

# User Guide

December 2022



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# Brushes and how to use them

Press Down/Move Stick Down on your Primary Controller to enter Sculpt/Edit mode and access Sculpt/Edit brushes and tools



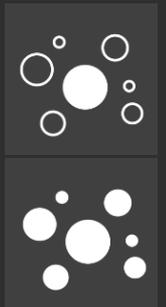
## Paint brush

- A quite straightforward paint brush tool using vertex painting technology. It operates specifically to vertex data rather than texture maps and allows users to paint with 4 different material properties (or channels): Color, Roughness, Metalness, and Emission.
- Use the Eye Dropper tool to select colors from objects or reference images.
- Tool-specific settings and options
  - Airbrush mode: Use this mode to build up multiple paint layers in one long and contiguous stroke, like if you were using a paint spray gun.
  - Material presets: Material presets are available, and users can save and add new presets to their library.



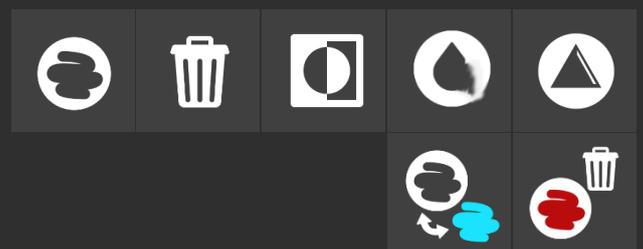
## Paint bucket

- Use this tool if you wish to replace the color (or other material properties) of your entire object or specific regions of your object.
- Use the Eye Dropper tool to select colors from objects or reference images.
- Tool-specific settings and options
  - Threshold: It defines the acceptable range of colors that can be filled.
  - Contiguous: Starting from the selected point, the tool fills adjacent vertices that have the same color as the selected vertex (plus vertices that have similar colors within the threshold value).
  - Global fill: Starting from the selected point, the tool fills all vertices that have the same color as the selected vertex (plus vertices that have similar colors within the threshold value).



## Mask brush (has multiple modes)

- Mask areas of your creation to lock vertices and shield them from any sculpting or painting.
- You can use alphas and patterns for your mask brush as well.
- Brush-specific settings and options
  - Brush modes (toggle group)
    - Add mask
    - Erase mask
    - Blur mask
    - Sharpen mask edges
  - Global actions (press once to apply)  
(Configure the impact with the mask brush "strength" slider.)
    - Mask all
    - Clear all (delete mask)
    - Invert masked area
    - Blur mask edges
    - Sharpen mask edges
    - Separate masked polygons into a new sculpt object
    - Delete masked polygons





### Standard/Carve (Invertible)

- You can use this brush to build up your shape layer by layer or to add small details like various types of skin textures.
- This brush displaces the vertices outwards or inwards, like if you would add or remove material.



### Inflate/Deflate (Invertible)

- An easy way to expand or dent the surface.



### Clay/Carve (Invertible)

- Work with this brush to sculpt surfaces and build up volume using alphas. It's like the "Standard" brush, but it involves a plane which defines the maximum height of the surface the brush has an effect on.
- You can either build up or carve out "material" in the chosen shape.
- Brush-specific settings and options
  - Height limit on/off (checkbox)
  - Height limit value (slider)



### Smooth

- Use the Smooth brush to even out peaks, troughs, and polygons.
- It can also be helpful for fixing topology issues when it is used with the dynamic topology turned on.



### Surface stamp/Carve (Invertible)

- The Surface stamp tool allows you to see exactly how your chosen Alpha mask would modify the surface at a specific location without applying the modification.
- The modification will only be applied to that specific location when you release the trigger.



### 3D Stamp/Cut out (Invertible)

- With the Stamp tool, you can quickly add and weld primitive shapes to your mesh or cut out and erase complete parts or sections of it.
- You can use this tool in combination with the "separate" features to divide your sculpt object into two multiple objects: Cut the object into two contiguous meshes then apply the new "Separate" feature.
- Choose from various primitive shapes and set
  - X, Y, Z dimensions
  - Resolution (polygon number)
  - Roundness (not available for all shapes)



### Move

- You can easily relocate and move geometries with this tool without adding or losing details.
- It can be very useful for moving body parts or modifying facial expressions and other features.



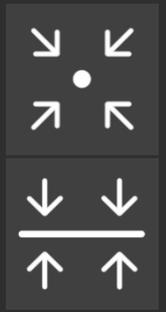
### Flatten

- Use the Flatten brush to even out the surface by pulling out the area.



### Pinch/Crease (Invertible)

- This brush basically pulls the surface together. Use the Pinch mode to slightly pull out the surface and the Crease mode to push it in.
- This tool will come in handy when adding wrinkles or making edges sharper.
- Brush-specific settings and options
  - Pinch to Point: Pulls the surface together into a point.
  - Pinch to Line: Pulls the surface together into a line.
  - Pinch height (slider)



### Snake Hook (or "Tentacle")

- When it comes to creating long tentacles, horns, branches, limbs, or other similar shapes, this is probably your go-to brush.



### Trim (Has multiple modes)

- Use the Trim brush to even out the surface by pushing down the area.
- Brush-specific settings and options
  - Lock plane upon edit: Locks the position and rotation of the trimming plane when the trigger is pressed. When it is unlocked, the plane moves along the surface of the model dynamically.
  - Modes (toggle group)
    - Dynamic mode: follows the geometry surface while flattening it.
    - Keep Edges mode: tries to preserve the edge borders while flattening along the geometry surface.
    - Create stairs mode: Try this mode to create stairs-like geometry.



### Regularize

- Use this tool to change mesh resolution, regularize and even out topology locally by subdividing and decimating the surface.
- Set the resolution to achieve the desired polygon density.
- Keep in mind that it works relative to brush and object size.

## General brush settings

### Size

- You can modify your brush size, relative to the scene.
- Uncheck the "Global" checkbox if you want to set the brush size separately for each brush.

### Strength (or Opacity for painting)

- Choose your brush's intensity.
- You can use a fixed value if you set the slider or controller trigger pressure sensitivity by checking the "Pressure Sensitivity" checkbox



### Falloff

- You can dim or blur the intensity of the brush around its edge.
- A too high falloff value can significantly change how your brush behaves. Try out multiple settings and see what configuration is best for your goals. The higher the falloff value is, the less defined your clay buildup pattern will be.

### Resolution

- You can choose to turn dynamic topology on and off. When the "dynamic" checkbox is checked, the algorithm dynamically adds and removes polygons while you are sculpting.
- "Resolution" refers to the density of the polygons generated. Increase the resolution to add more details and reduce it or turn it off completely in case you are just blocking out chunky shapes.
- The resolution slider is disabled when the "dynamic" checkbox is unchecked. In this case, the algorithm doesn't change the number of polygons at all.

### Steady Stroke

- Helps you create smoother strokes by ignoring smaller controller movements that fall into the threshold.

### Raycast

- Brushes can be projected onto the object's surface (as it is usually done in traditional flat screen design programs) or can be kept attached to the controller.



### Edit connected surfaces only

- Check "Edit connected surfaces only" to manipulate areas independently that form a continuous surface with the polygon that is closest to the center of your sphere cursor.



### Rotate along drag

- Automatically rotates the cursor towards the moving direction.



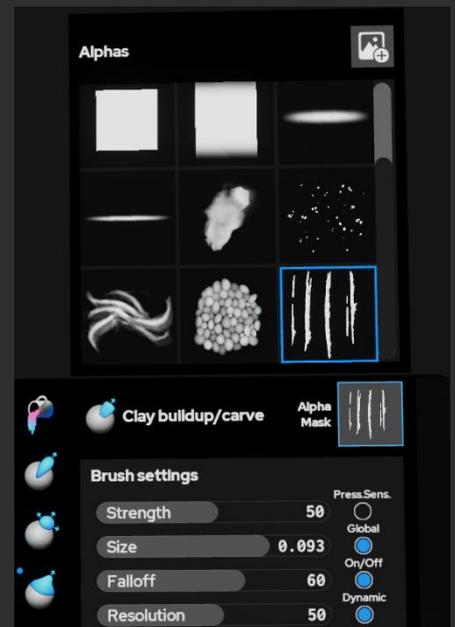
### Edit front faces only

- Check "Edit front faces only" to only manipulate the surfaces that are facing your controller.



## Alphas

- Available for: Clay buildup brush, Standard brush, Paint brush, Mask brush
- Select "Alpha masks" on the top right corner of your brush modifier panel and choose a default alpha or import your own.
- Import custom alphas by selecting the "add" button at the top right corner of the alpha panel.
- Replace and delete custom alphas by selecting the alpha and choosing the desired command at the top of the alpha panel.
- The pattern will determine the shape of the brush being used. These are basically grayscale images that define the shape, the height, and the depth of the given pattern.
- Use the alphas to create various 3D textures and bumps.
- Subdivide your model or increase the brush resolution if the shape doesn't appear on the surface detailed enough.



## Brush shapes

- Available for: Move, Clay buildup brush, Standard brush, Inflate brush
- You can choose from three types of cursor shapes:
  - Sphere
  - Cube
  - Capsule





# Scene tools and how to use them

Press Up/Move Stick Up on your Secondary Controller to enter Scene mode and access Scene tools (Sculpt UI panel will close automatically).



## Select tool

- Use the Select tool to select the object you would like to move, rotate, scale or 3D edit.
- Only one object can be selected at a time.
- Select the "air" to select the sculpt object's parent and transform all the sculpt objects at once.
- Access more options by pressing UP on the secondary controller again.
  - You can also select objects on the Document Outline UI.
  - Hide, lock, delete, duplicate, rename or export the selected object.



## Create tool

- Use this tool to add primitives quickly and easily to your scene.
- Access more options by pressing up on the Secondary Controller again.
  - Choose a primitive from the Create tool menu.
  - Scale the object with the Primary Controller up/down buttons.
  - Place the object by pulling the Primary Controller trigger.



## Clone tool

- Activate the Clone tool, hover on an object and pull the Primary Controller trigger to clone the given object.
- If you are pulling the trigger, the duplicate will stay grabbed by your Primary Controller.



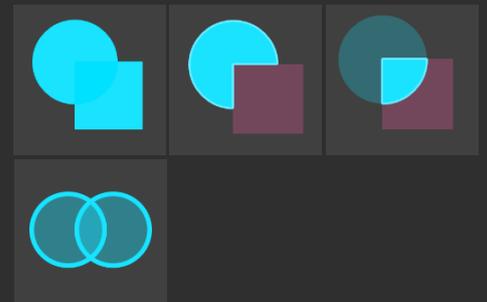
## Delete tool

- Activate the Clone tool, hover on an object and pull the Primary Controller trigger to delete the given object.
- You can delete objects on the Document Outline UI as well.



## Boolean tool

- Use this tool to merge, subtract, intersect, or join two objects.
- Activate the Boolean tool, select two objects and apply operation.
- You can reselect objects by selecting the A, B object fields again, then choosing the desired objects in the scene.



# Context menu tools and options

## Sculpt Object Context Menu

Select the desired object and press the Context Menu button on the controller to open the Sculpt Object Context Menu.



### Material tab

- Choose from numerous material options and change how the sculpt object looks and feels.
- Both matcap and PBR materials are available.
- Paintable materials are indicated with a paint brush icon.



### Topology tab

- Polygon count
  - Selected object
  - Total number of polygons in the scene
- Decimate – To simplify and reduce the number of faces.
  - Set a target number of faces and apply.
  - Applies to the entire sculpt object.
- Subdivide – To increase the number of faces.
  - Set topology smoothing intensity and apply 4x subdivision.
  - Applies to the entire sculpt object.
- Regularize
  - To change mesh resolution, regularize and even out topology globally by subdividing and decimating the surface.
  - Set the resolution to achieve the desired polygon density.
- Voxel remesh
  - Rebuilds and fixes the geometry with an evenly distributed topology. The approximate polygon density of the new topology can be set by the user.
  - Check the "Close holes" checkbox to fill the open parts before running the voxel remesh algorithm.



### Transforms tab

- Flip
  - Flip the object on its X, Y or Z axis.
- Clone and mirror
  - Clones the object and mirrors the duplicate without welding
  - How to execute:
    - Choose the object to be cloned and open its context menu
    - Select any object and axis on which the duplicate has to be mirrored and press "Apply"
- Mirror and weld
  - Mirrors the geometry from one side to the other and welds the new topology together.
  - How to execute:



- Choose the object to be manipulated and open its context menu
- Select any object and axis on which the geometry has to be mirrored and press "Apply".
- Scenarios:
  - When there are polygons found on the negative side of the chosen axis:
  - Mirrors the geometry from the negative side to the positive side, welds the topology together while also removing the original topology from the positive side.
  - When there are no polygons found on the negative side of the chosen axis:
  - Mirrors the geometry from the positive side to the negative side, while merging the mirrored topology together with the original one.



### Poly Transforms tab

- Edit masked polygons
  - You can either separate the polygons you masked into new objects or delete them completely.
- Separate contiguous meshes
  - If a sculpt object consists of multiple contiguous meshes, you can separate these into new objects with a press of a button.
  - Use the slider to set the maximum number of objects you would like to get as a result. The order of separation is based on the polygon number of the contiguous meshes found in the object.
- Close holes
  - This feature will automatically detect and close all the holes on the selected sculpt object.
  - Use this feature after you remove a surface area and you still would like to continue sculpting or whenever you need a watertight mesh. For instance, 3D printing would require all objects to be closed too.
  - You can combine the feature with the Voxel Remesh tool in order to get better results when remeshing open objects.



## Reference Image Context Menu

### How to activate

- Select the desired object and press the Context Menu button on the controller to open the Reference Image Context Menu.

### What you can find here

- Lock/Unlock image
  - Locked images can't be grabbed, moved, rotated, or scaled.
- Delete image



# Options menu



## User preferences

- Hand dominance
  - Switch between left and right-handed mode
- Desktop image quality - Set the desktop image quality by switching between "Low resolution" and "HD image" quality.
  - The "Low resolution" version is a mirrored and cropped version of the image you can see in the VR headset.
    - This is more performance friendly.
  - The "HD image" activates and uses an additional virtual camera with a wider field of view and smooth camera movement.
    - This has a negative impact on the application performance.
- Cursor opacity
  - You can set the opacity of the VR brush cursor here
- Backface rendering (backface culling)
  - You can turn polygon backface rendering on and off here.
  - Backface rendering can be very useful for working with scan data, but I also increase computational requirements., which can result in a slower operation.
- Show/hide items and indications
  - Active object
    - When turned on, the active sculpt mesh is rendered normally, while the rest becomes darker.
  - Sculpt symmetry plane
  - Object bounding box and pivot
    - Show/hide the bounding box and pivot of the selected object.
  - Sculpt parent plane and pivot
    - When turned on, the coordinate space of the Sculpt object parent is visualized.



## Screenshot/Camera

- Select this tab to turn the UI panel into a camera object
- Position the "Camera" and pull the trigger on the Secondary Controller to take a screenshot
- Screenshots will be automatically saved to C:\Users\User\Documents\ShapeLab\ScreenShots



## Environments

- Choose from various work environments.
- Select the thumbnail and the environment will load instantly.



## Help

- Open to learn about controls and shortcuts.



## Info

- Legal text and version number.



# File menu

## New

- Select "New" to discard your current work, and restart from scratch.

## Import/Export

- You can import and export the following file formats: STL, OBJ, GLB, FBX
- Choose GLB or FBX to keep colors and material properties.
- Choose "Export selected" to export the selected object only.

## Save project, Quick Save/Load

- If you choose Save project or Quick Save, the app will save your creation in a proprietary project file format called SL3D.
- SL3D will keep the colors of your creation.
- Find the "Quick Saved" creations here: C:\Users\Username\Documents\ShapeLab



# Controls and shortcuts

## Alternate brush

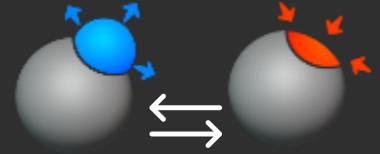
You can define a primary brush and an alternate brush and switch back and forth between them quickly and easily.

- How to activate
  - Keep pulling the Secondary Controller Trigger to activate your alternate brush.
    - As long as the trigger is being pulled, the alternate brush will remain active.
  - Use this shortcut to quickly switch between two brushes.
  - The "Smooth" brush is your alternate brush by default.
- How to configure
  - Just keep pulling the Secondary Controller Trigger while selecting another brush from the brush palette. A small blue dot will appear on the palette next to the selected brush.
  - You can make any combination of brushes to suit your sculpting task by assigning another sculpting brush to your alternate brush.



## Invert brush

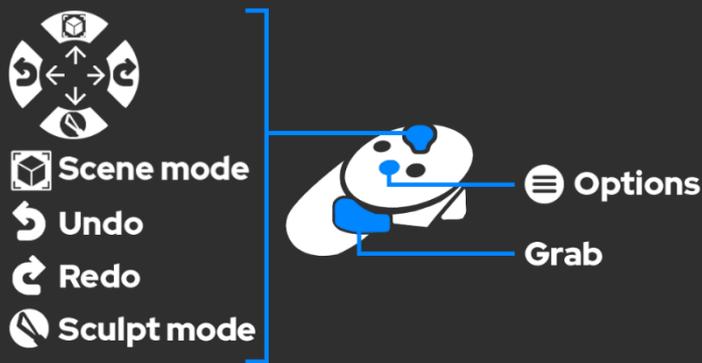
- Invertible brushes
  - There are a number of invertible brushes in the application that you can use in two different ways.
    - Inflate – Deflate
    - Pinch – Crease
    - Clay buildup – Carve
  - You can select the desired mode in the brush modifier menu or press the (B) button on the primary controller (for Oculus, HP Reverb and Valve Index Controllers) and there is also a shortcut (for HTC Vive and other WMR Controllers)
- The shortcut
  - Besides selecting the inverted brush mode on the brush modifier menu, you can quickly switch between the two modes by double pressing the “Context Menu” button on your Primary Controller.



## Others

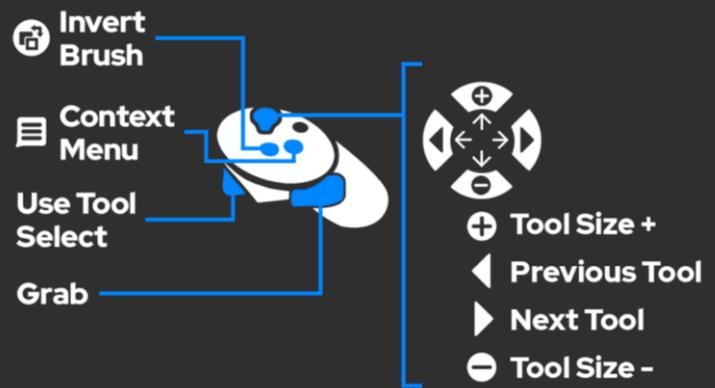
- Brush modifier UI, Document Outline and Creation tool primitives
  - Open/close brush modifier UI with the “Secondary Controller Down” button/stick.

# Controls / Oculus, HP Reverb



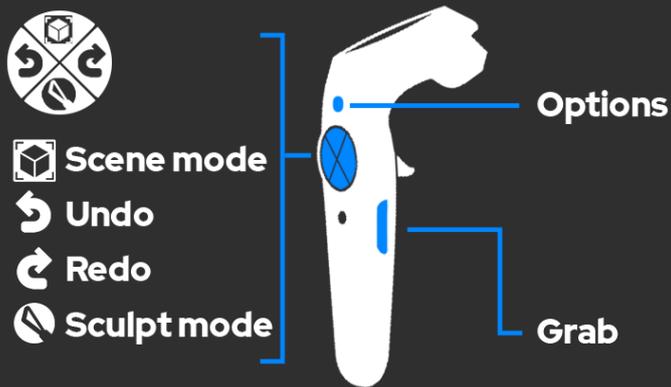
## Secondary Controller

- Options
  - How to open
    - Press "Button (X)" to open Options UI (Sculpt UI panel will close automatically)
  - What you can find here
    - User preferences - Hand dominance, Polygon wireframe on/off, Mirror plane on/off
    - Environment list
    - Screenshot feature
- Scene tools
  - How to open
    - Move "Stick Up" to enter Scene mode and access Scene tools (Sculpt UI panel will close automatically)
  - What you can find here
    - Scene tools
    - Document Outline UI
- Sculpt brushes
  - How to open
    - Move "Stick Down" to open Sculpt UI panel (Options UI panel will close automatically)
  - What you can find here
    - Sculpt brushes
    - Sculpt brush modifiers (click on the header to open)
- Undo/Redo
  - Move "Stick Left/Right" to remove/replace your modifications
- File menu
  - The file menu is located on the left side of the secondary controller
  - Open the panel by pointing to it



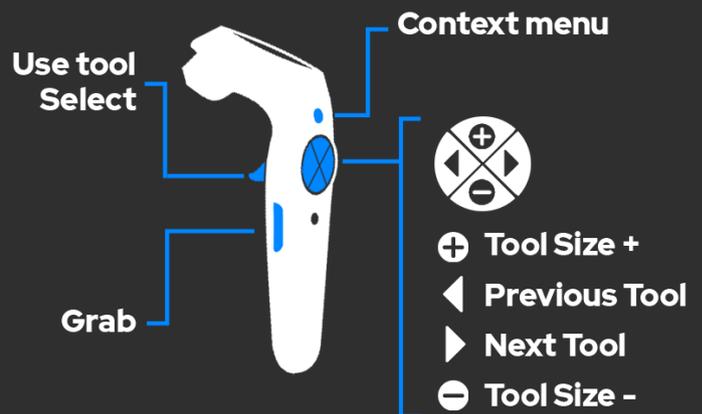
## Primary Controller

- Context menu
  - How to open
    - Press "Button (A)" to open the selected object's menu.
  - What you can find here
    - Model context menu
      - Material tab
      - Topology tab
        - Decimate - Set target number of faces and apply
        - Subdivide - Set smoothing strength and apply 4x subdivision
        - Regularize topology
      - Transform
        - Mirror/flip on X, Y, Z axes
    - Reference Image context menu
      - Lock/Unlock
      - Delete
- In "Sculpt/Edit mode"
  - Invert brush: Press (B)
  - Tool size
    - Move "Stick Up/Down"
  - Previous/next tool
    - Move "Stick Left/Right"
  - Pull/push object
    - Keep pressing the grip button while moving the stick up or down
- In "Scene mode"
  - Cursor mode: Raycast VS Direct touch
    - Move "Stick Up/Down"
  - Previous/next tool
    - Move "Stick Left/Right"
- Scale, rotate and grab
  - Keep pressing both grip buttons simultaneously



## Secondary Controller

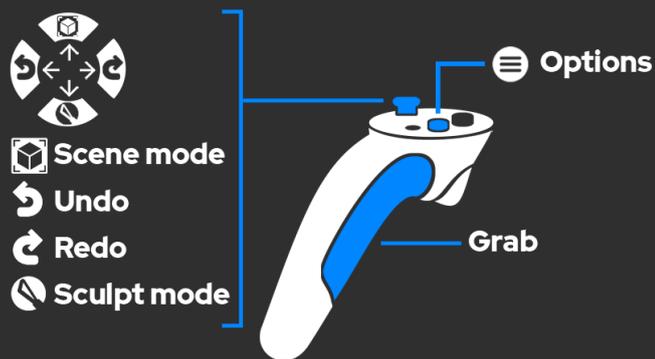
- Options
  - How to open
    - Press "Menu Button" to open Options UI panel
  - What you can find here
    - User preferences – Hand dominance, Polygon wireframe on/off, Mirror plane on/off
    - Environment list
    - Screenshot feature
- Scene tools
  - How to open
    - Press "Trackpad Up" to enter Scene mode and access Scene tools (Sculpt UI panel will close automatically)
  - What you can find here
    - Scene tools
    - Document Outline UI
- Sculpt brushes
  - How to open
    - Press "Trackpad Down" to open Sculpt UI panel (Options UI panel will close automatically)
  - What you can find here
    - Sculpt brushes
    - Sculpt brush modifiers (click on the header to open)
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  - Press "Trackpad Left/Right" to remove/replace your modifications
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## Primary Controller

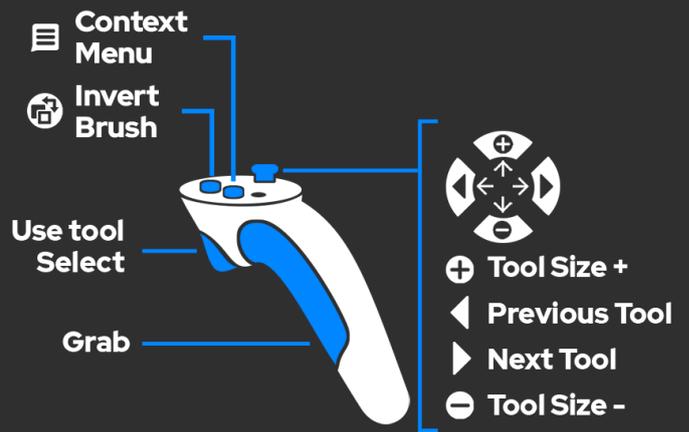
- Context menu
    - How to open
      - Press "Menu Button" to open the selected object's menu.
    - What you can find here
      - Model context menu
        - Material tab
        - Topology tab
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          - Subdivide – Set smoothing strength and apply 4x subdivision
          - Regularize topology
        - Transform
          - Mirror/flip on X, Y, Z axes
      - Reference Image context menu
        - Lock/Unlock
        - Delete
- In "Sculpt/Edit mode"
  - Tool size
    - Press "Trackpad Up/Down"
  - Previous/next tool
    - Press "Trackpad Left/Right"
  - Pull/push object
    - Keep pressing the grip button while moving the stick up or down
- In "Scene mode"
  - Cursor mode: Raycast VS Direct touch
    - Press "Trackpad Up/Down"
  - Previous/next tool
    - Press "Trackpad Left/Right"
- Scale, rotate and grab
  - Keep pressing both grip buttons simultaneously

# Controls / Valve Index



## Secondary Controller

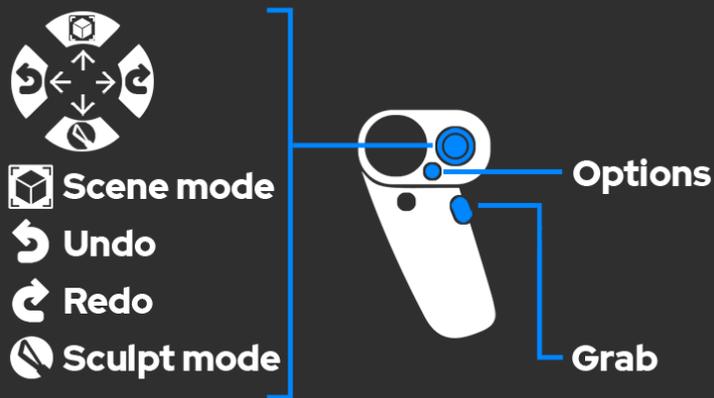
- Options
  - How to open
    - Press "Button (B)" to open Options UI
  - What you can find here
    - User preferences - Hand dominance, Polygon wireframe on/off, Mirror plane on/off
    - Environment list
    - Screenshot feature
- Scene tools
  - How to open
    - Move "Stick Up" to enter Scene mode and access Scene tools (Sculpt UI panel will close automatically)
  - What you can find here
    - Scene tools
    - Document Outline UI
- Sculpt brushes
  - How to open
    - Move "Stick Down" to open Sculpt UI panel (Options UI panel will close automatically)
  - What you can find here
    - Sculpt brushes
    - Sculpt brush modifiers (click on the header to open)
- Undo/Redo
  - Move "Stick Left/Right" to remove/replace your modifications
- File menu
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## Primary Controller

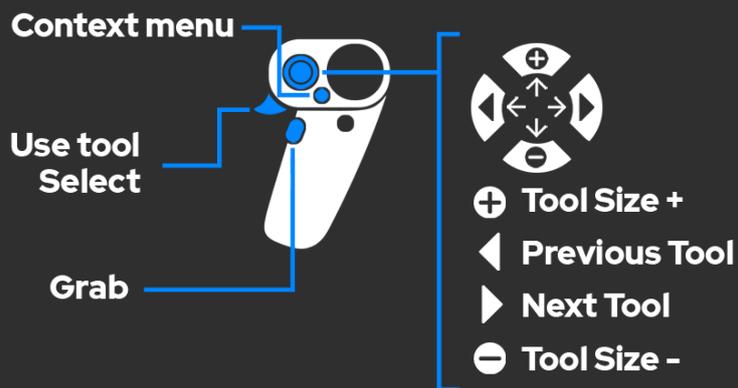
- Context menu
  - How to open
    - Press "Button (A)" to open the selected object's menu.
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        - Subdivide - Set smoothing strength and apply 4x subdivision
        - Regularize topology
      - Transform
        - Mirror/flip on X, Y, Z axes
    - Reference Image context menu
      - Lock/Unlock
      - Delete
- In "Sculpt/Edit mode"
  - Invert brush: Press (B)
  - Tool size
    - Move "Stick Up/Down"
  - Previous/next tool
    - Move "Stick Left/Right"
- In "Scene mode"
  - Cursor mode: Raycast VS Direct touch
    - Move "Stick Up/Down"
  - Previous/next tool
    - Move "Stick Left/Right"
  - Pull/push object
    - Keep pressing the grip button while moving the stick up or down
- Scale, rotate and grab
  - Keep pressing both grip buttons simultaneously

# Controls / Windows Mixed Reality



## Secondary Controller

- Options
  - How to open
    - Move the "Menu button" to open Options UI
  - What you can find here
    - User preferences - Hand dominance, Polygon wireframe on/off, Mirror plane on/off
    - Environment list
    - Screenshot feature
- Scene tools
  - How to open
    - Move "Stick Up" to enter Scene mode and access Scene tools (Sculpt UI panel will close automatically)
  - What you can find here
    - Scene tools
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    - Move "Stick Down" to open Sculpt UI panel (Options UI panel will close automatically)
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- File menu
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## Primary Controller

- Context menu
  - How to open
    - Press "Menu" (while pointing to the object with the Primary Controller)
  - What you can find here
    - Model context menu
      - Material tab
      - Topology tab
        - Decimate - Set target number of faces and apply
        - Subdivide - Set smoothing strength and apply 4x subdivision
        - Regularize topology
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    - Move "Stick Left/Right"
  - Pull/push object
    - Keep pressing the grip button while moving the stick up or down
- Scale, rotate and grab
  - Keep pressing both grip buttons simultaneously