Houdini
3D ANIMATION TOOLS

# Houdini
# Light, Shade, Render

## M06: Creating a Light Rig

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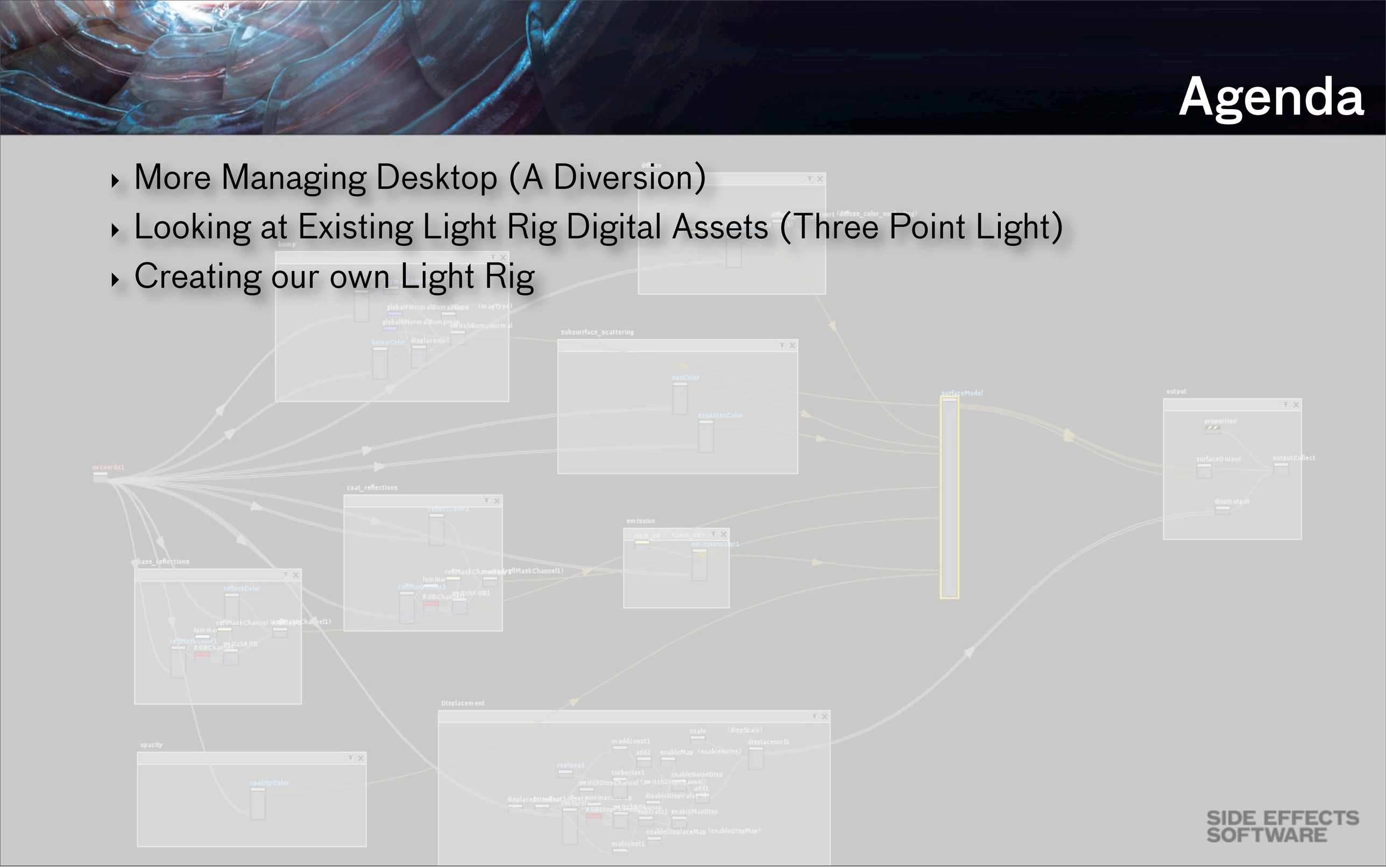
# Agenda

- More Managing Desktop (A Diversion)
- Looking at Existing Light Rig Digital Assets (Three Point Light)
- Creating our own Light Rig

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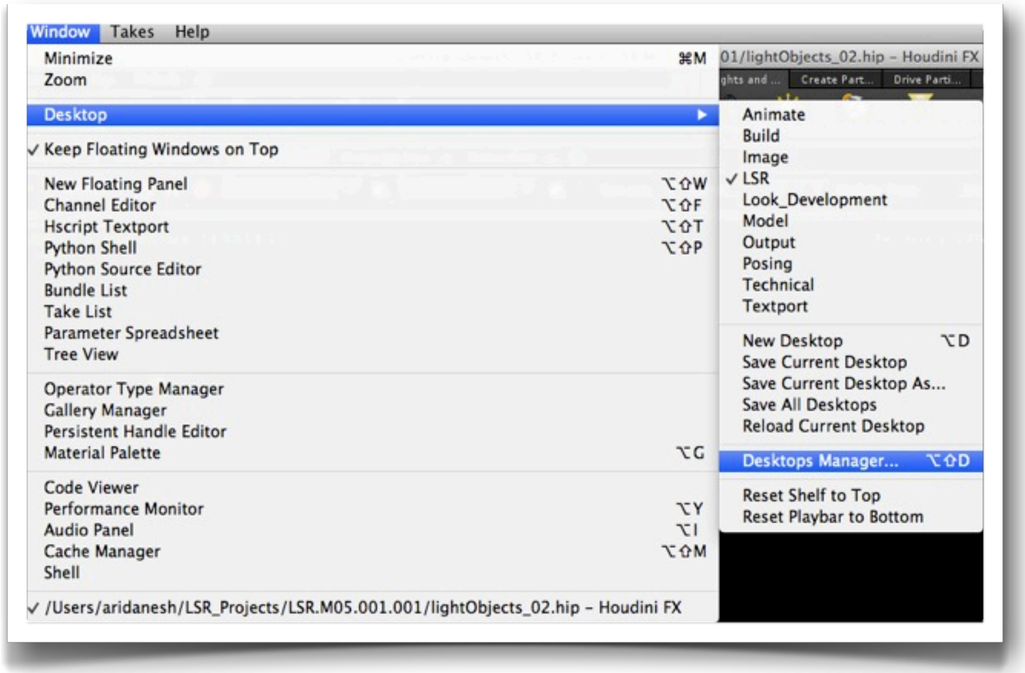
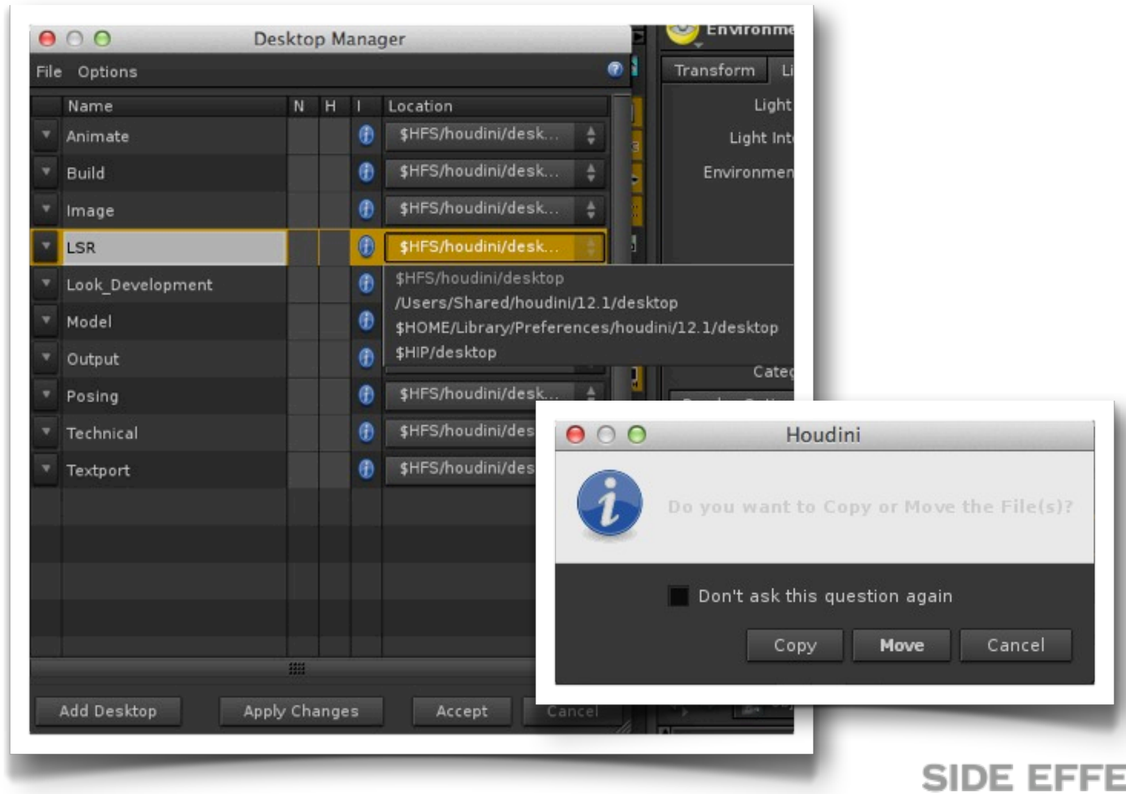
# Desktop Manager




- You can save your desktop to a local “Desktop” folder
  - Go to Window --> Desktop --> Desktop Manager
  - On the right side drop down menu choose where to save your desktop
  - Select “Move” or “Copy”




- The Desktop file is just a HScript Text file
  - Take a look

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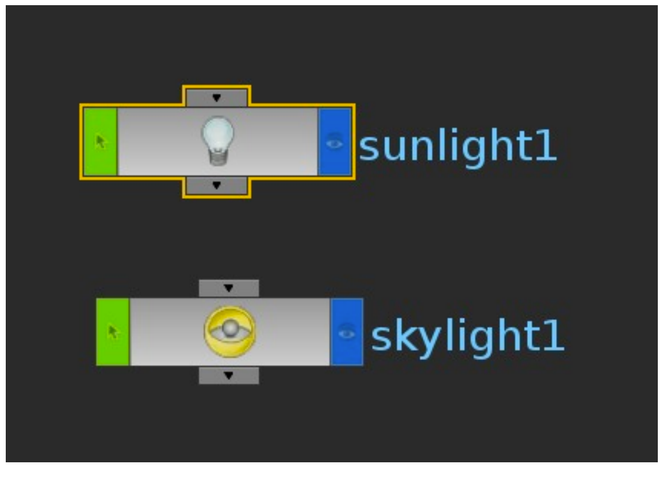
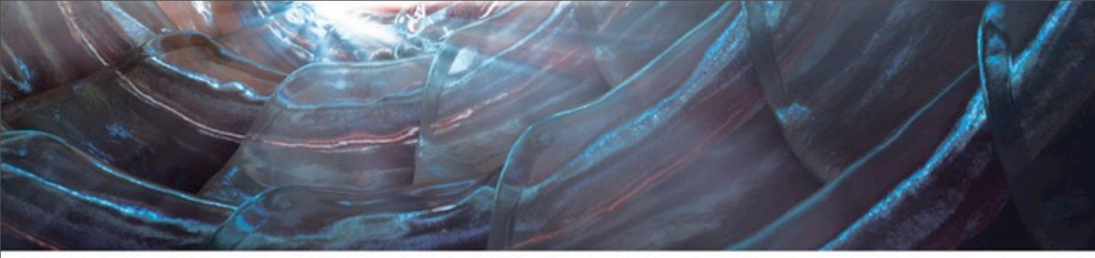
# What is a Sky Light



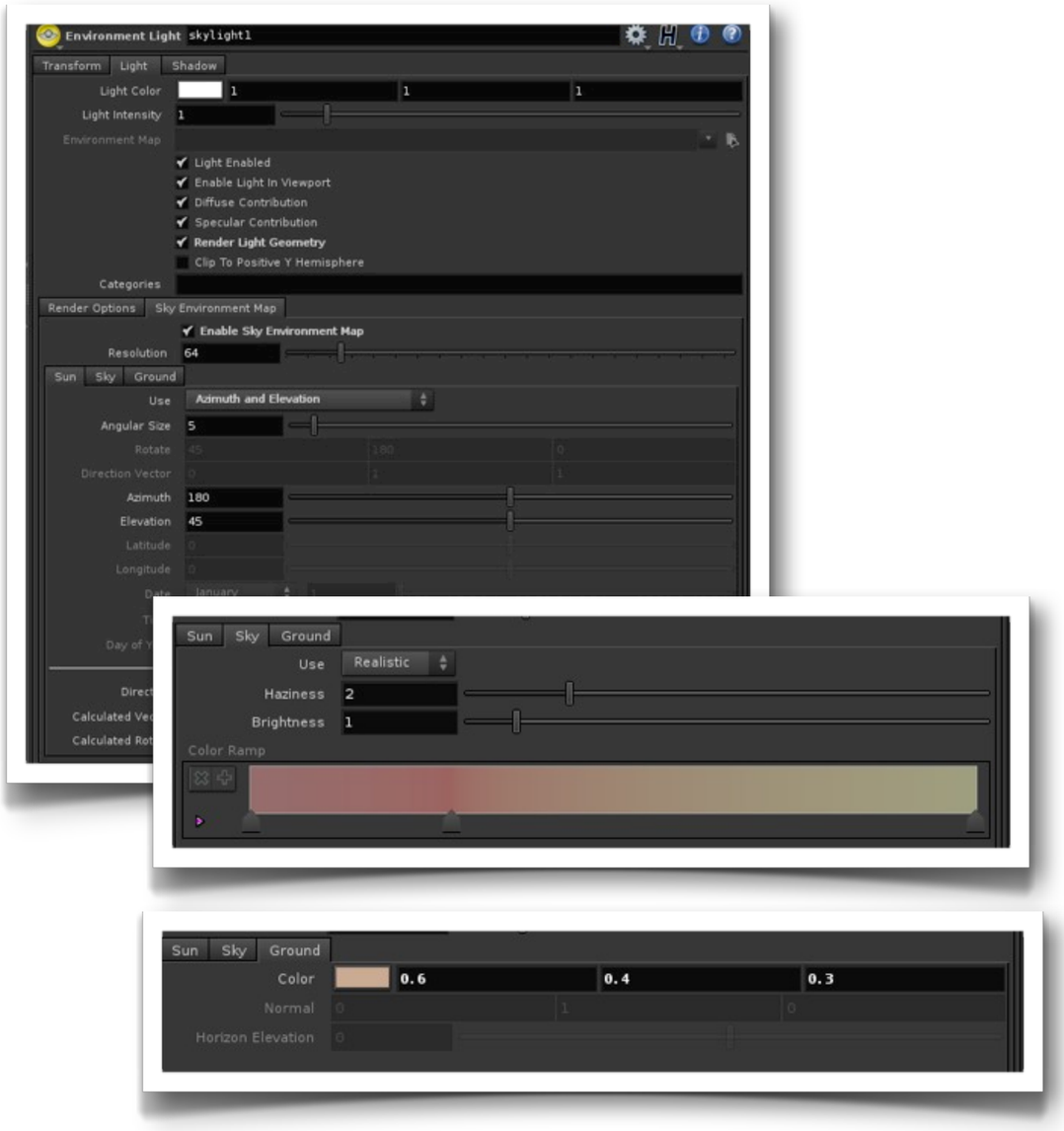

- Drop Down a Sky Light
  - It contains a Light whose presets are set to Sun Light
  - It contains another light which is an environment light



# What is an Environment Light?

- Environment Lights provide background illumination from outside the scene.
- Environment lights illuminate the scene from a virtual hemisphere (or sphere) that is beyond that farthest geometry objects in the scene. Environment lights can be rotated to orient directional illumination, but they cannot be translated.
- An environment light may use a texture map to provide HDRI illumination from an environment map. With no rotation, the environment map is oriented so that the top face aligns with the positive Y axis.

# Options for Environment Light/Sky Light




- Diffuse and Specular Contributions
- Render Light Geometry
- Clip to Positive Y Hemisphere

- Enable Sky Environment Map
  - Sun Tab
    - Angular Size
  - Sky Tab
    - Realistic or Ramp
    - Haziness
    - Brightness
  - Ground
    - Color

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# Whar is Sun Light?

Sun lights are like distant lights but they allow us to have a little angle instead of perfectly parallel light rays

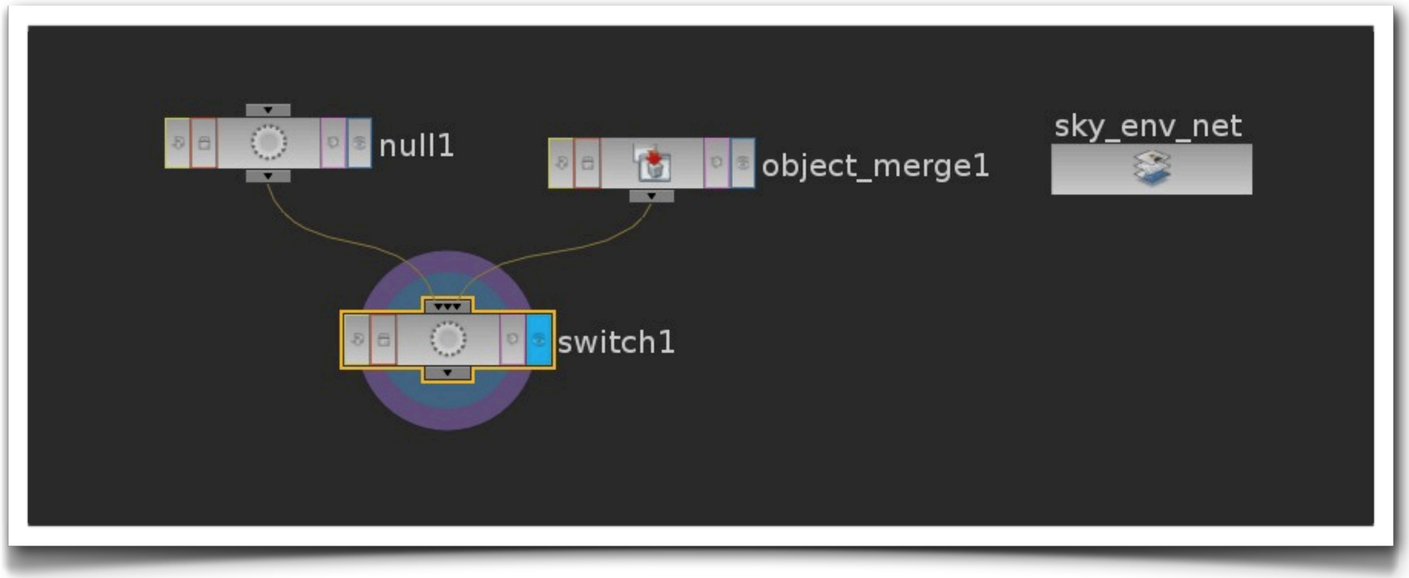
- Well...
- We know a Distant Light emits parallel rays of light, which are similar to the rays of the sun.
- A Sun Light - A finite sized (non-point) directional light source infinitely far from the scene. Sun lights are similar to distant lights with the exception that they produce a penumbra - similar to the actual sun.

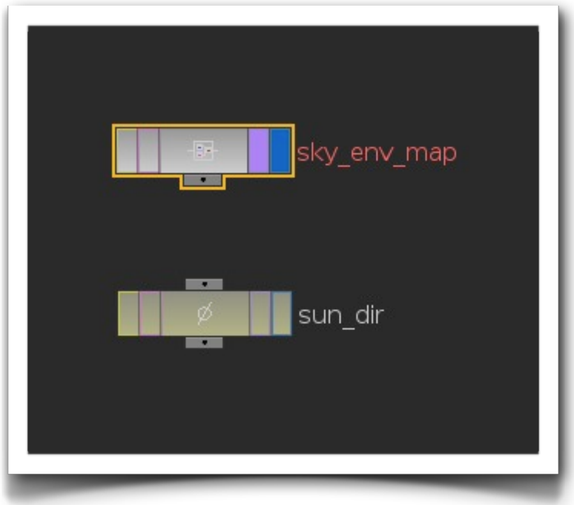
- Notice - The Sun Angle is controlled through the Environment/Skylight

# Sky Light


## Take a peak...

- Unlock Asset (Houdini let's you see how the asset was constructed)
- You can modify
- Notice there is a COPNET
- Dive inside the COPNET

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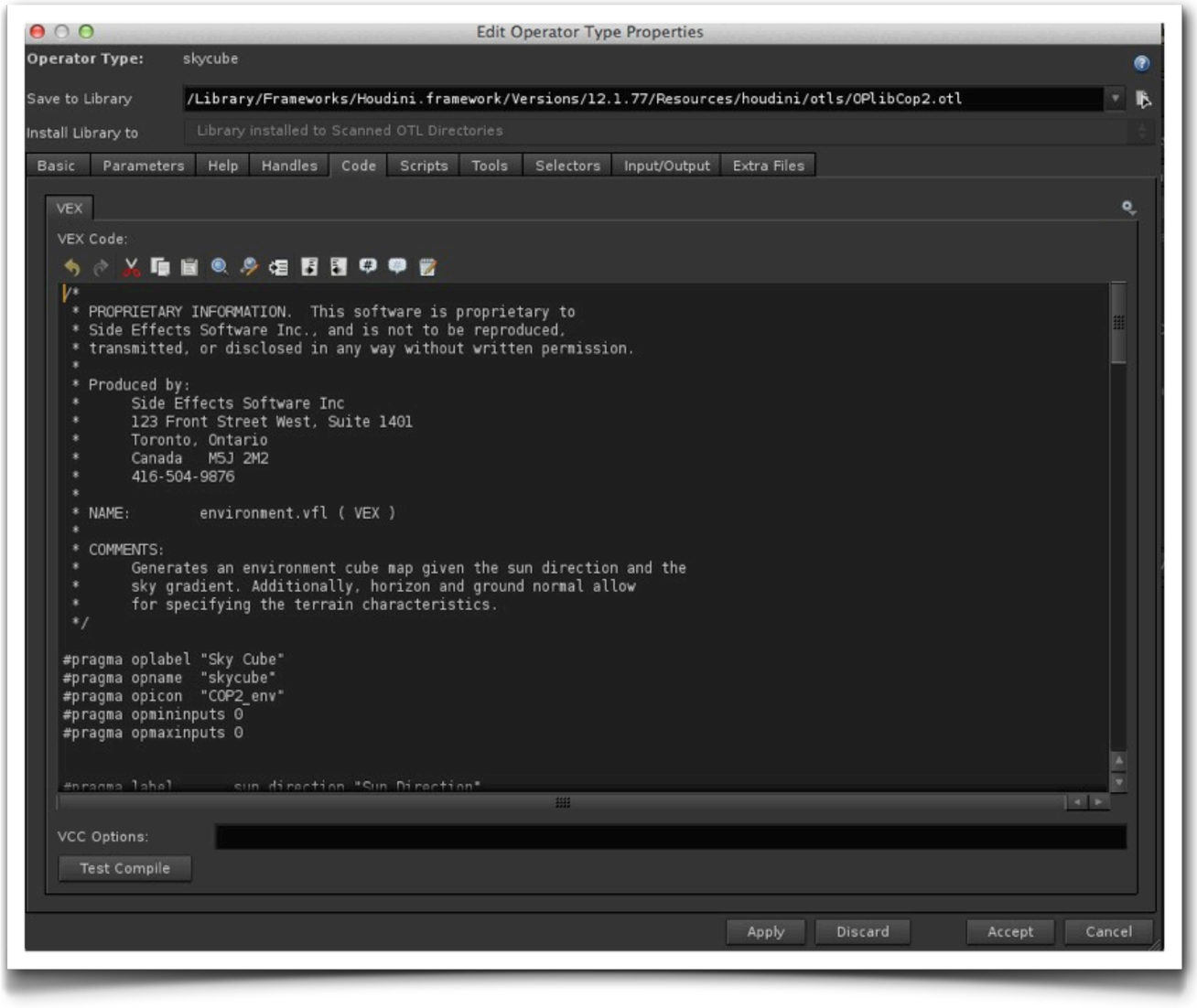
# Sky Light (cont.)

## Take a peak...




- You can explore the VEX Code, change it, or...
- Replace it with your own HDR image

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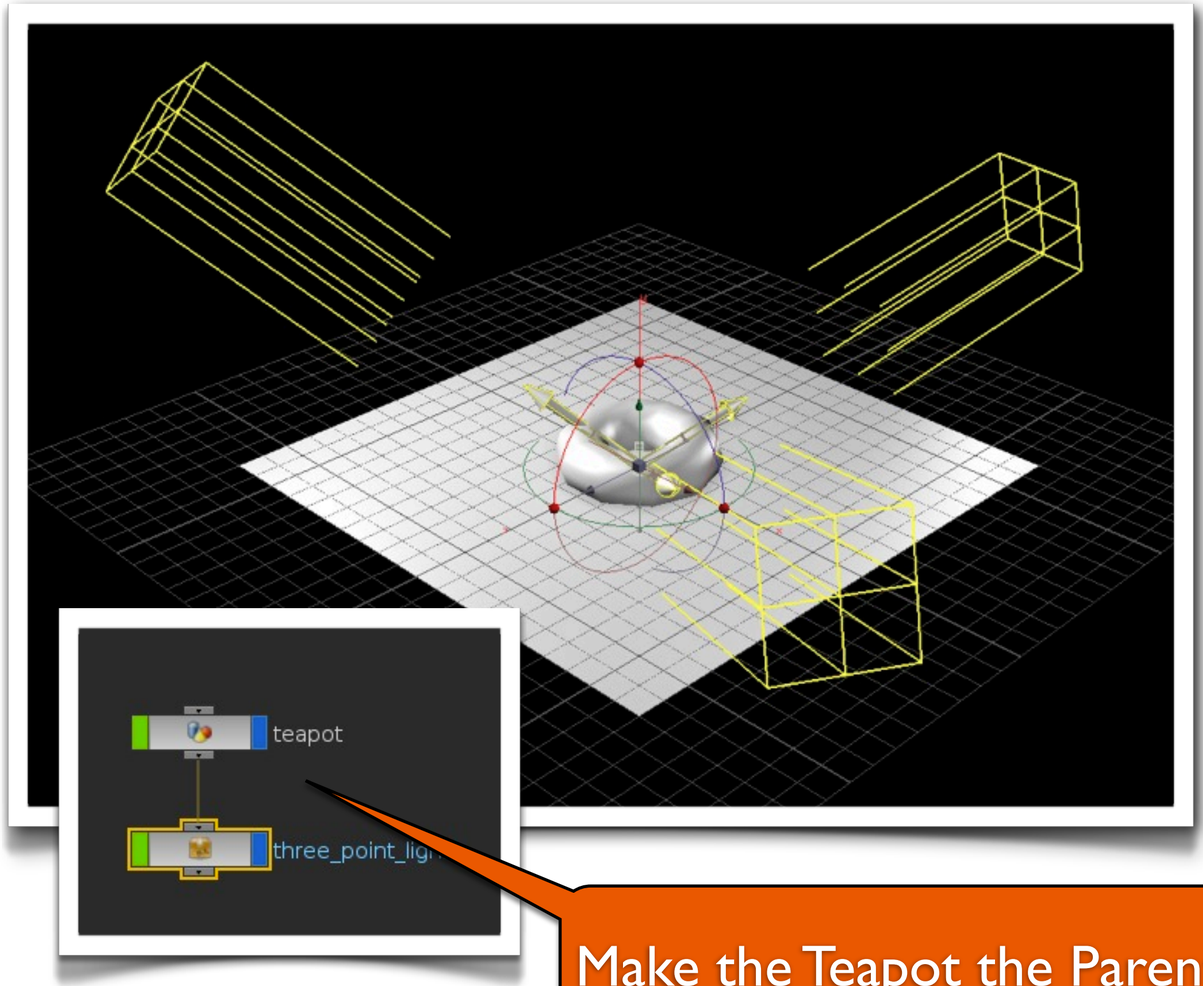
# Three Point Light Rig




- Not on the Shelf Tool
- Activate by using the Tab Key selection menu
- Let's Explore this Asset
  - You can move or rotate the whole rig using the translate or rotate handles
  - Notice you can toggle though the handles using the "y" keyboard short cut
- Now click on one of the arrays
  - You can rotate the arrow
  - Try toggling the handles - "y" key
  - It does not have the translate handle
  - How can you do that?

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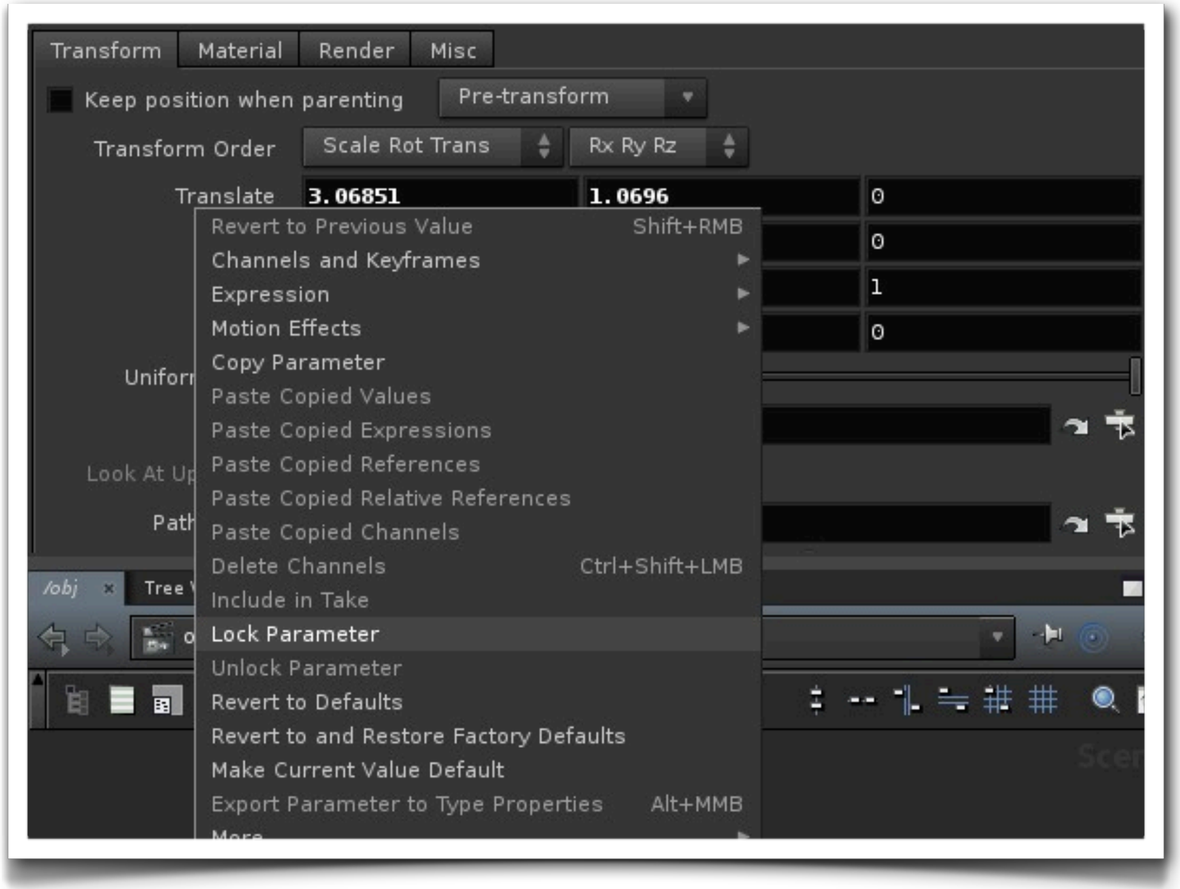
# Locking Parameters

## a diversion...




- Drop down a box
- Toggle handles (y-key) they all are visible
- Go to parameters
- Right click on translate and choose
  - “Lock Parameter”
- Notice that you can no longer toggle to the translate handle

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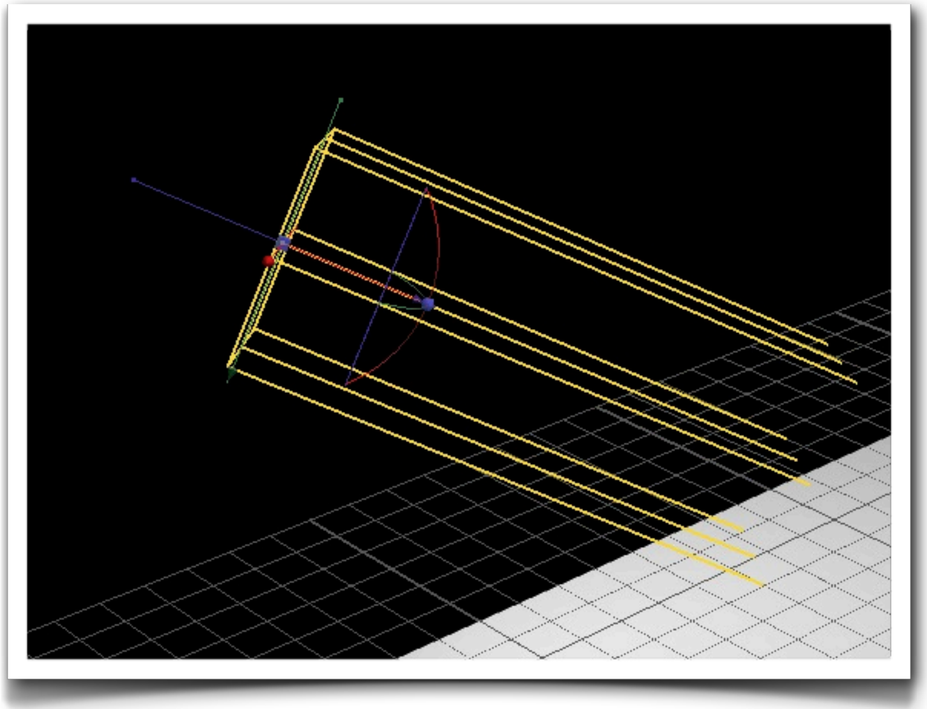
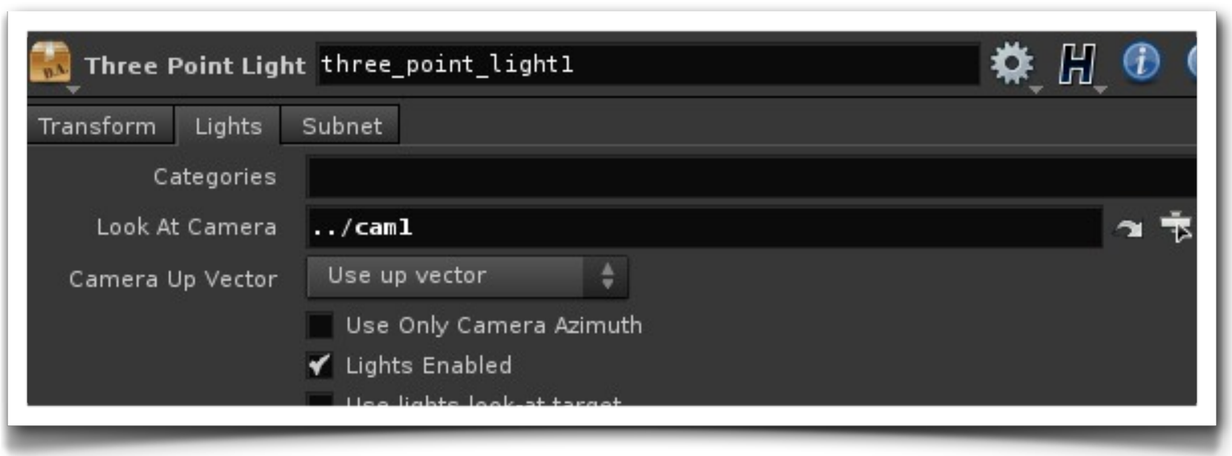
# Back to the Three Point Light






- 3 Point Light is used to light a specific hero character or product
- Click on a specific light handle (the handle that looks like an area light with rays pointing out)
- Notice you can translate and rotate the individual lights
  - Good for creating glancing angles
- Go to the parameter view and notice that you can orient the lights to work with a camera
- Notice the asset knows what parameters go with what is being picked.

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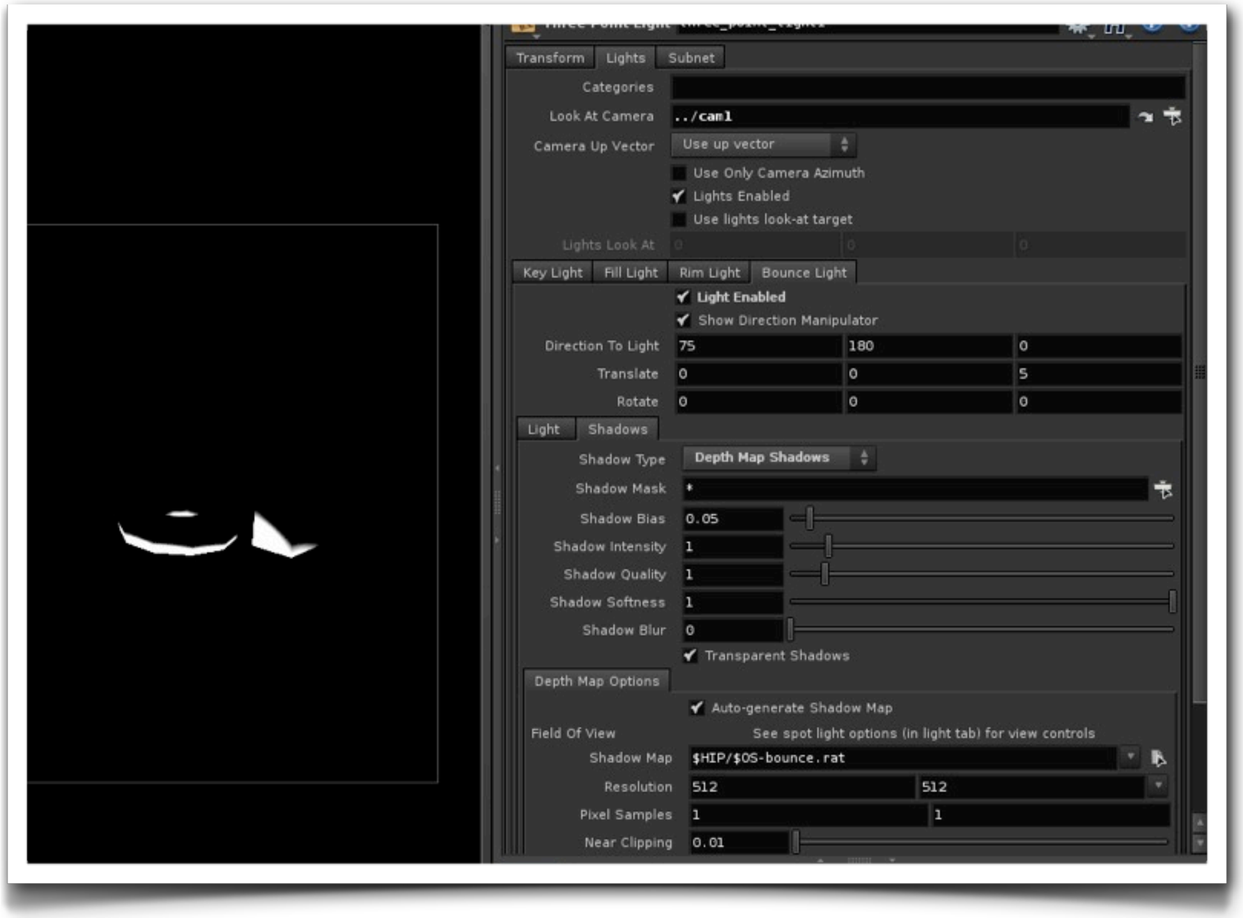
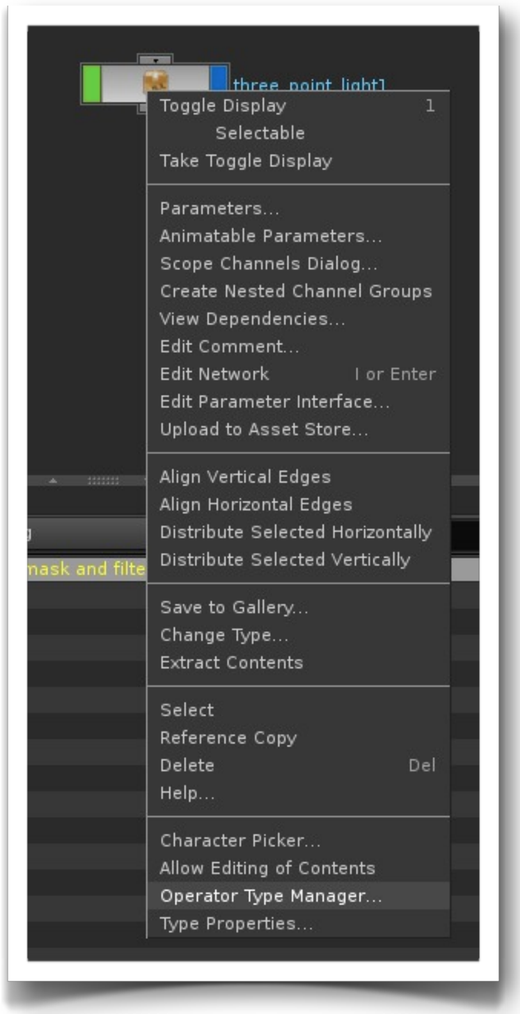
# Back to the Three Point Light (cont.)

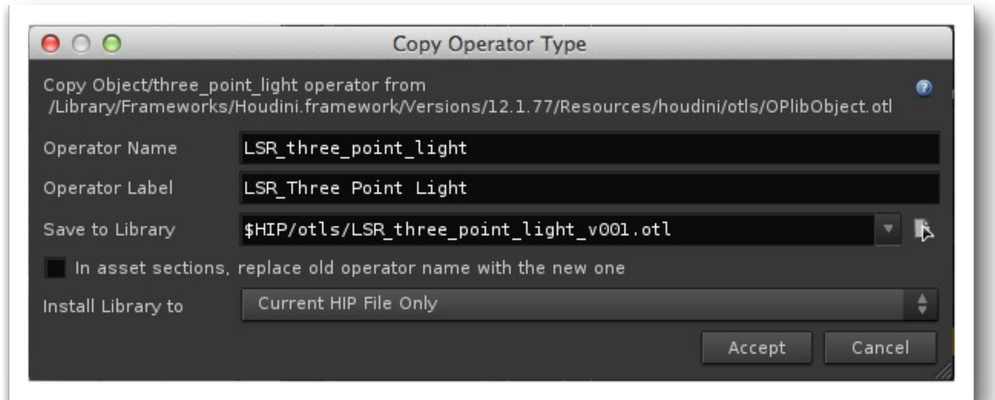



- Can change colors and type of light
- Shadows can be associated with light
- Can enable a bounce light
- Enable bounce light
  - Notice the light comes underneath floor
  - Go to light tab and set intensity to 1000
  - Go to Shadows tab and turn on ray trace shadows - What happens?
  - Ray Traced shadows do not go through objects
  - Try shadow map or none for light gradient falloff

# Make Your Own Copy of the Three Point




- Right Click on Three Point Light Rig
  - Select Operator Type Manager
  - Right Click on Three Point Light Rig and select copy
  - Save to your OTL folder in the $HIP folder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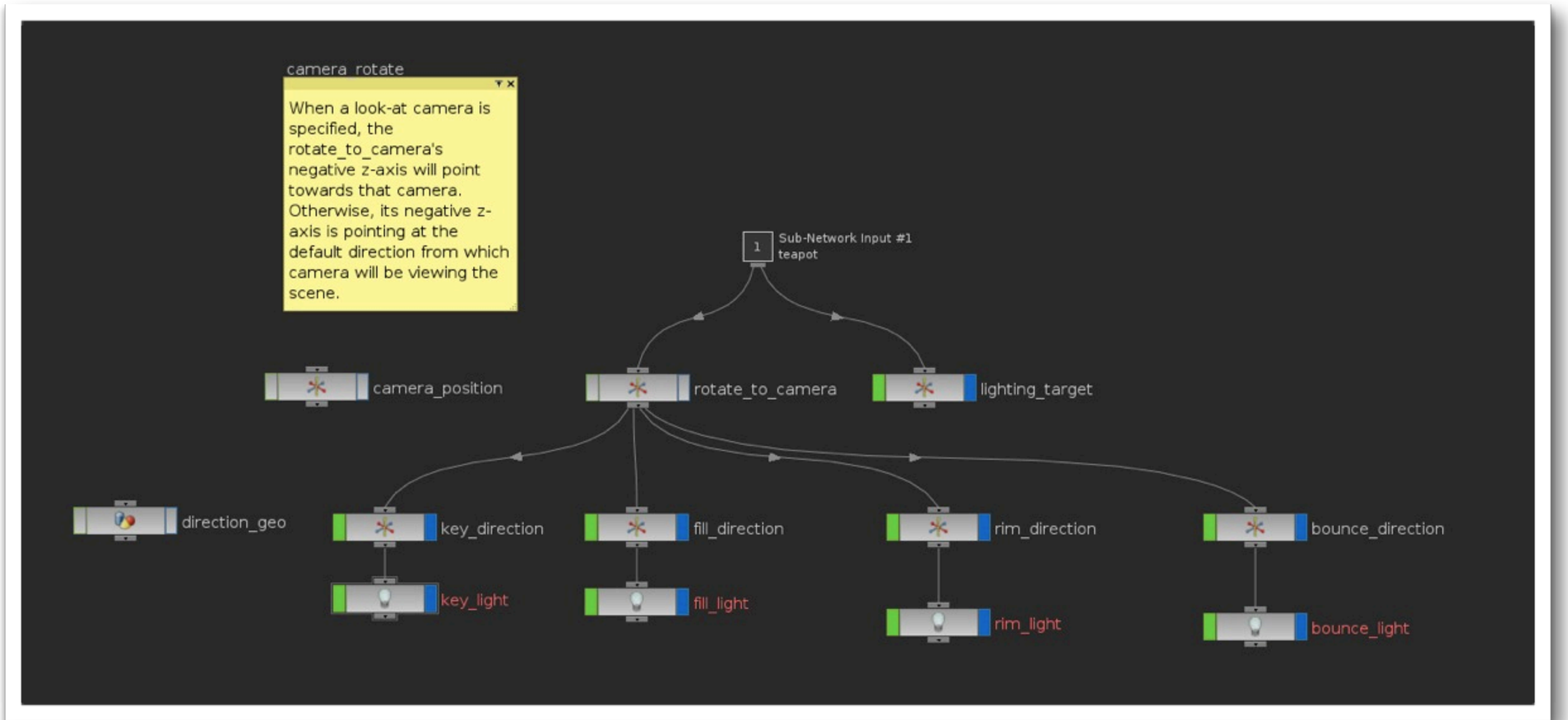
# Dive Into Three Point Light

- Generic Setup - Ready for you to modify

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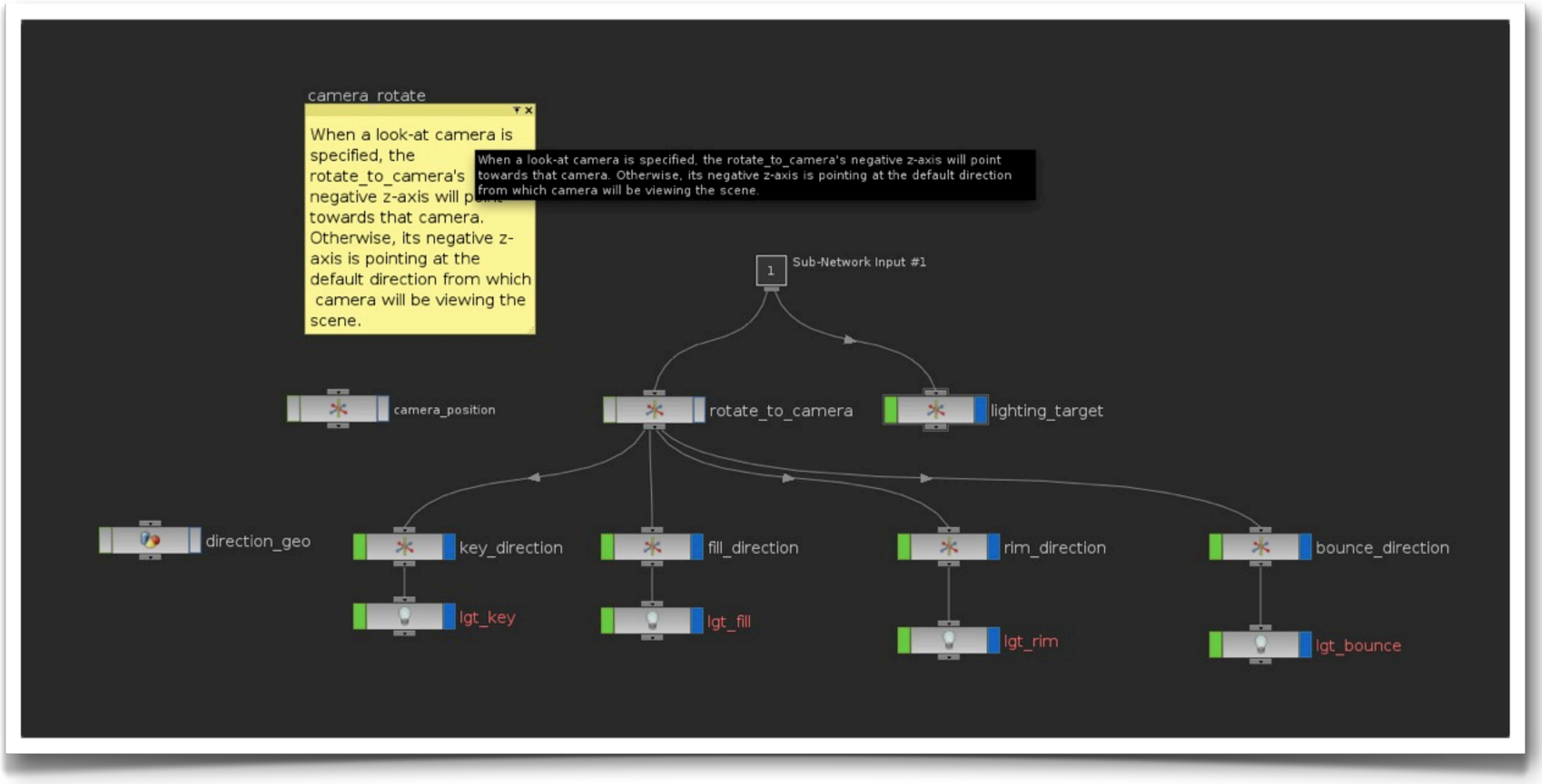
# Dive Into Three Point Light (cont)

- Change Light names to your needs
- Go up to Obj level and save asset / match asset definition

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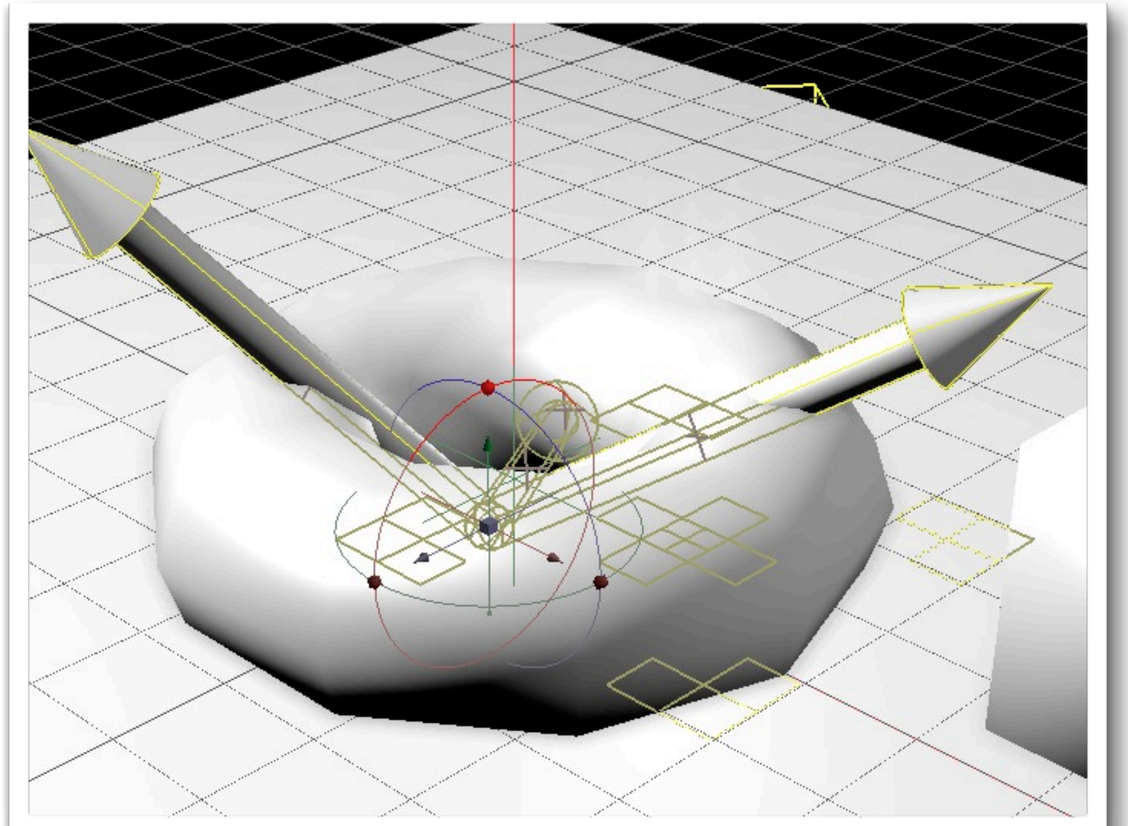
# One more thing...



- Enable Look at Target
  - Notice new set of handles
  - Translate rig

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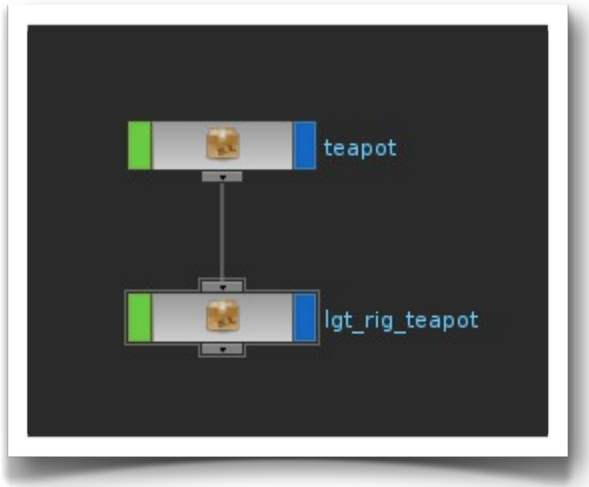
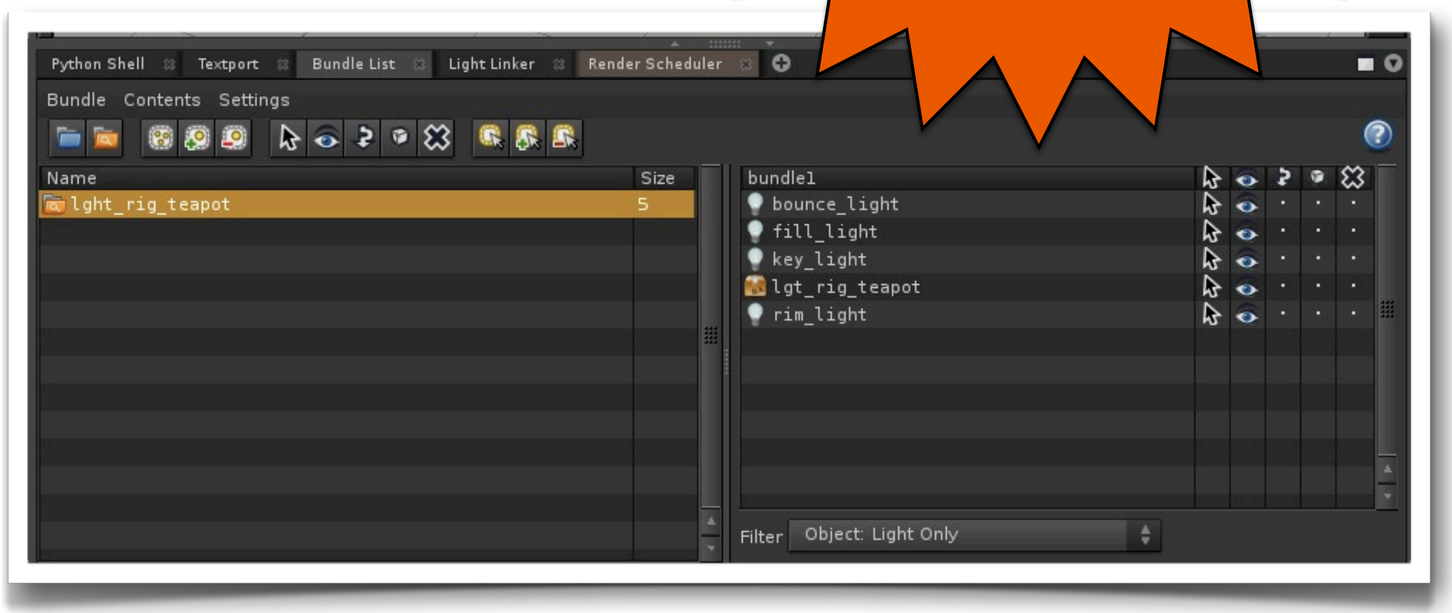
# Create a Smart Bundle




Smart Bundles tunnel into Digital Assets!




- Drop down a LSR_three point light
  - Name is - lgt_rig_teapot
- Parent lgt_rig_teapot to Teapot
- Create  Smart Bundle
  - Name it - lgt_rig_teapot
  - Filter - lights ony
  - Double Click on bundle
    - pattern - lgt_rig*
  - See results
- Make a bundle for Object too
  - Teapots

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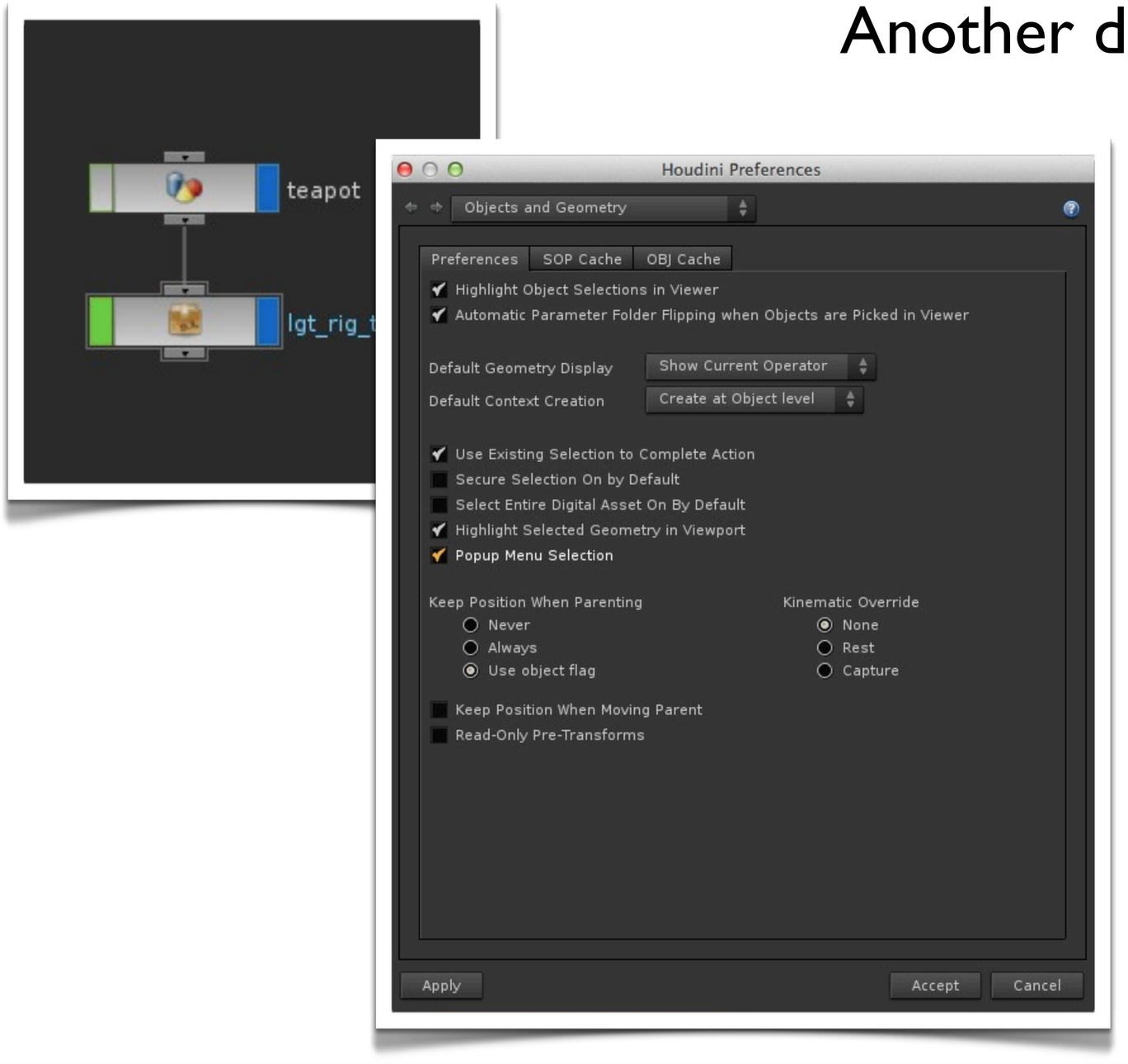
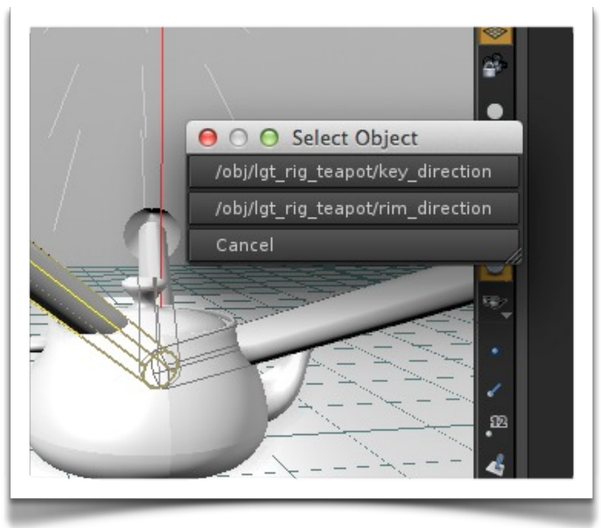
# Selecting Items that are Behind Other Objects




## Another diversion...

- Two methods
  - Turn off selection flag of parent object
- Or...
  - Houdini Preferences
    - Objects and Geometry
  - Pop Menu Selection

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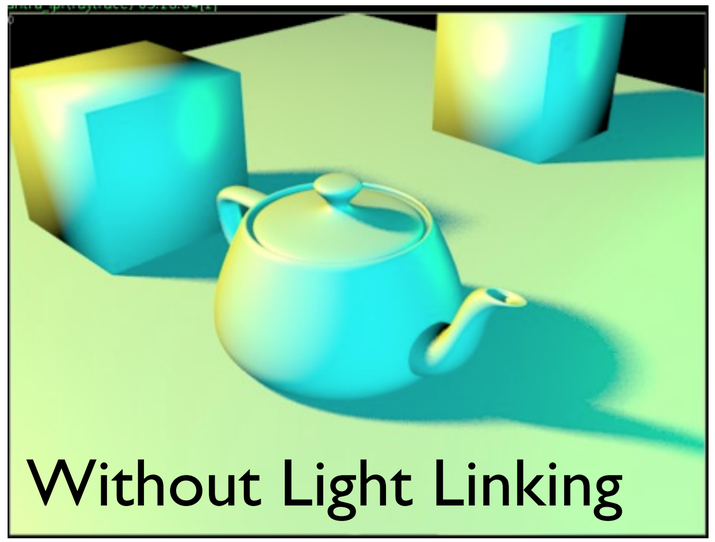
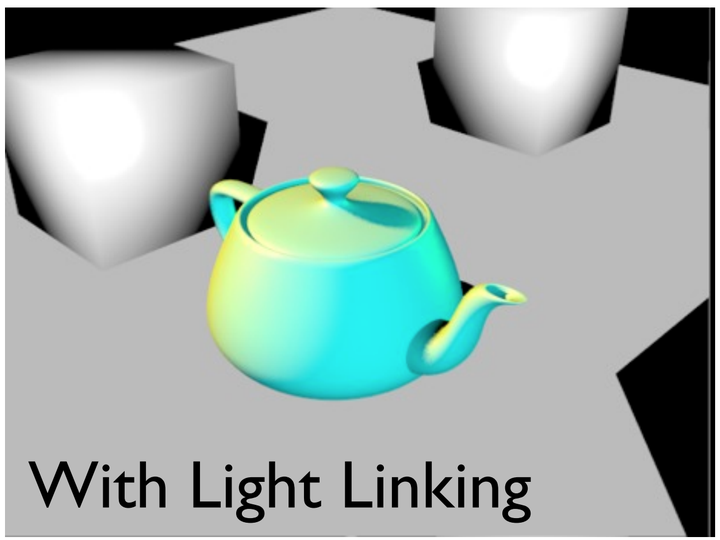
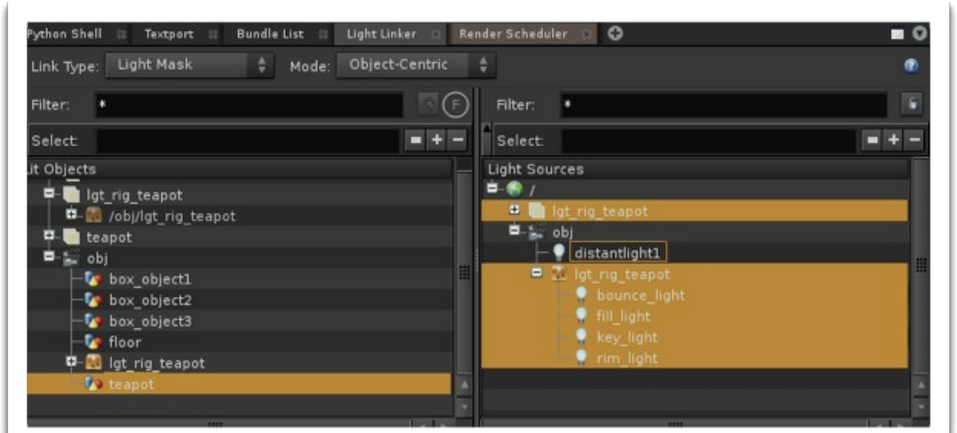
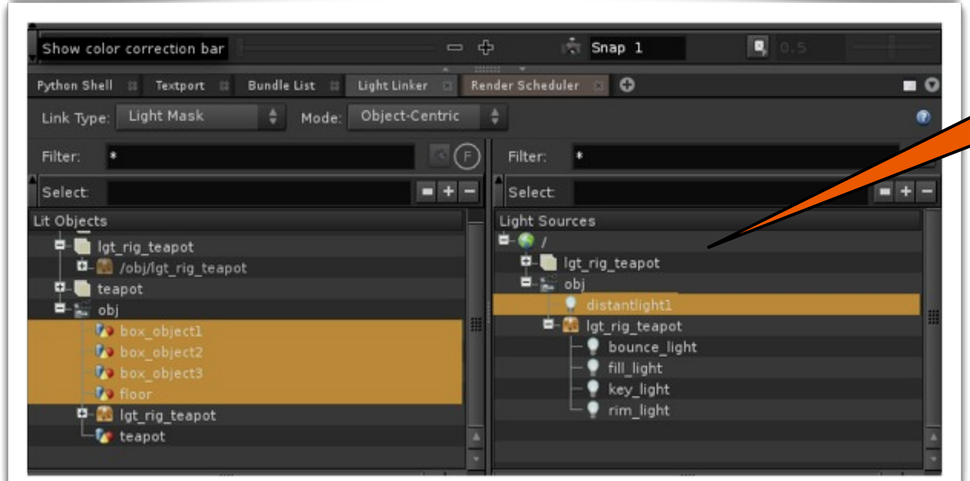
# Light Linker




- Setup your light linker so the 3 Point Light only lights the teapot




Notice bundles are at top of list

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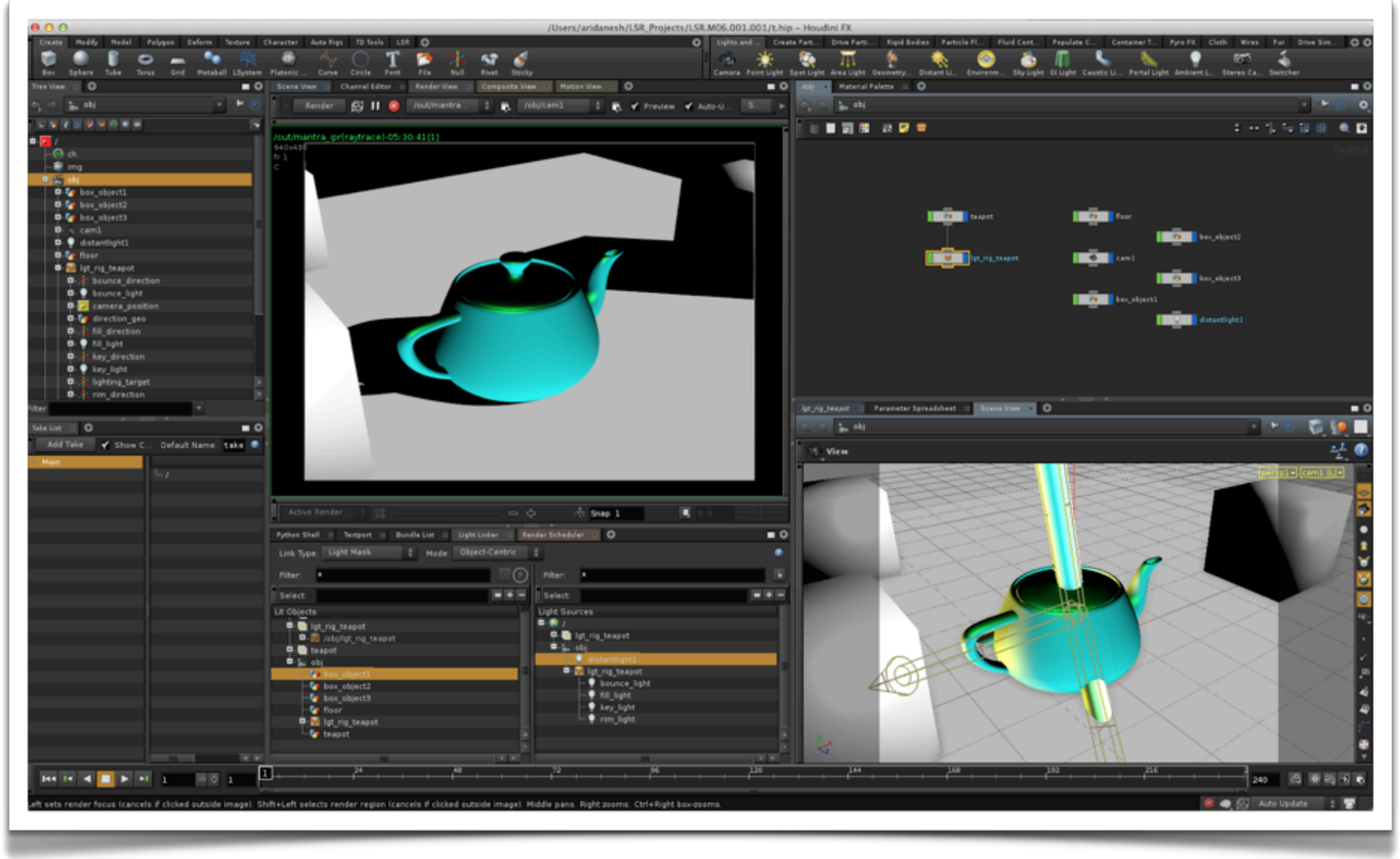
# A Quick Test



- Add a Scene View next to the parameters
- Select Lock Camera to Light
- Rotate and move light
- Notice how your rig moves with it and does the appropriate render

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# Finally... How does the rig work?

- Look at Key Direction
  - Notice only ROTATION is being promoted up - That is why you can not translate
    - ch("../key_direction_rx")
- Look at Key Light
  - It is a child of Key Direction - therefore you can independently translate and rotate light


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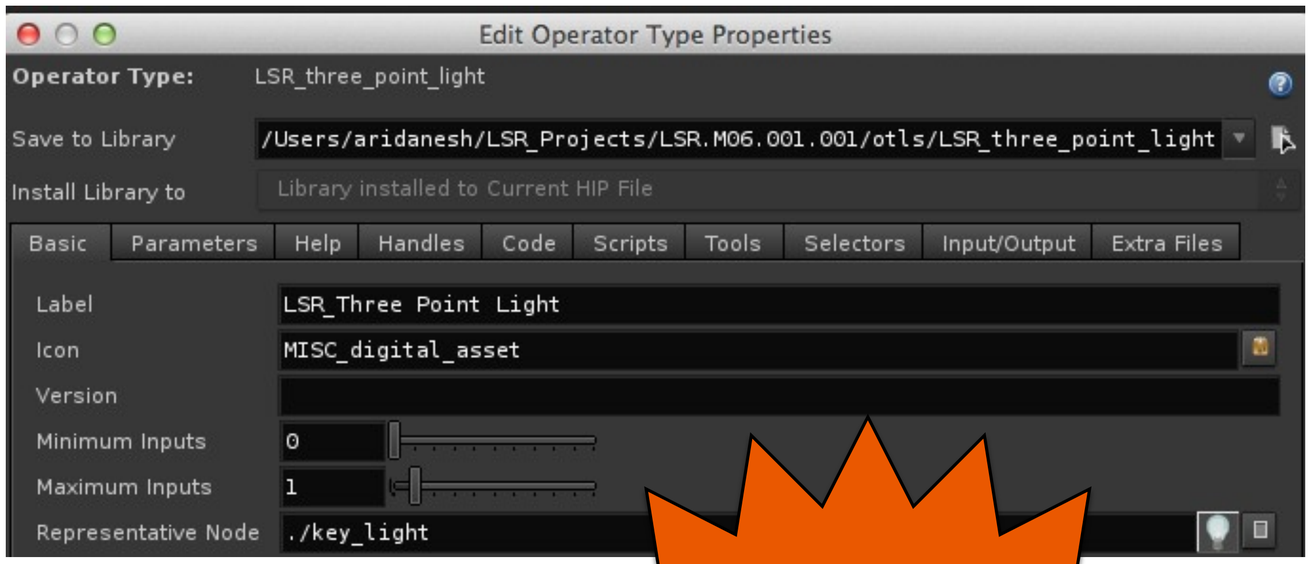
# Type Properties




The representative node is what makes smart bundles dive into the asset and find all lights

- Go to Obj level and select Rig
- Open Type Properties
- Notice the parameter “Representative Node”
  - This node tells Houdini how this asset is supposed to behave
- Click on it
  - Dive into asset and select a Null
    - Notice it only allows selection of cameras and lights
  - Pick Key Light

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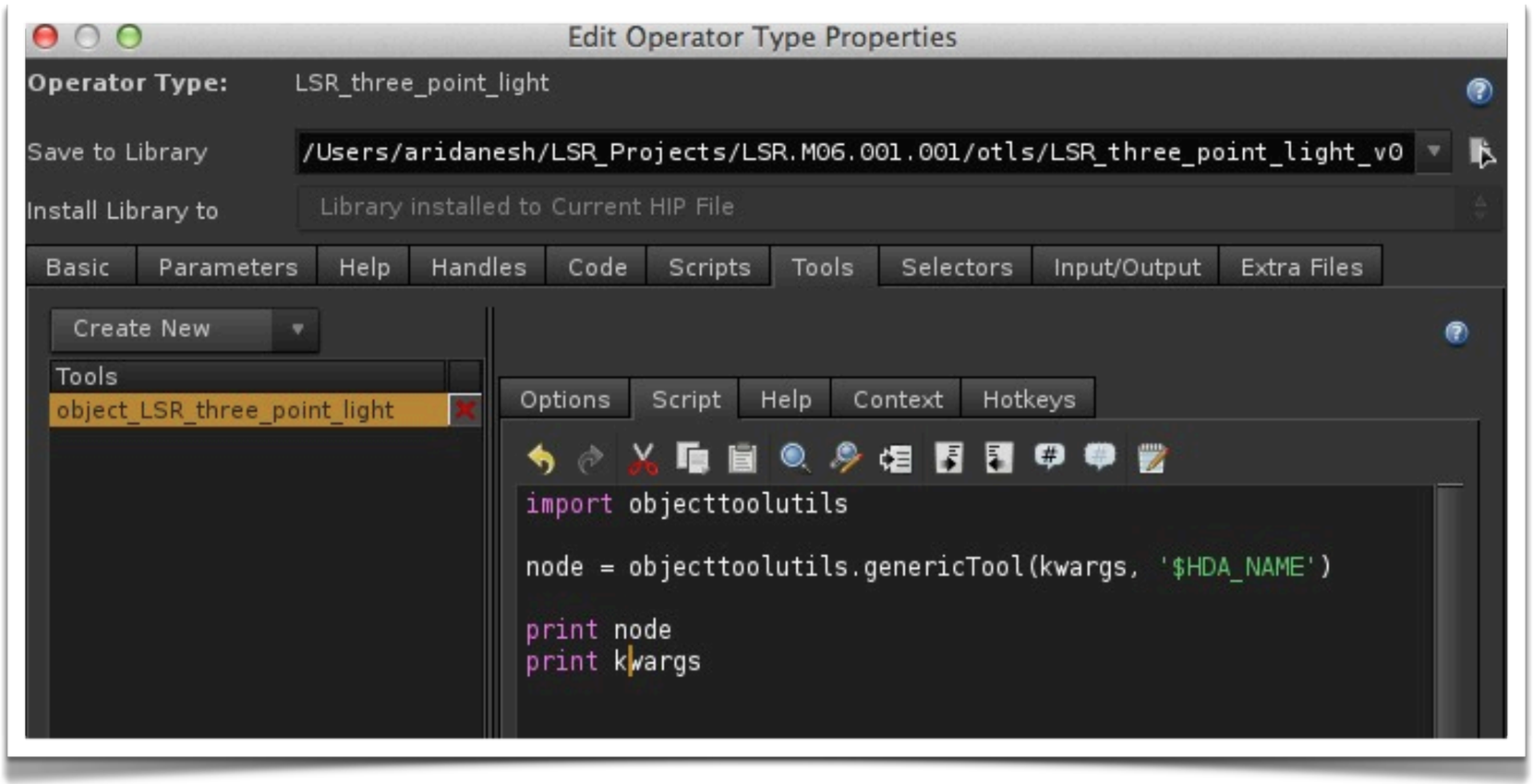
# Moving Asset to Shelf

- Before adding to shelf
  - Open Type properties
  - Go to Tools Tab, then Script Sub Tab
  - Edit code as shown
- Save Digital Asset
- Match Current Definition

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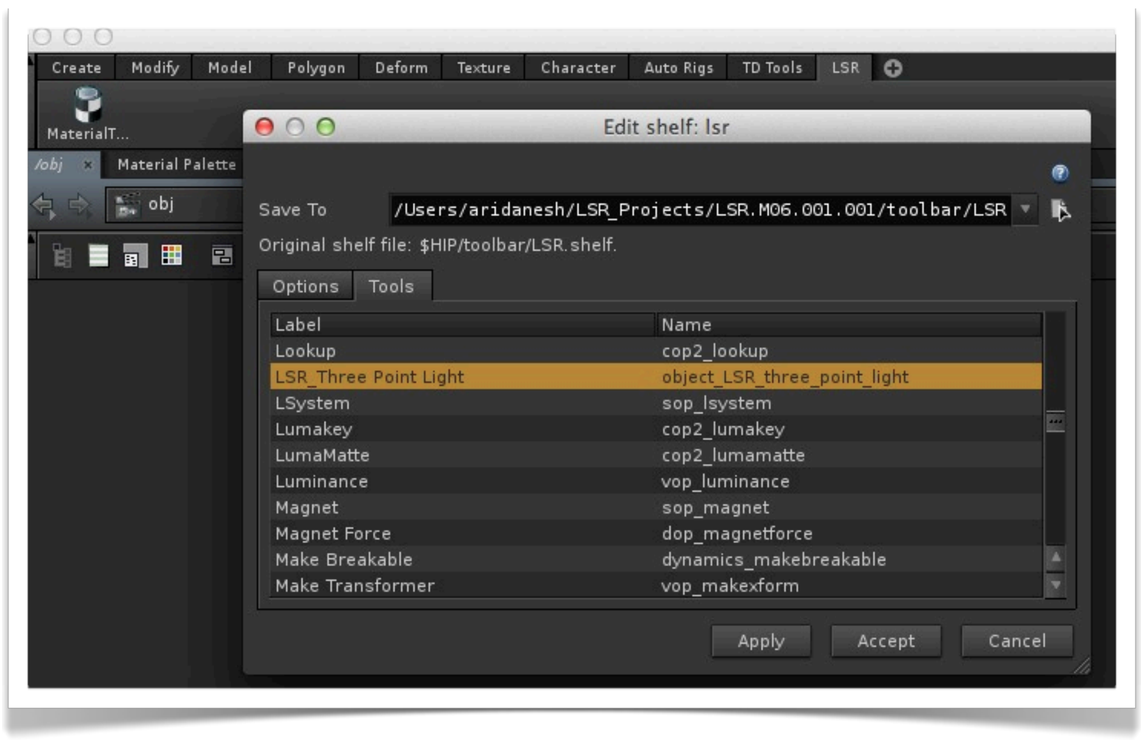
# Moving Asset to Shelf (cont.)

- Select your shelf
- Right click and select “Edit”
- Go to Tools Tab
  - Find the asset “LSR_Three_Point_Light”
  - Click Accept

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# Time To Build Are Own Asset

- Start a new scene
- let's just drop down a grid for a ground
- and drop a teapot down as a hero
- Save the hip file in the shot folder

## A Studio Light Setup....

- We will create an environment light
- A portal light

- Rules
  - Build and test the tool before making an asset
  - Promote the handles not the parameters

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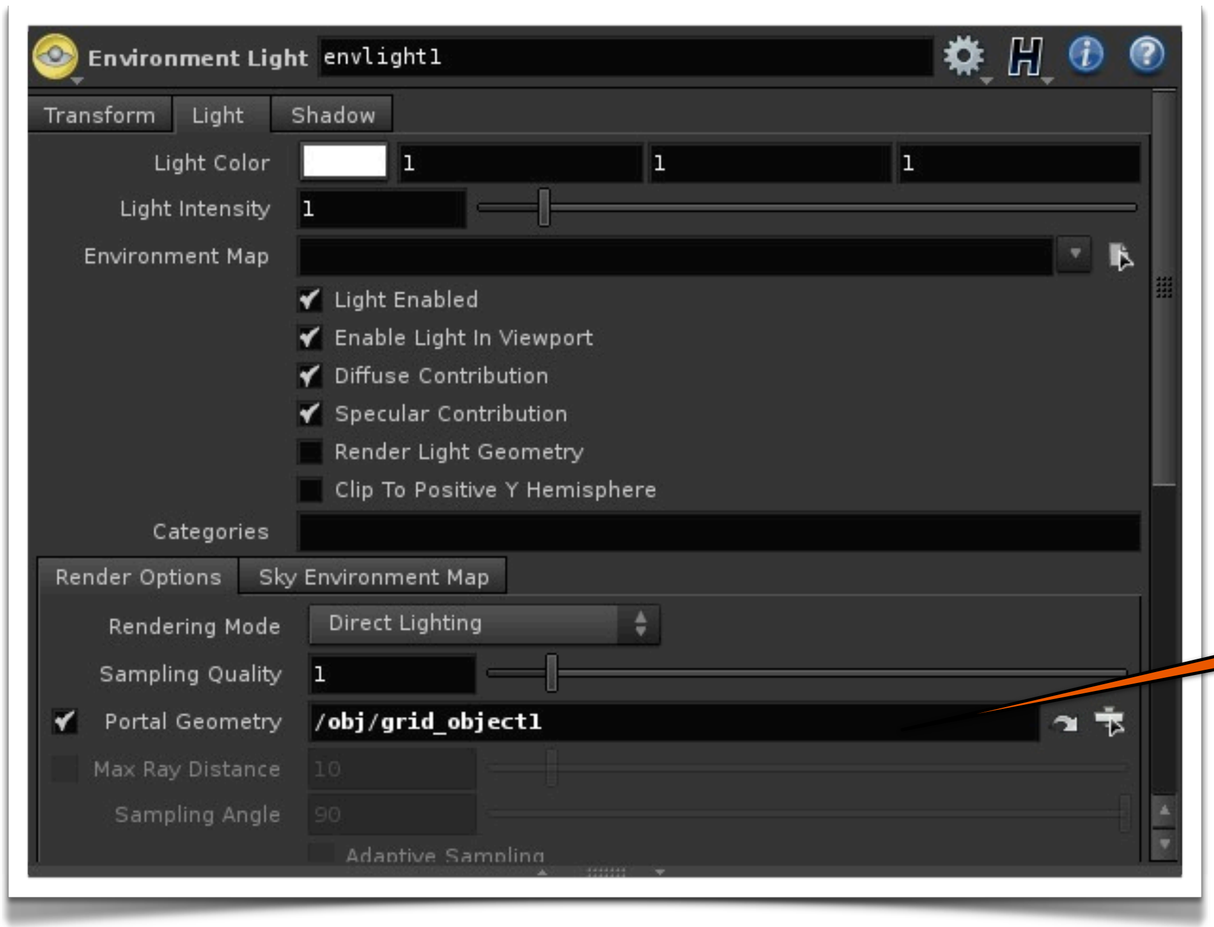
# Make the Environment Light into a Portal




- In the Light Tab of the Environment Light
- Toggle Portal Geometry on
- Drag and drop your grid

Toggle Prtal Geometry on

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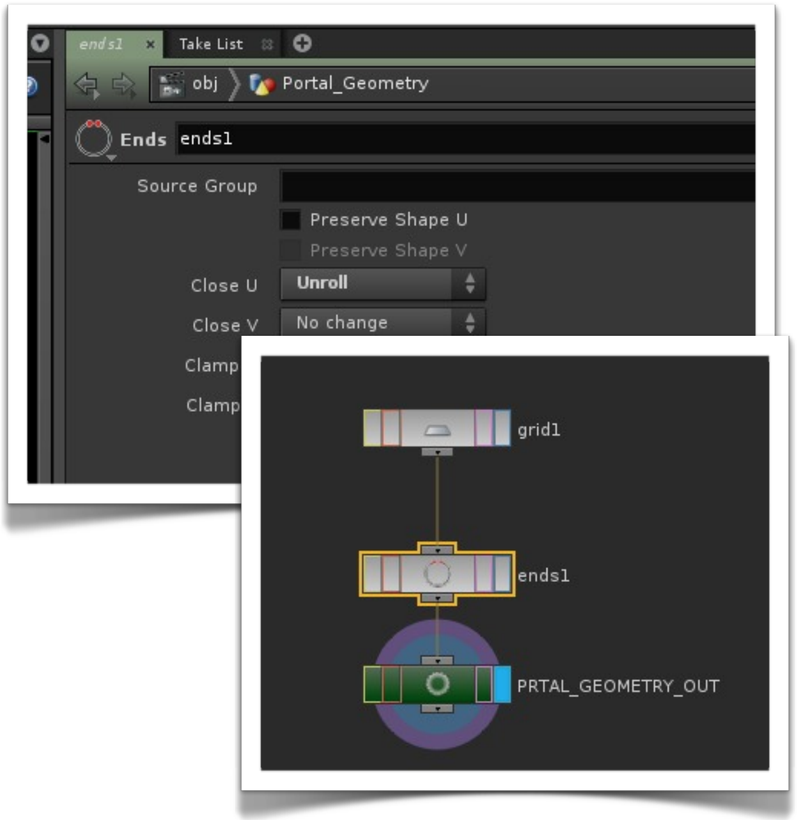
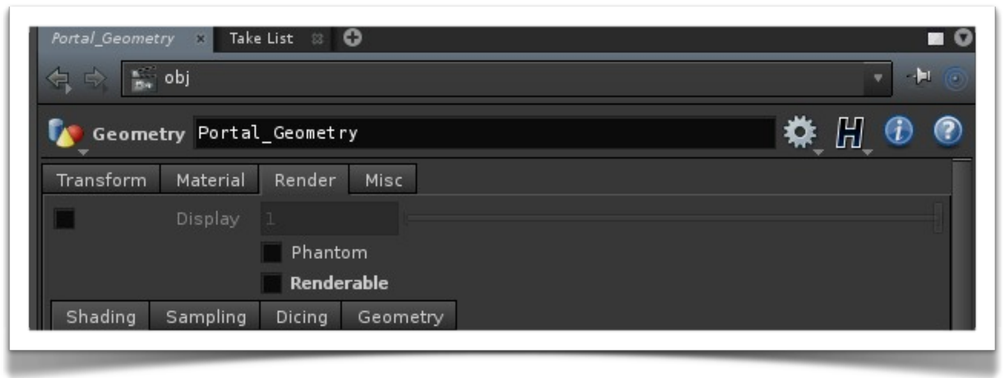
# Making the Grid a Wire Frame




- Rename the Grid that is acting as the Portal Light to “Portal Geometry”
- Dive into Portal Geometry
  - Append a Ends SOP
  - Change “Close U” to unroll
- Append a NULL
  - Name it - PORTAL_GEOMETRY_OUT
- At the Obj level click on the RENDER Tab
  - Turn off Renderable

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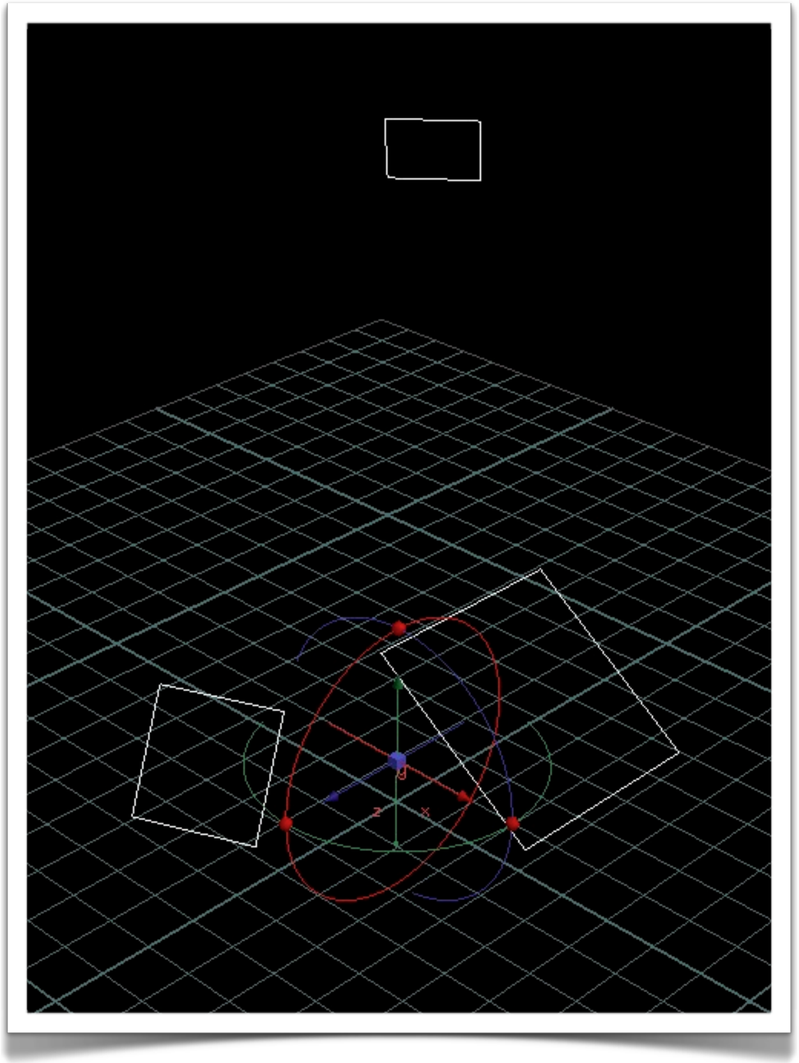
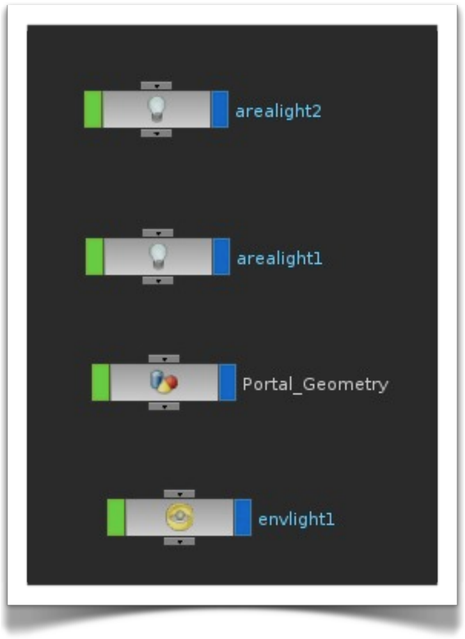
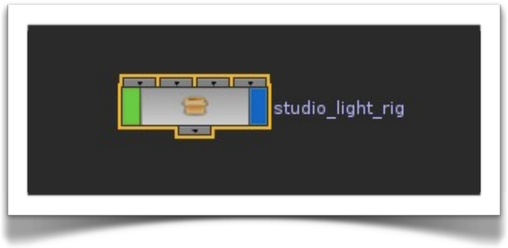
# Now Let's Add Two Area Lights



- Using the Shelf Tool
  - Drop down two area lights
- Grab the four Objects - Env Light, Portal Geometry, AreaLight1 AreaLight 2
- Make a Subnet

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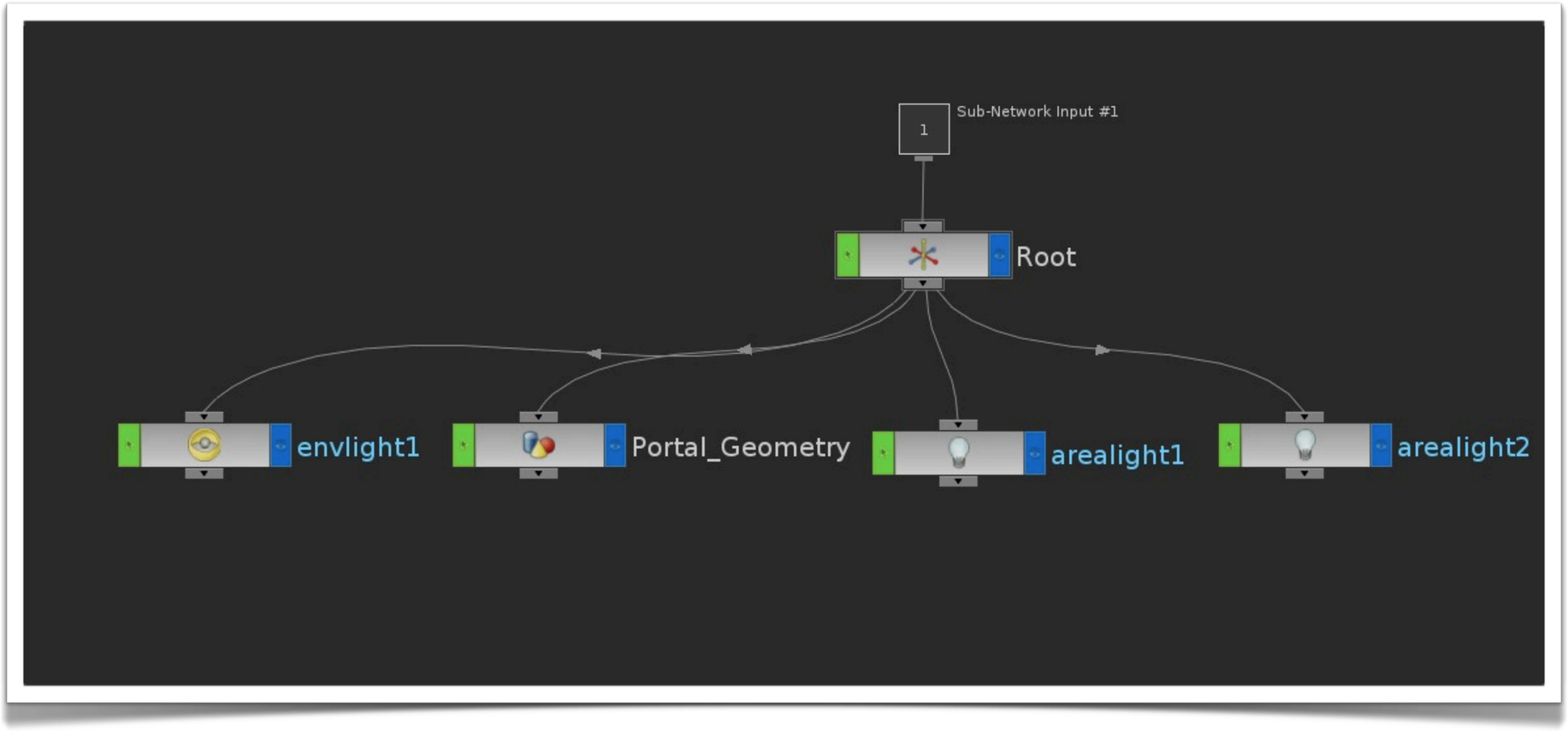
# Dive Into the Subnet

- Create a Null
  - Call it Root
- Wire everything to Root
- Now we can rotate or move the whole Rig at the obj level

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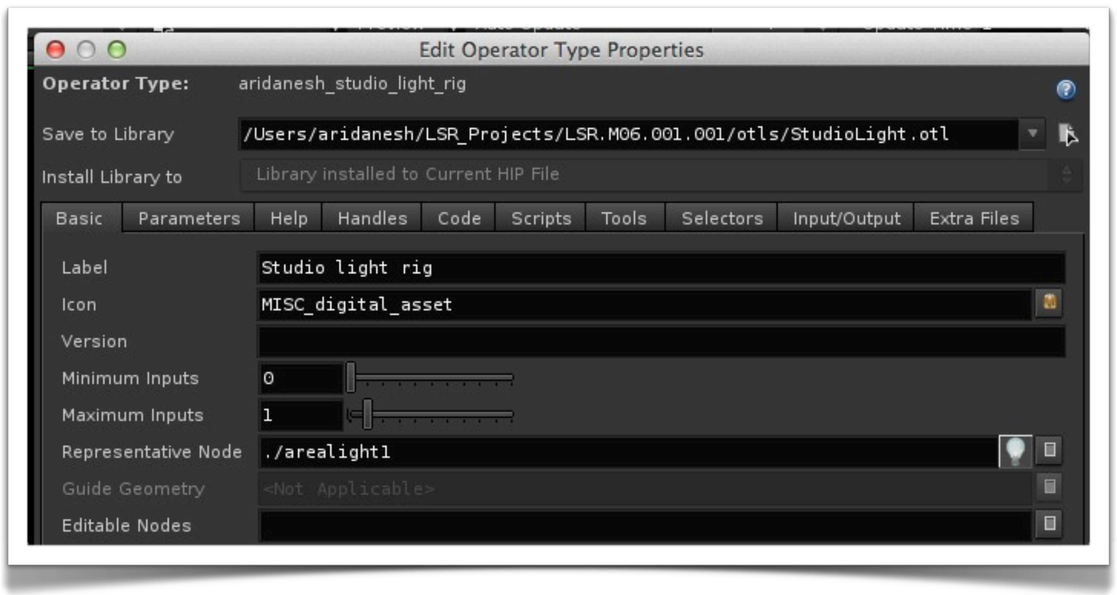
# Make Your Representative Node




- In the Basic Tab
  - Click on the chooser for the Representative Node
    - Select Area Light 1
  - Set Maximum Inputs to 1

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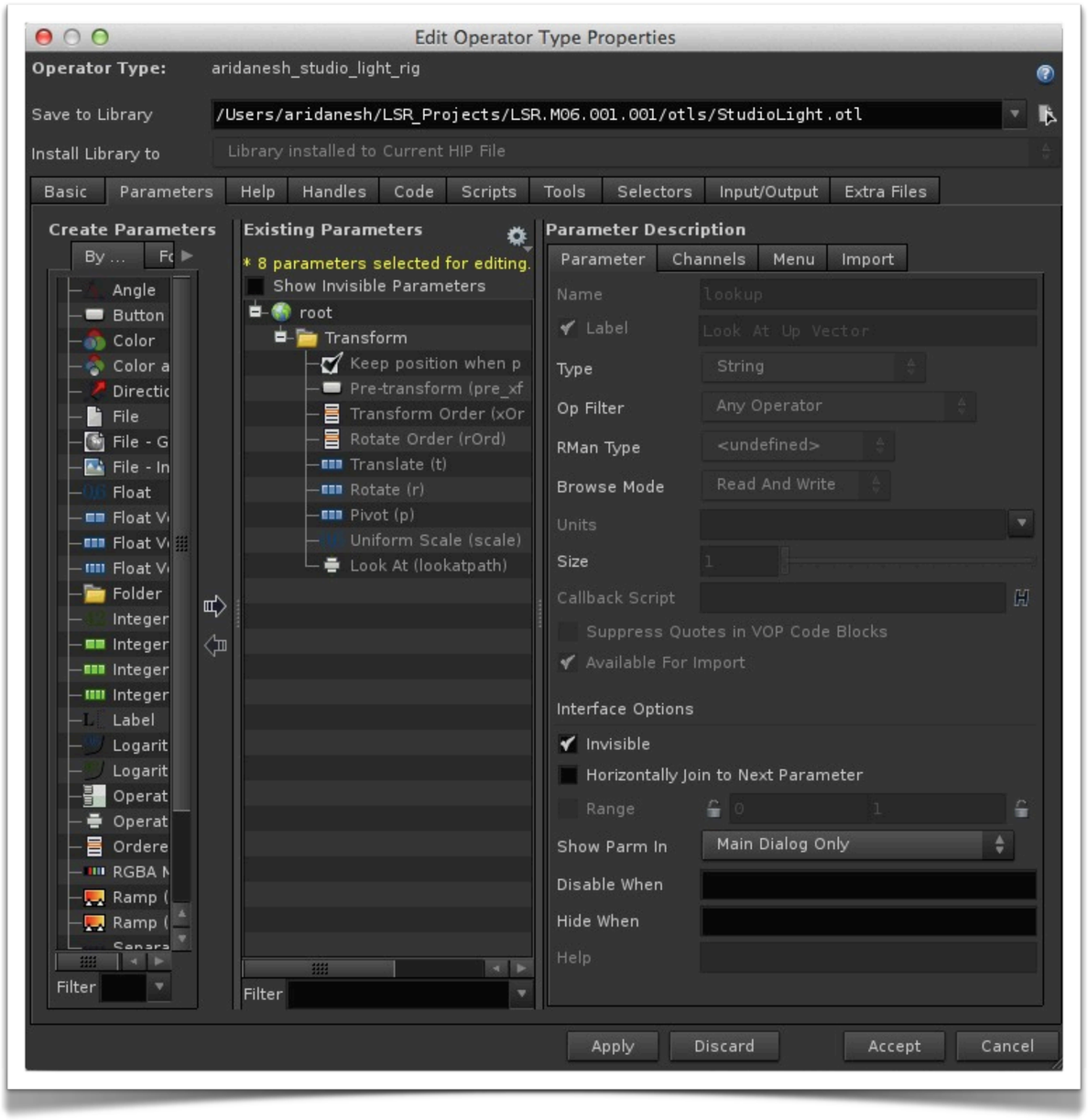
# In the Parameters Tab




- Make the Subnet Invisible - So the UI has less clutter
- Make the Scale Invisible
  - Remember we do not want to scale lights
- Make everything under Look At invisible

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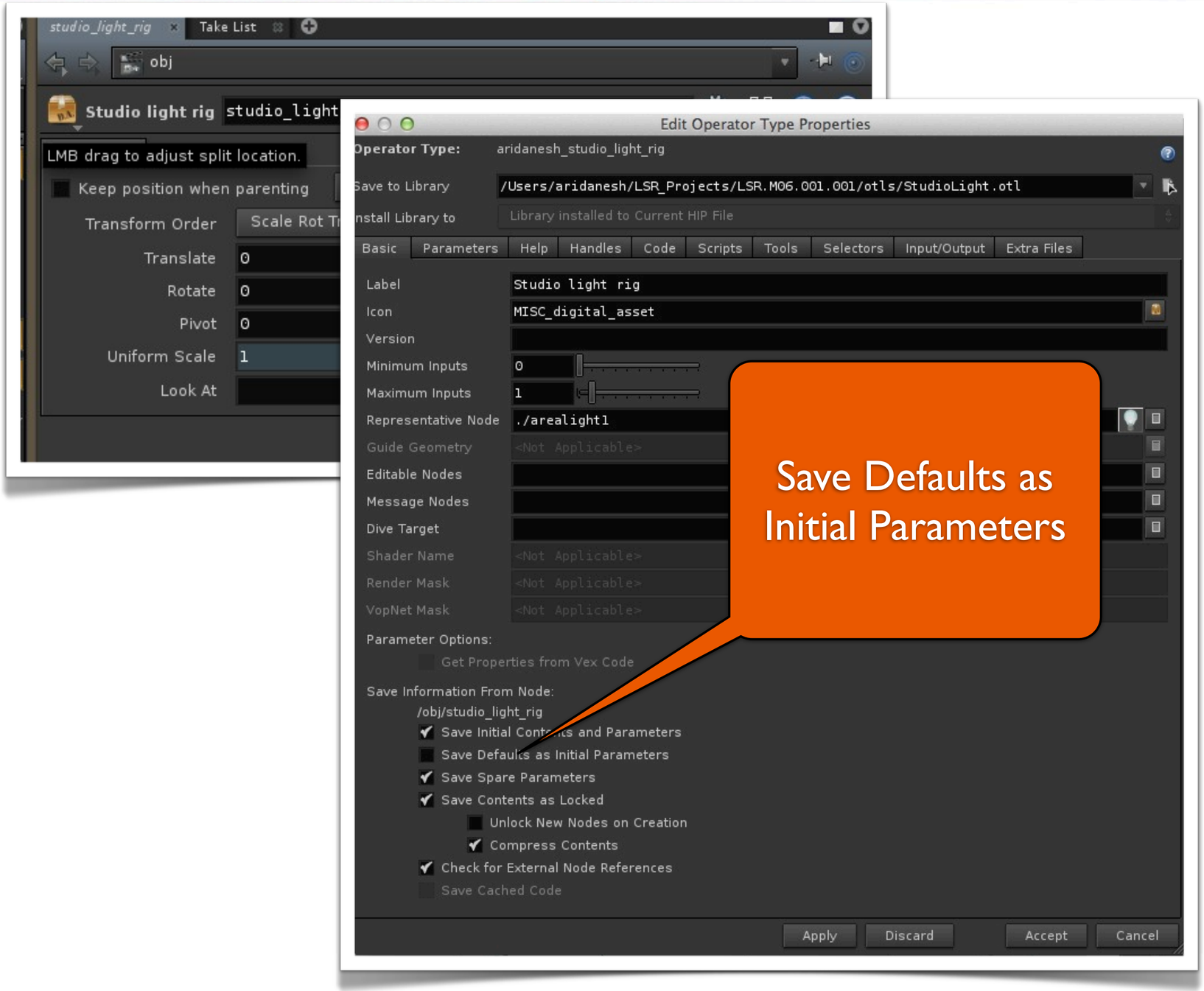
# Lock the Uniform Scale Parameter




- In the Parameters Lock the Uniform Scale Setting
- In the Basic Tab of the Operator Type Interface
  - Turn off - Save Defaults as Initial Parameters
- By turning it off you save the locked parameters in the Asset

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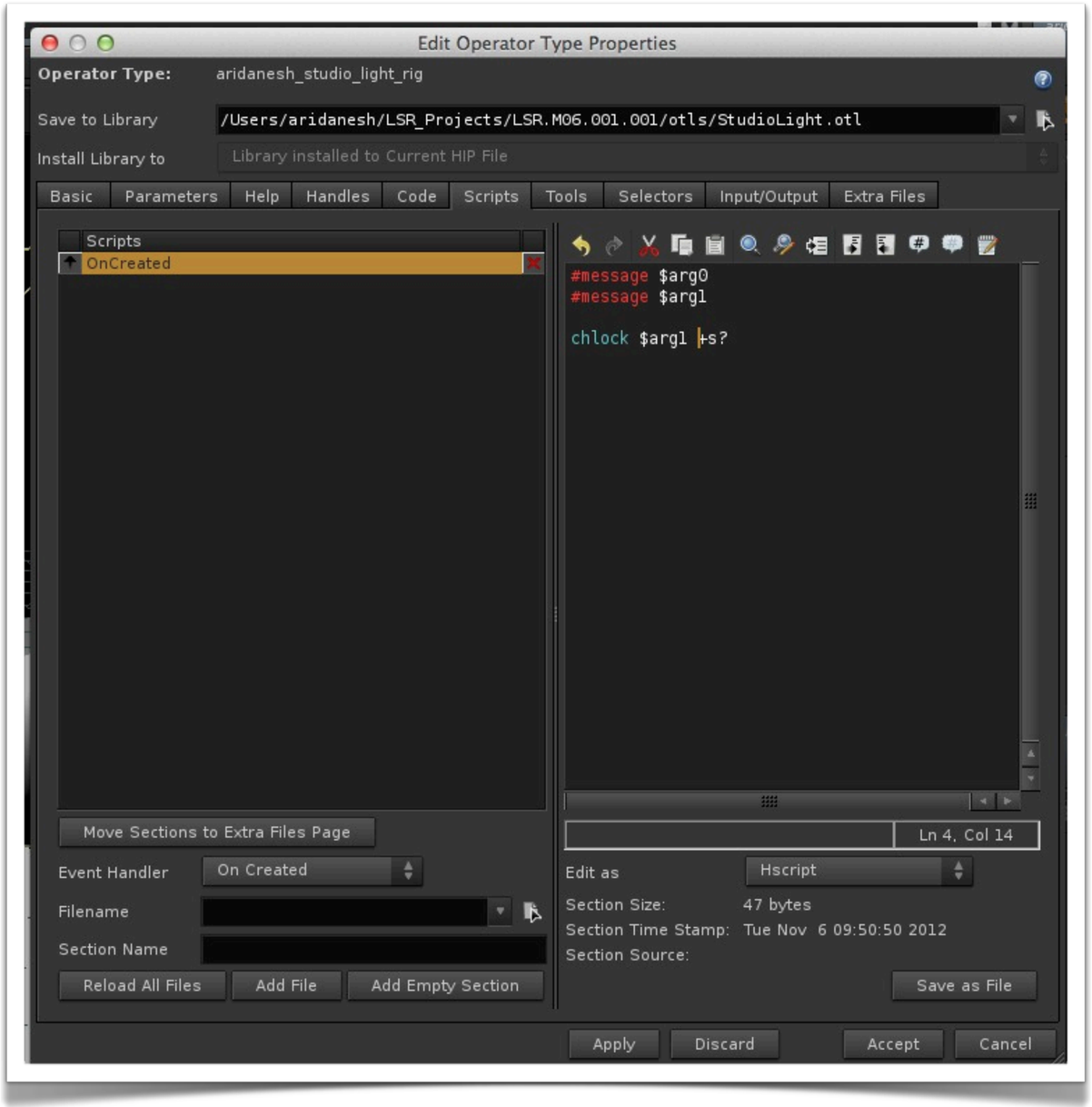
# Locking via Scripting




- Open Type properties
- Select the Scripts Tab
- Create a “On Created” Handler
- Type
  - chlock $arg1 +s?

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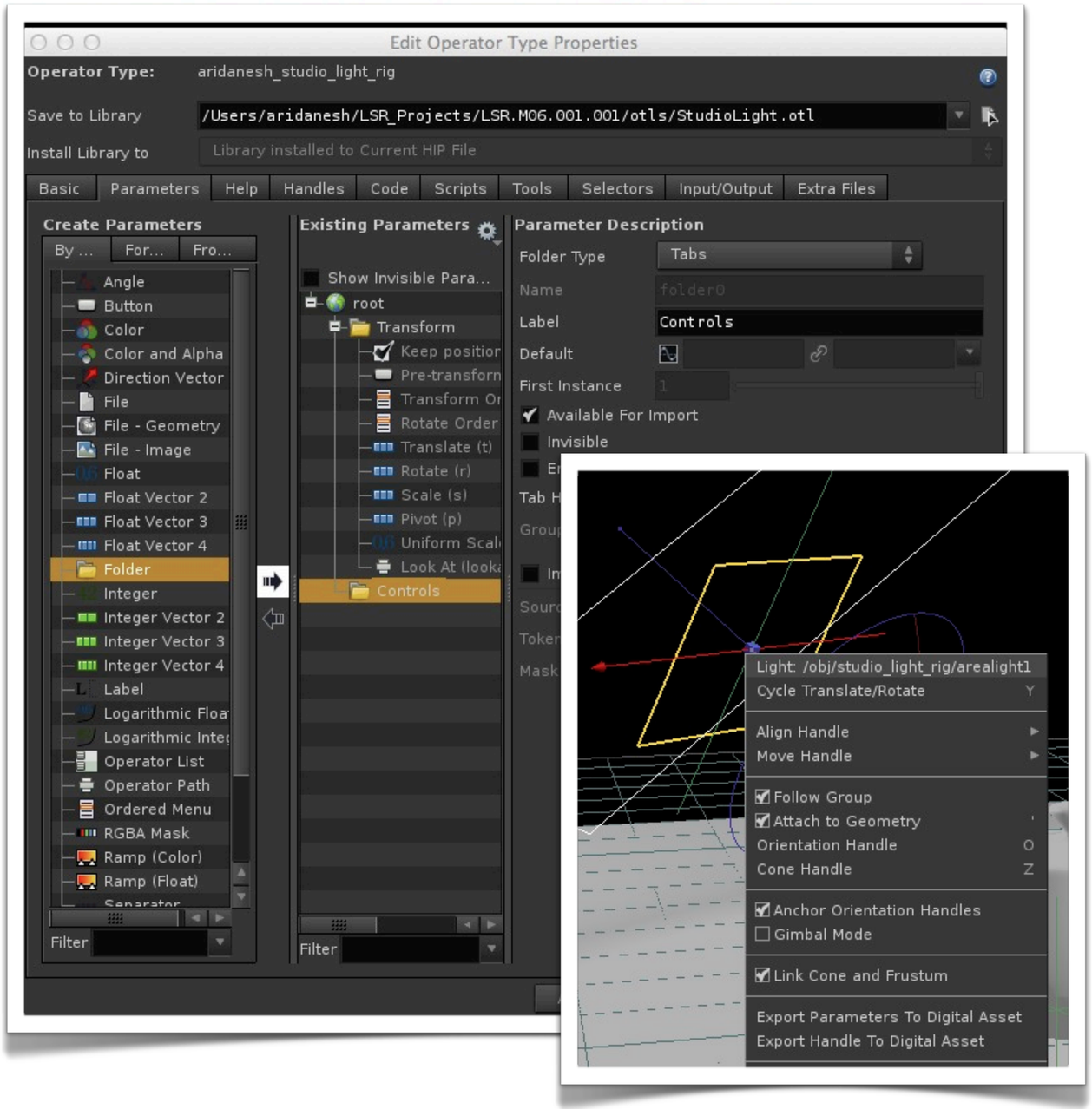
# Creating Handles




- In the Parameters Tab of the Operator Type Interface
  - Add a new folder and name it Controls
  - Hit Apply
  - Keep the Dialog Box Open
- Dive into Your Asset
  - Select Area Light 1
  - In the Scene View
    - Right Click on the Area1 Light
    - Select - Export Handle To Digital Asset
  - All the Handle parameters are now in the Controls Folder

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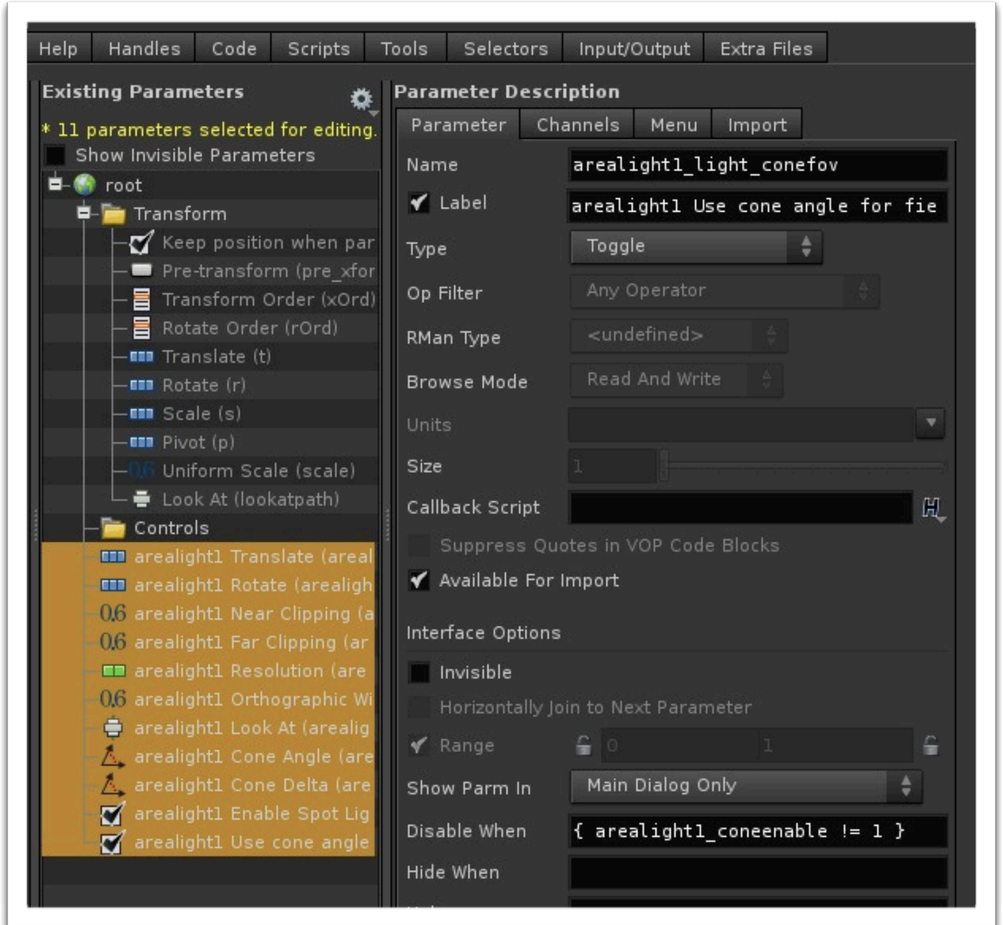
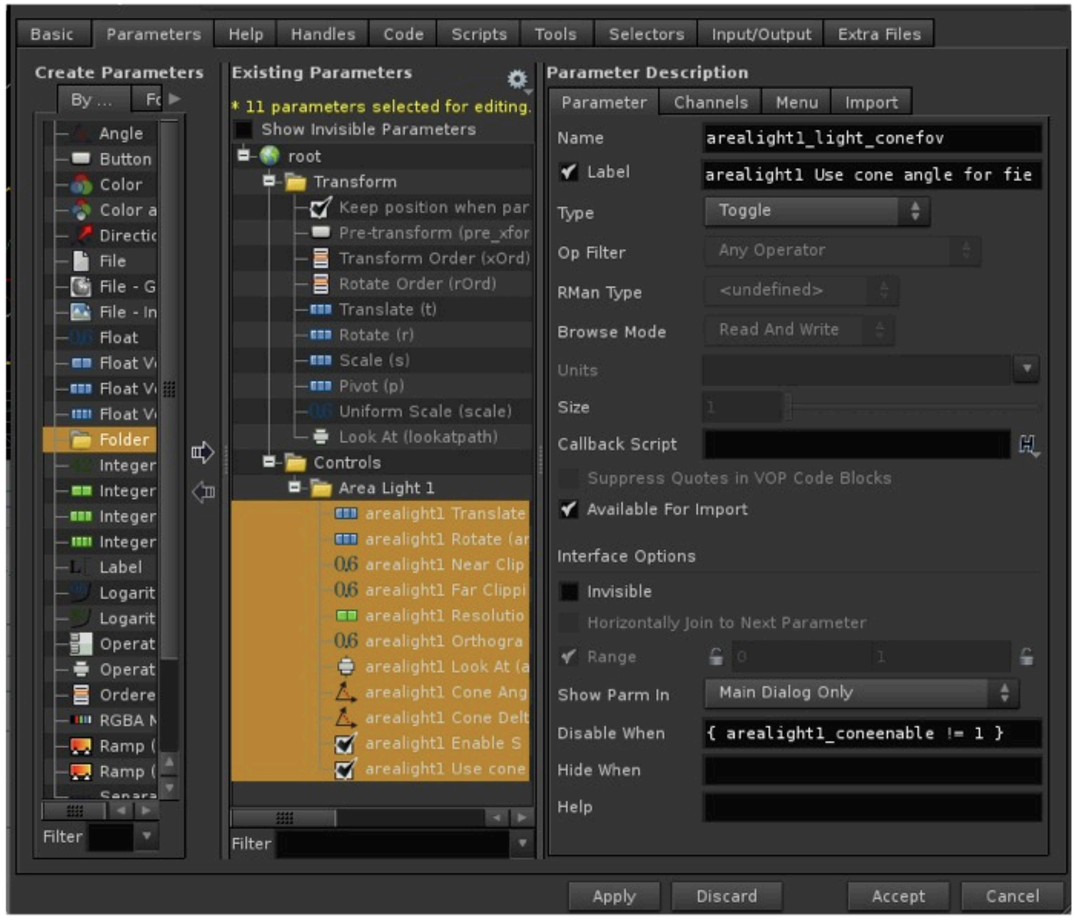
# Creating Handles (cont.)

## The Results




## Create a subfolder Area Lights 1 and put parms in there

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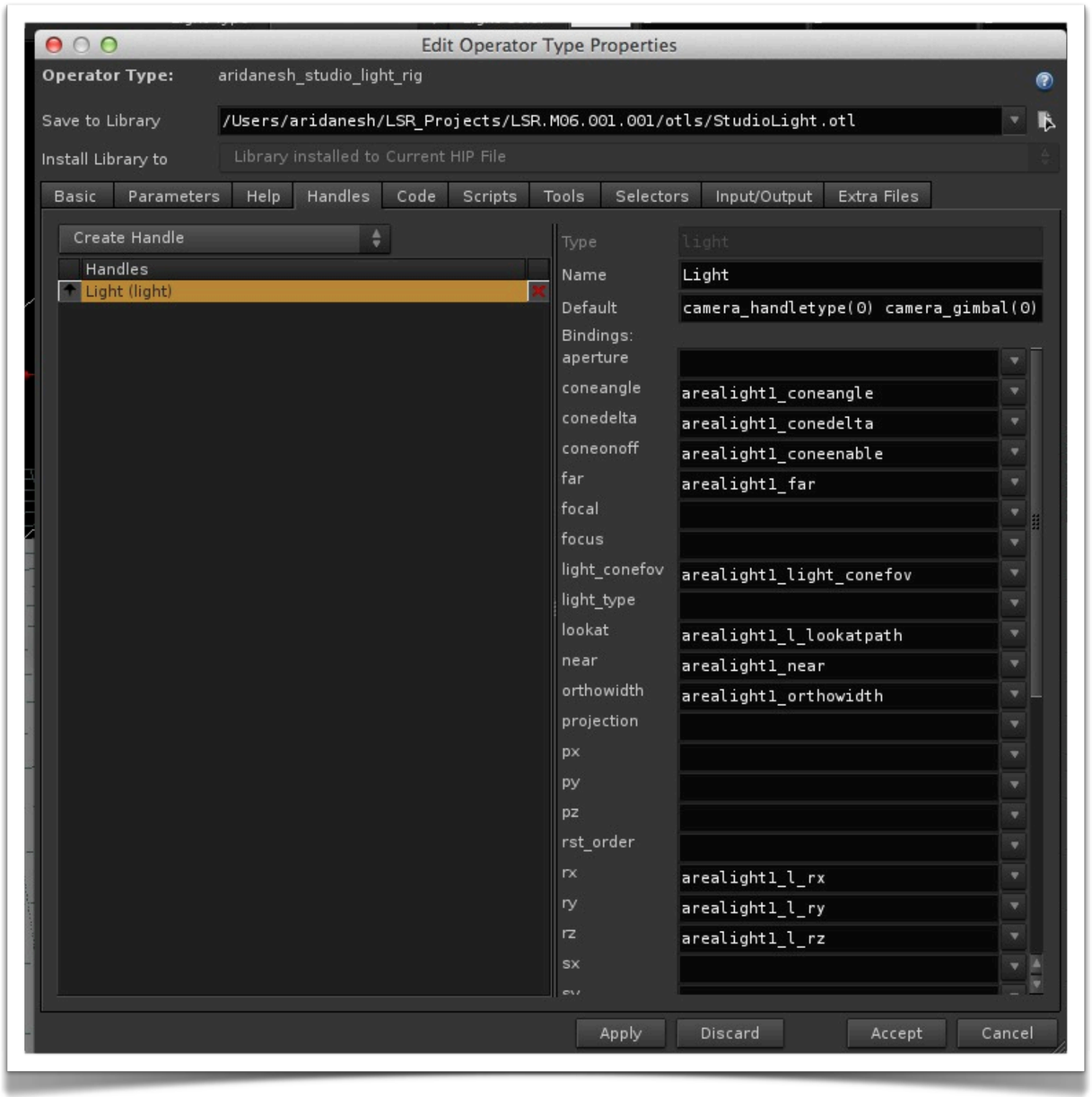
# Look at the Handle Tab




- The Handles were created for you!
- Repeat Steps for Area Light2

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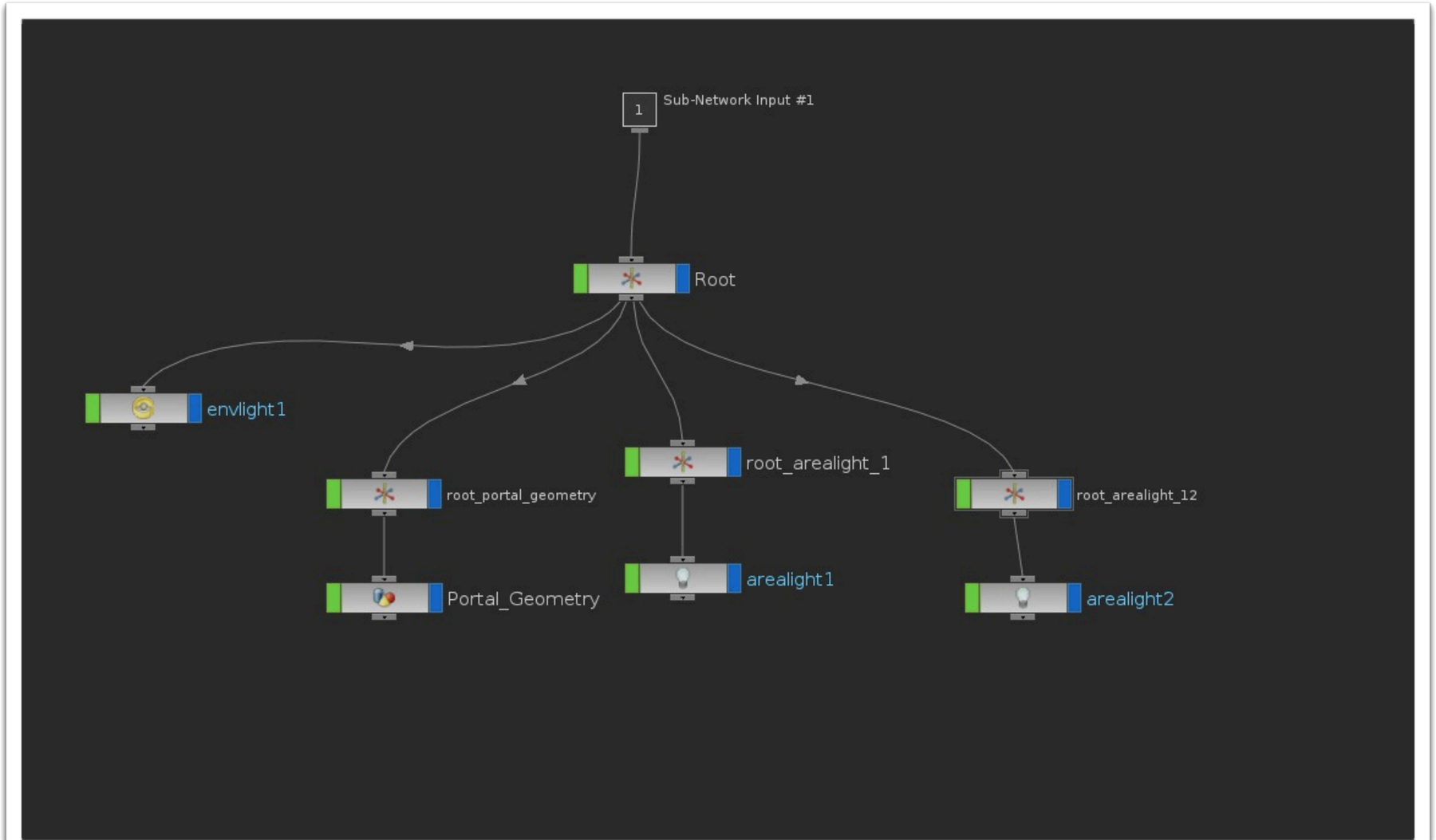
# Add Nulls to Control Orbit of Individual Lights

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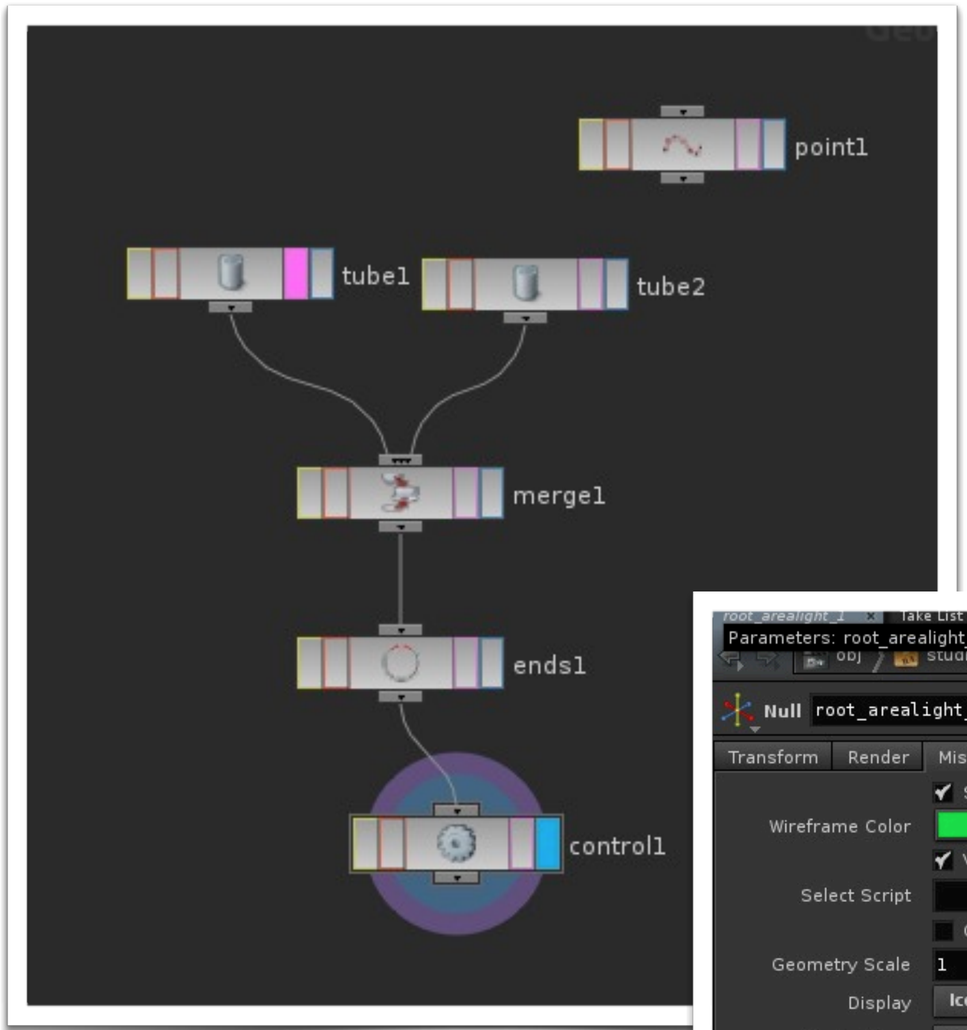
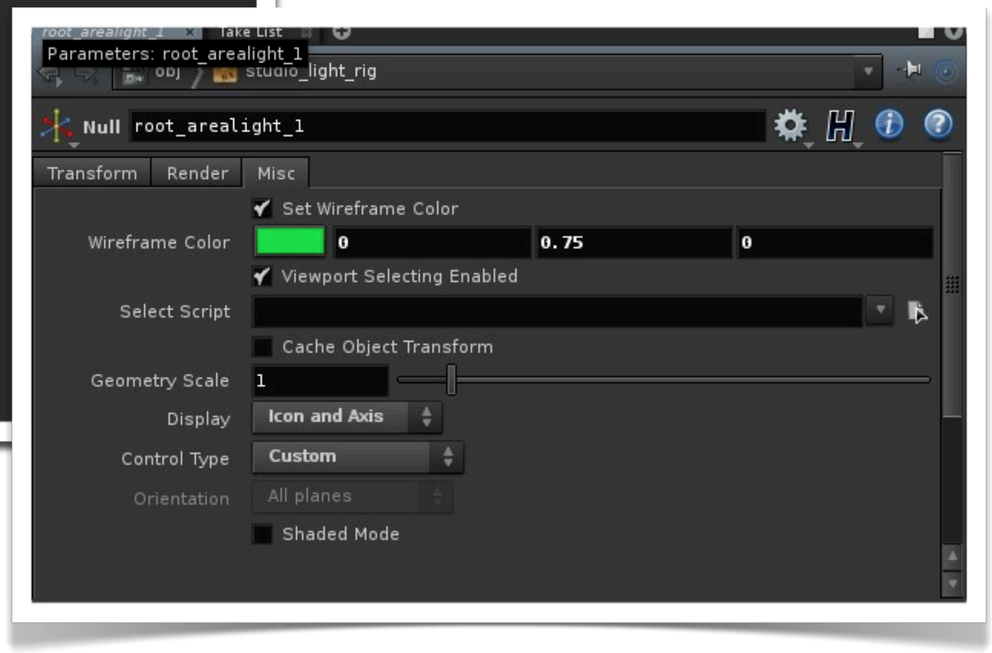
# Create a Custom Handle




- Dive into the Null you just created
- Add a couple of tubes to make an arrow
- Use the Ends SOP to Unroll
- Parent to Control
- On the Null
  - Click on the Misc Tab
  - Select Control Type - Choose Custom

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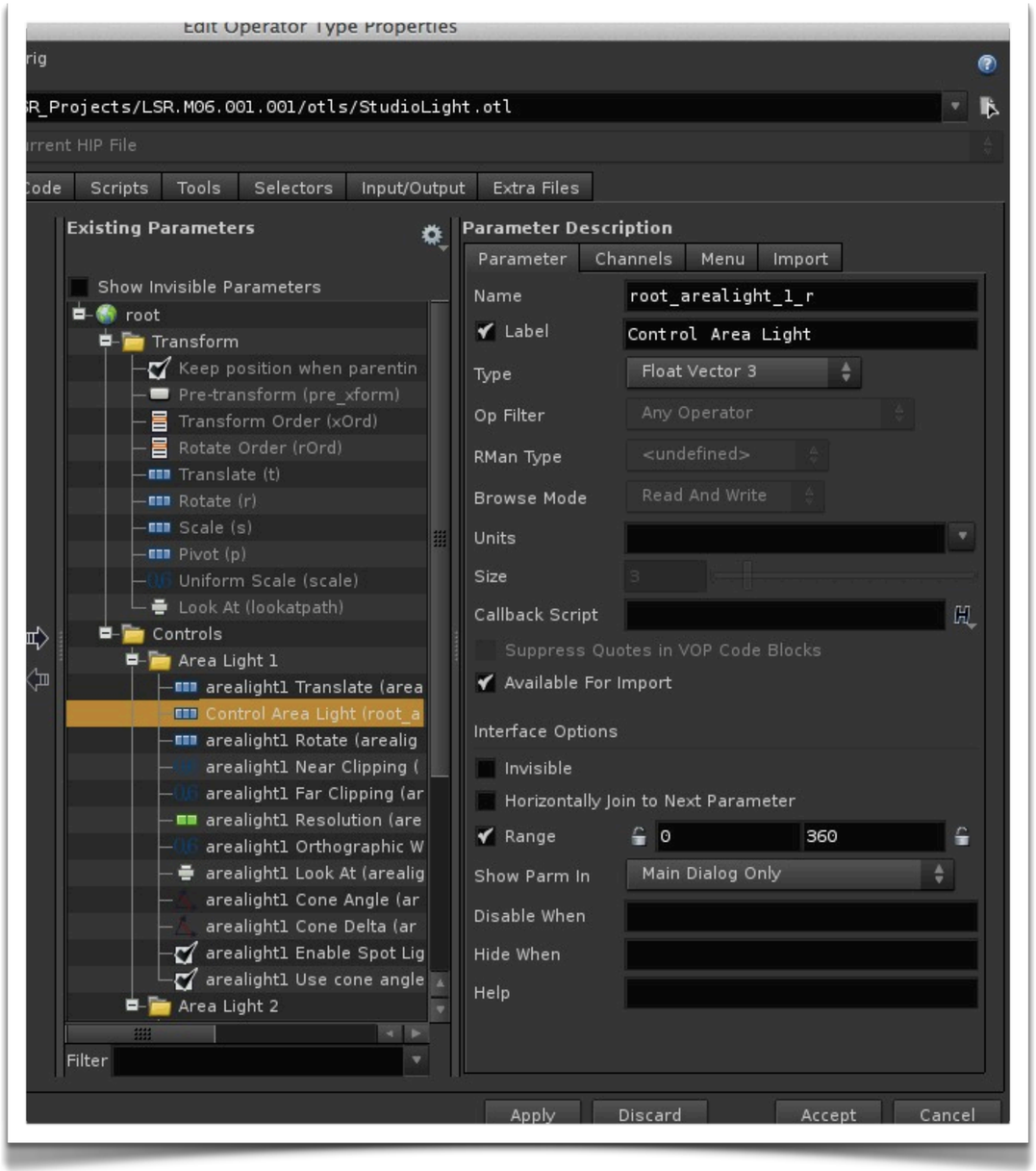
# Bring the Rotate Parameters Out




- Drag the rotate from the Root Area1 Light to the Digital Assets Area 1 Light Parameter

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