for maximum)

-smoothAU_strength_blinks 4.0

Sets eye blink smoothing strength (0.0 for OFF, 10.0 for maximum)

-smoothAU_strength_lips 4.0

Sets lips smoothing strength (0.0 for OFF, 10.0 for maximum)

-smoothAU_strength_smileFrown 9.0

Sets smile/frown smoothing strength (0.0 for OFF, 10.0 for maximum)

-smoothAU_strength_jawLR 9.0

Sets jaw left/right smoothing strength (0.0 for OFF, 10.0 for maximum)

-smoothAU_strength_jawOpen 4.0

Sets jaw open smoothing strength (0.0 for OFF, 10.0 for maximum)

-smoothAU_responsiveness_brows 2.0

Sets brows smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-smoothAU_responsiveness_blinks 4.0

Sets brows smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-smoothAU_responsiveness_lips 2.0

Sets brows smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-smoothAU_responsiveness_smileFrown 1.0

Sets brows smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-smoothAU_responsiveness_jawLR 1.0

Sets brows smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-smoothAU_responsiveness_jawOpen 4.0

Sets brows smoothing responsiveness (0.0 for OFF, 4.0 for maximum)

-OSC_enable 0

0 disable OSC data streaming

1 enable OSC data streaming

-OSC_host localhost

Sets the hostname/IP of the machine to which to stream OSC data

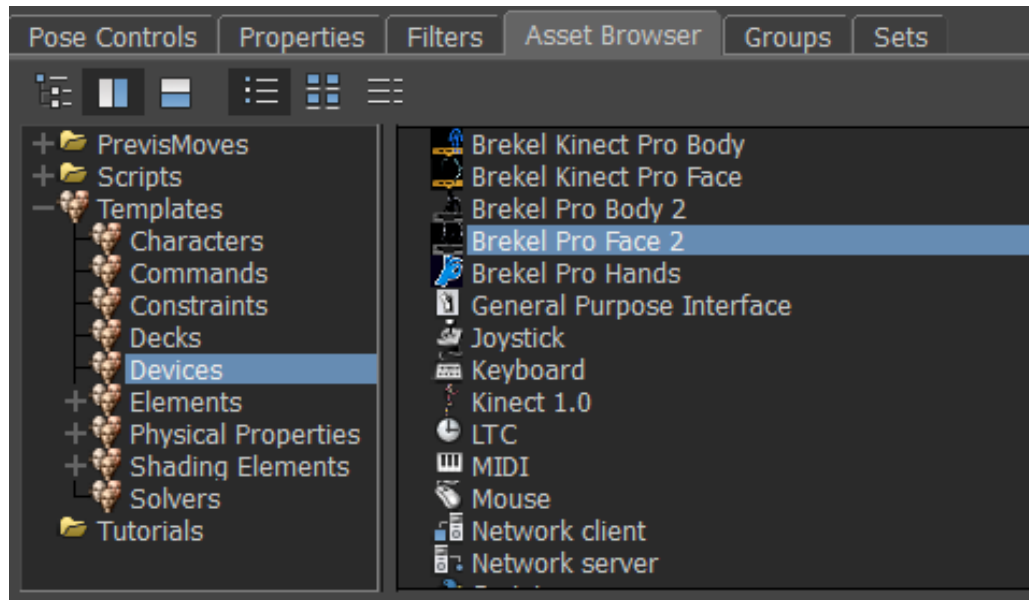
-OSC_port 7775

Sets the port over which to stream OSC data

MOTIONBUILDER PLUGIN INSTALLATION

The installer should have automatically installed the plugins for the available versions of MotionBuilder.

And you should now have “Brekel Pro Face 2” listed under the “Devices” folder of the “Asset Browser”.



If it doesn't show up, you can find all the plugins for the various MotionBuilder versions (2009-2015 both 32- and 64 bit) in the “Brekel Pro Face 2” installation folder, usually in:

C:\Program Files\Brekel Pro Face 2 x64\MotionBuilder plugins

Simply copy the .dll file of your particular MotionBuilder version to the plugin folder.

Typically for a 32 bit version:

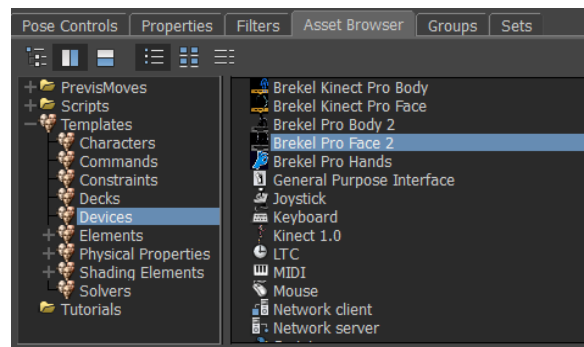
C:\Program Files (x86)\Autodesk\MotionBuilder 2013\bin\win32\plugins

For a 64 bit version:

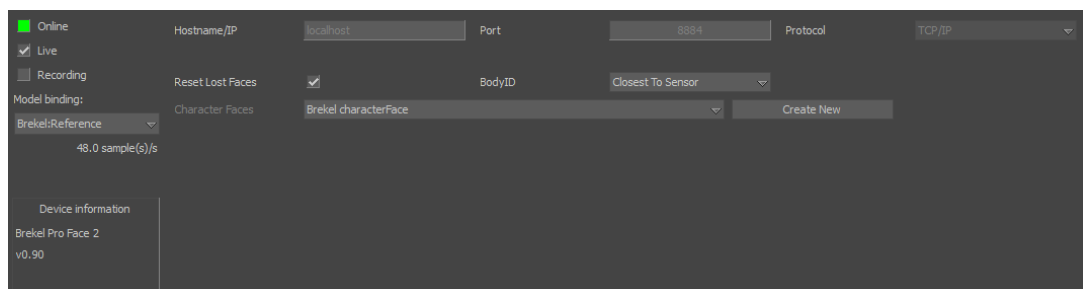
C:\Program Files\Autodesk\MotionBuilder 2013\bin\x64\plugins

USING THE MOTIONBUILDER PLUGIN

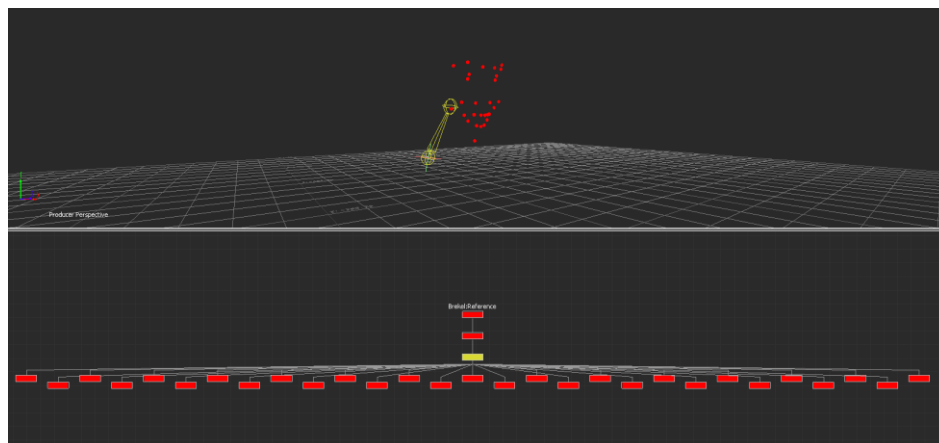
First make sure Brekel Pro Face 2 is running, and it's set to stream out data in the Network settings.



- Drag a Brekel Pro Face 2 device from the Devices folder in the Asset Browser into your scene
- In the GUI for the device make sure the Hostname/IP points to the machine running the Brekel Pro Face 2 application
(Note: if both applications are running on the same machine you can simply use the default Hostname/IP of “localhost” or “127.0.0.1”)
- Make sure Port and Protocol match in both Brekel Pro Face 2 and MotionBuilder
- Make sure your security software (firewall) isn't block this port/protocol



- Toggle the “Online” button to turn the device on
- If it doesn't turn green go back to the steps above
- Toggle the “Live” button to start receiving data
- Under “Model binding:” hit the “None” option and then “Create”, this will create a model hierarchy in your scene containing the neck, head and face points



You should now see one or more moving skeletons in your 3D viewport.

Hostname/IP

Should point to the machine running Brekel Pro Face 2.

If both MotionBuilder and Pro Face 2 run on the same machine you can also leave this at the default of "localhost" or "127.0.0.1"

Port

Should be the same port as used in the Brekel Pro Face 2 application. (default 8884)

Protocol

Should be the same protocol (TCP/IP or UDP) as used in the Brekel Pro Face 2 application.

Reset Lost Faces

When turned ON faces that are not tracked are set to 0,0,0

When turned OFF faces that are not tracked are left in their last known state.

BodyID

Since the device only streams one face at a time, this setting depicts which body ID is selected.

The default "Closest to Sensor" picks whichever body is closest to the sensor and is the ideal setting when tracking a single actor.

The specific ID's can be set when tracking multiple actors and having multiple devices in the scene, the number corresponds to the number that hovers above the face mask in the Pro Face 2 viewport.

Character Faces

The "Create New" button will create a CharacterFace Node in the scene with channels for the supported Animation Units. This can be used to drive blendshapes or joints poses you've define on your own character's model. Please refer to the MotionBuilder documentation if you're not familiar with the CharacterFace workflow.

When your scene contains multiple character face nodes you can select which one to drive with live values from the dropdown list. Note that only character face nodes created by the plugin will work properly.

To record a sequence:

- Make sure “Online” on the device is toggled ON
- Make sure “Live” on the device is toggled ON
- Make sure “Recording” on the device is toggled ON
- Make sure the “Record” button on the timeline transport controls is toggled ON
- Hit the Play button, and Stop button once the action is over

To play back a recording:

- Make sure “Live” on the device is toggled OFF
- Hit Play on the timeline transport controls or scrub through the timeline

LIVE STREAMING INTO UNITY

You can find the Unity example script/scene for streaming live network data in the “Unity3D” folder inside the Brekel installation folder, usually something like here:

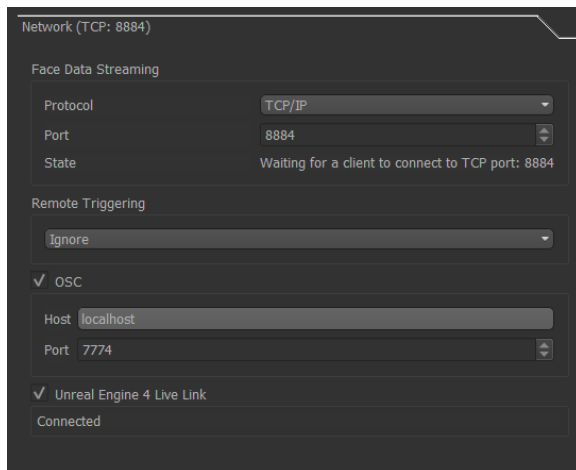
C:\Program Files\Brekel Pro Face 2 x64\Unity3D

You can also find the latest ReadMe.txt file here with instructions

LIVE STREAMING INTO UNREAL ENGINE 4

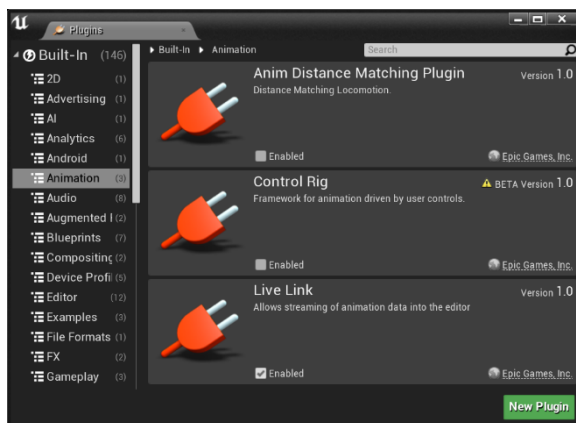
Live data can be streamed into the Unreal Engine 4 engine using its Live Link feature.

In the Brekel app make sure "Unreal Engine 4 Live Link" is enabled on the "Network" panel

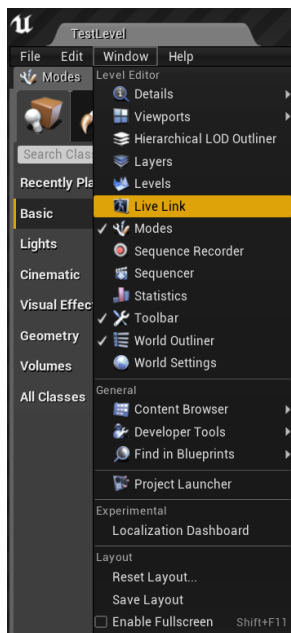


First make sure you enable this feature in the UE4 engine:

- Click Edit > Plugins
- Enable "Live Link" under "Animation"

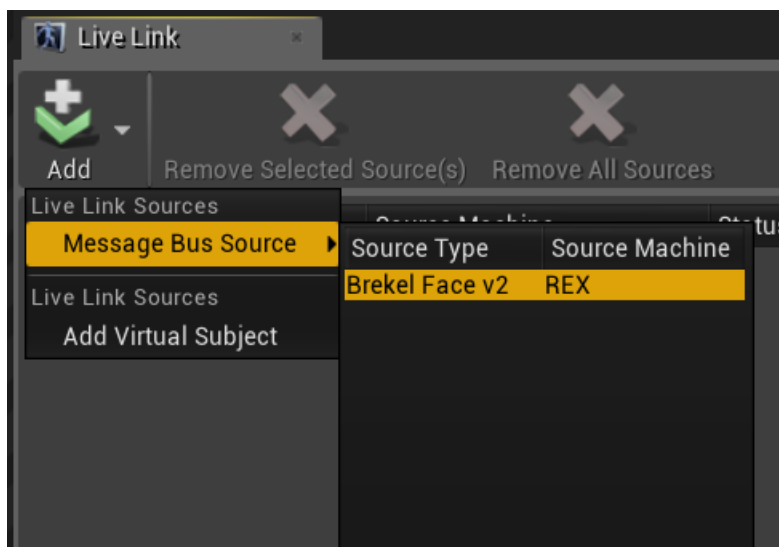


Click Window > Live Link

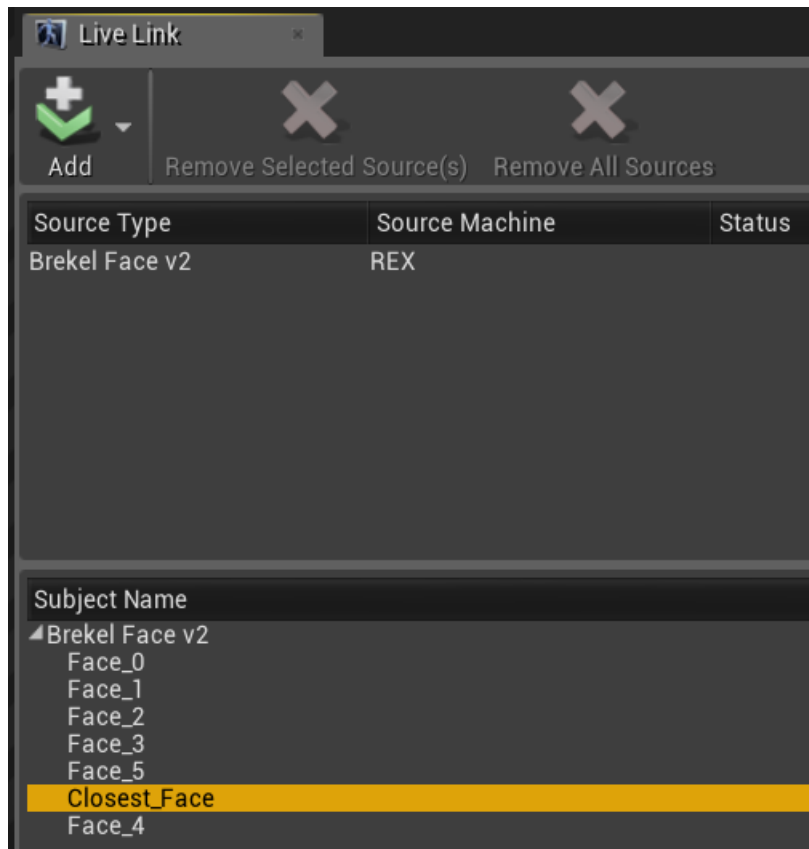


In Live Link Window

- click Add > Message Bus Source
- "Brekel Face v2" should be listed under Source Type/Machine, click it and hit Ok



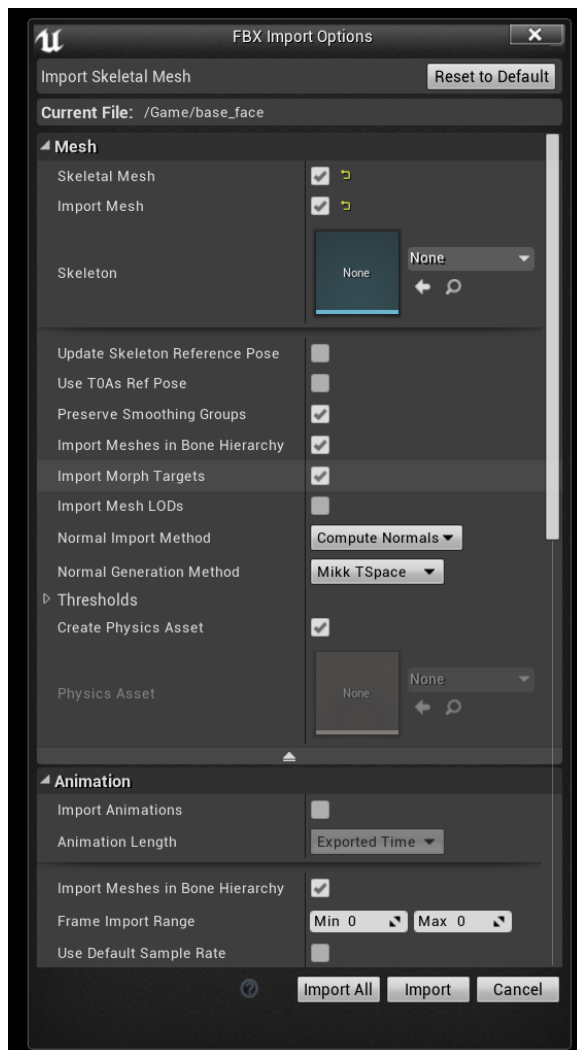
- Any visible and tracked faces should be listed under "Subject Name"
- Take note of the body name you want to use
- "Closest_Face" for the body that is closest to the sensor
- "Face_0" - "Face_5" for a specific face, note that the IDs can be displayed in the Brekel 3D viewport for reference



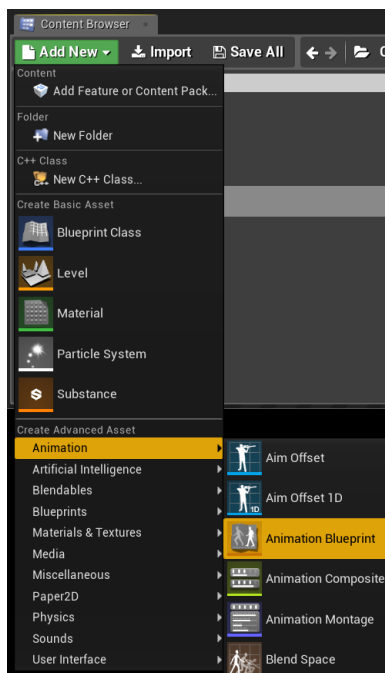
In the Content Browser:

- Import "base_face.fbx"
- You can find this file in the "UnrealEngine4" folder inside the Brekel installation folder, usually something like here:
- C:\Program Files\Brekel Pro Face 2 x64\UnrealEngine4

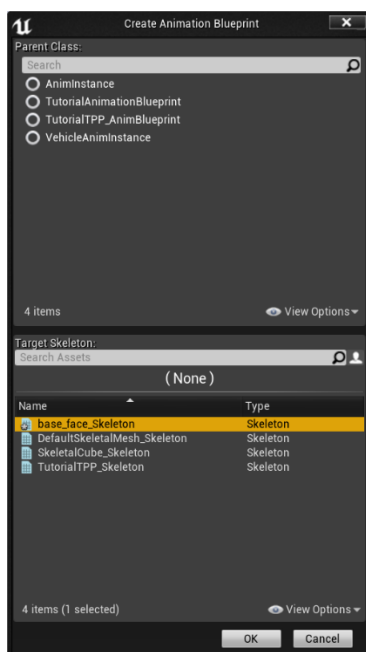
Make sure that "Import Morph Targets" is enabled in the "FBX Import Options" under the advanced "Mesh" options:



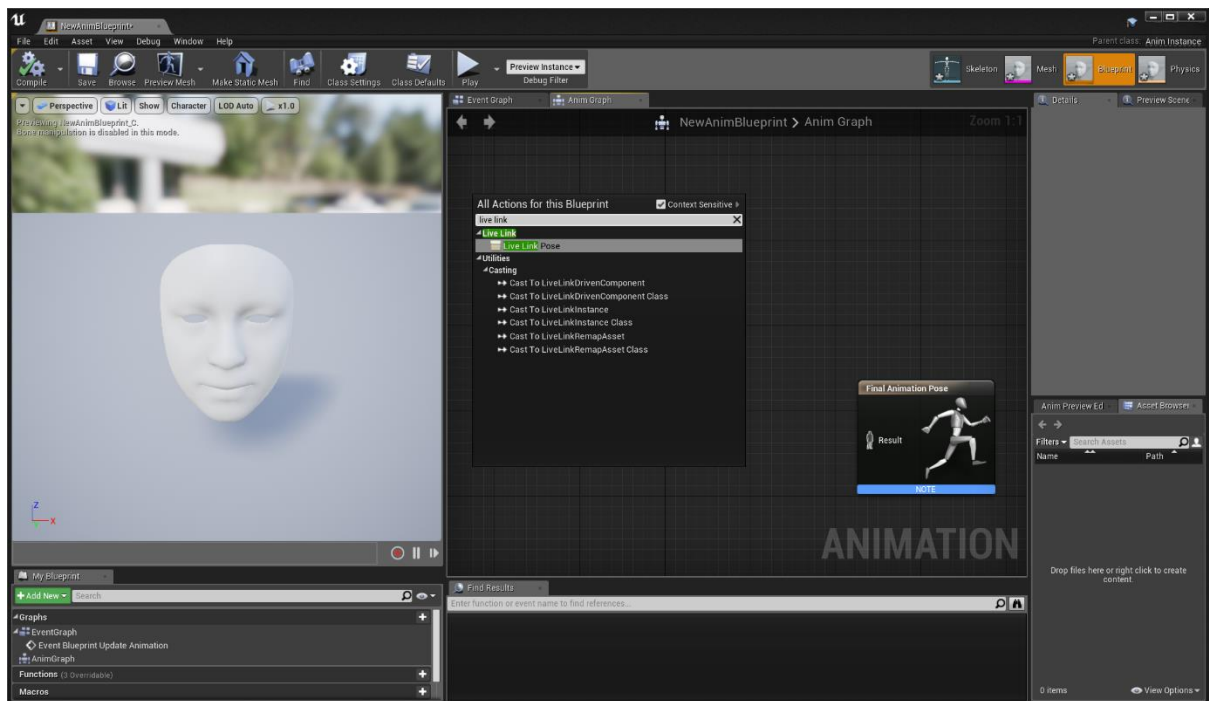
- Add New - Animation BluePrint



- Pick “base_face_Skeleton” from the list



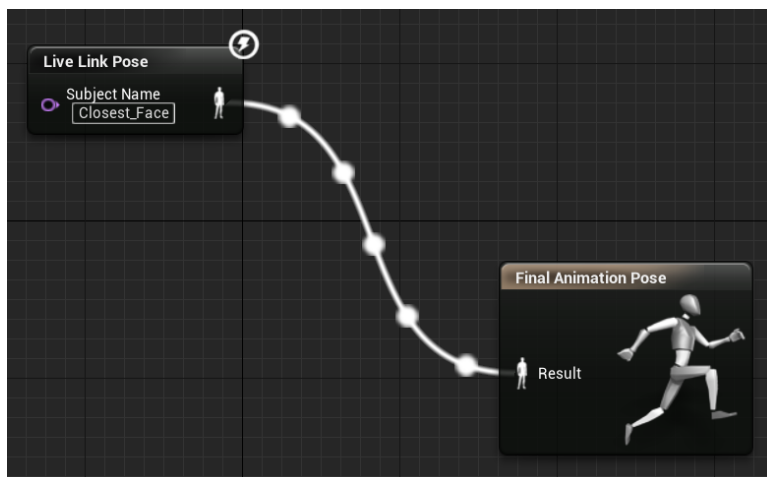
- Open the newly created blueprint by double clicking on it
- Right click in empty blueprint area
- Create a new "Live Link Pose" node



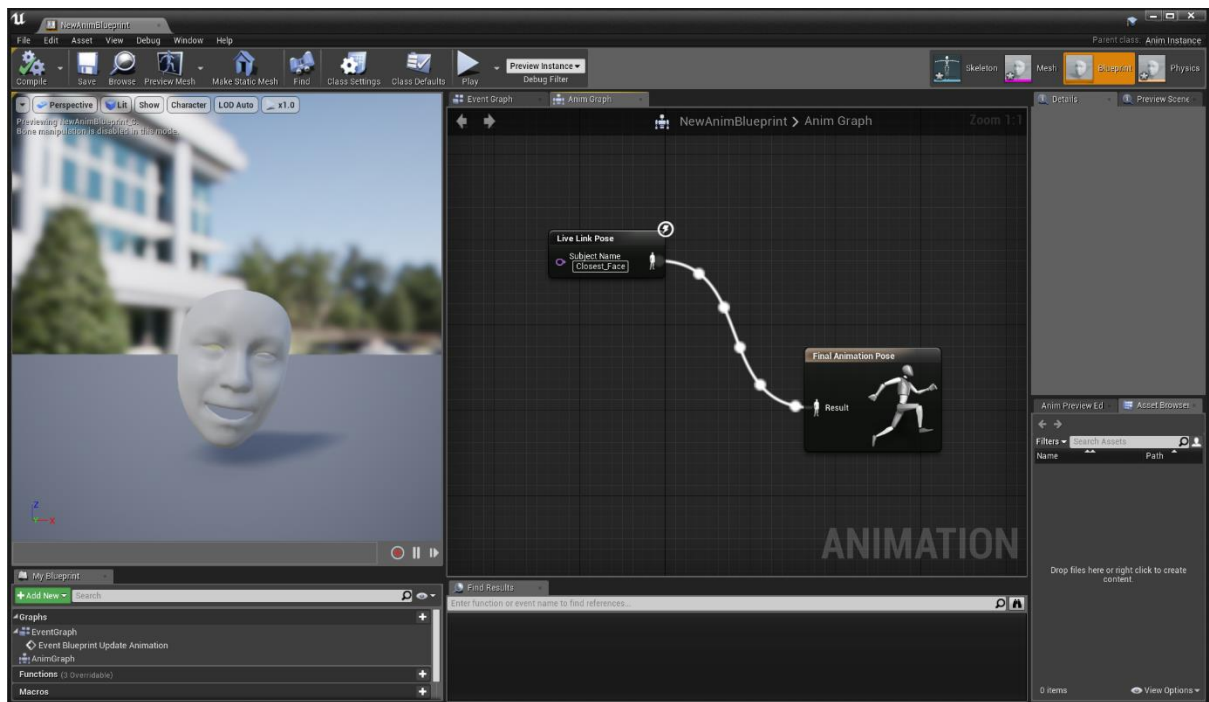
- Change Subject Name - None into the body you want to use ("Closest_Face" most probably)



- Connect Live Link Pose node to Final Animation Pose node



- Hit save and compile
 - You should now see a live data connection between the nodes
 - You should now see live data in the 3D window



NETWORK STREAMING PROTOCOL

Network packets can be sent through TCP or UDP, on a user definable port (default 8884)

Note that the free trial version doesn't include network streaming for security reasons, only the retail and full evaluation version do.

The beginning of each packet is as follows:

```
char          '2'  
u_short       bufferLength
```

The bufferLength is currently expected to be 5024, it is advised to check your incoming data for these values

Then it contains the following struct for the data:

```
struct networkDataBuffer_face
{
    const int      max_num_faces      = BODY_COUNT;

    const int      num_animUnits      = bAnimUnit_count;


    int            isTracked[BODY_COUNT];

    int            bodyID[BODY_COUNT];

    float          timeStamp[BODY_COUNT];


    float          neck_gbl_pos[BODY_COUNT][3];

    float          neck_gbl_rot[BODY_COUNT][3];


    float          head_lcl_pos[BODY_COUNT][3];

    float          head_lcl_rot[BODY_COUNT][3];


    float          animUnits[BODY_COUNT][bAnimUnit_count];


    float          facePoints_lcl_pos[BODY_COUNT][bFacePoint_count][3];

    float          facePoints_lcl_rot[BODY_COUNT][bFacePoint_count][3];

};
```

Where:

BODY_COUNT = 6

bAnimUnit_count = 20

bFacePoint_count = 29

Note that all variables use 4 bytes (int/float) with no additional padding added to make parsing a packet as simple as possible.

Most of the data contents should be pretty self-explanatory and what you'd expect from the names.

The coordinate system uses: +X going screen right, +Y going up and +Z coming out of the screen.

Rotations are in Euler angles and degrees and are all in local space. (so in relation to their parent)

Some of these things may be subject to change in future versions.

The animation units are defined in the following order:

```
enum bAnimUnit
{
    bAnimUnit_brow_up_L,
    bAnimUnit_brow_up_R,
    bAnimUnit_brow_down_L,
    bAnimUnit_brow_down_R,

    bAnimUnit_eye_closed_L,
    bAnimUnit_eye_closed_R,

    bAnimUnit_cheek_puffed_L,
    bAnimUnit_cheek_puffed_R,

    bAnimUnit_lips_pucker,
    bAnimUnit_lip_stretch_L,
    bAnimUnit_lip_stretch_R,

    bAnimUnit_lip_lower_down_L,
    bAnimUnit_lip_lower_down_R,

    bAnimUnit_smile_L,
    bAnimUnit_smile_R,
    bAnimUnit_frown_L,
    bAnimUnit_frown_R,

    bAnimUnit_jaw_L,
    bAnimUnit_jaw_R,
    bAnimUnit_jaw_open,
};
```

The face points are defined in the following order:

```
enum bFacePoint
{
    bFacePoint_Brow_Inner_L,
    bFacePoint_Brow_Mid_L,
    bFacePoint_Brow_Outer_L,
    bFacePoint_Brow_Inner_R,
    bFacePoint_Brow_Mid_R,
    bFacePoint_Brow_Outer_R,
    bFacePoint_Eyelid_Up_L,
    bFacePoint_Eyelid_Down_L,
    bFacePoint_Eyelid_Up_R,
    bFacePoint_Eyelid_Down_R,
    bFacePoint_Nostril_L,
    bFacePoint_Nostril_R,
    bFacePoint_Cheek1_L,
    bFacePoint_Cheek2_L,
    bFacePoint_Cheek1_R,
    bFacePoint_Cheek2_R,
    bFacePoint_Lips_Up,
    bFacePoint_Lips_Up_Inner_L,
    bFacePoint_Lips_Up_Outer_L,
    bFacePoint_Lips_Corner_L,
    bFacePoint_Lips_Down_Outer_L,
    bFacePoint_Lips_Down_Inner_L,
    bFacePoint_Lips_Down,
    bFacePoint_Lips_Down_Inner_R,
    bFacePoint_Lips_Down_Outer_R,
    bFacePoint_Lips_Corner_R,
    bFacePoint_Lips_Up_Outer_R,
    bFacePoint_Lips_Up_Inner_R,
    bFacePoint_Jaw,
};
```

OSC (OPEN SOUND CONTROL) MESSAGES

The following messages are sent:

Address pattern: /face_neck

int: ID of the body this belongs to
float: timestamp
float: X position
float: Y position
float: Z position
float: X rotation in euler angles
float: Y rotation in euler angles
float: Z rotation in euler angles

Address pattern: /face_head

int: ID of the body this belongs to
float: timestamp
float: X position
float: Y position
float: Z position
float: X rotation in euler angles
float: Y rotation in euler angles
float: Z rotation in euler angles

Address pattern: /<animUnitName>_anim_unit (see list below for possible animUnitNames)

int: ID of the body this belongs to
float: timestamp
float: blend value between 0.0 - 1.0

Address pattern: /<facePointName>_face_point (see list below for possible facePointNames)

int: ID of the body this belongs to

float: timestamp

float: X position

float: Y position

float: Z position

float: X rotation in euler angles

float: Y rotation in euler angles

float: Z rotation in euler angles

Available names for <animUnitName>

brow_up_L

brow_up_R

brow_down_L

brow_down_R

eye_closed_L

eye_closed_R

cheek_puffed_L

cheek_puffed_R

lips_pucker

lip_stretch_L

lip_stretch_R

lip_lower_down_L

lip_lower_down_R

smile_L

smile_R

frown_L

frown_R

jaw_L

jaw_R

jaw_open

Available names for <facePointName>

brow_inner_L

brow_mid_L

brow_outer_L

brow_inner_R

brow_mid_R

brow_outer_R

eyelid_up_L

eyelid_down_L

eyelid_up_R

eyelid_down_R

nostril_L

nostril_R

cheek1_L

cheek2_L

cheek1_R

cheek2_R

lips_up

lips_up_inner_L

lips_up_outer_L

lips_corner_L

lips_down_outer_L

lips_down_inner_L

lips_down

lips_down_inner_R

lips_down_outer_R

lips_corner_R

lips_up_outer_R

lips_up_inner_R

jaw

So for example you can search for matches on:

/brow_up_L_anim_unit

/lips_pucker_anim_unit

/nostril_L_face_point

/lips_corner_R_face_point