

# Operating the Responsive Workbench

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## A. Simple Overview

Responsive Workbench is a system where viewer-oriented stereoscopic 3D imaging is applied on a horizontal tabletop display. Imaging is supplied by a stereoscopic projector, attached to this machine. Stereoscopy is supplied by the display adapter and shutter glasses, with attached tracking apparatus. Using this 3-LED tracking apparatus and a stereo camera, the viewer's head is tracked.

After all is set, you will see 3D images on the tabletop display while you move within the range of the stereo camera.

## B. Preparation

1. The system works best at a dark room. Therefore, before you start the system it is better to close the lab windows and turn off the lights.
2. To confirm access to stereo camera, click [HERE](#). Simply, it executes the following command in a terminal:

```
sudo chmod 777 /dev/*1394
```

If you don't know the sudo password, you should check with one of the MediaLab VW members.

Note: For further details, check "*Handling IEEE1394 stereo cameras on a Linux machine*" by Başar Uğur.

3. To start the projector, use the remote control's Power button . Then, either by clicking [HERE](#) or from the Launcher panel at the bottom of the screen, start the "**NVIDIA X Server Settings**" by clicking on its icon .

From the Control Panel menu, choose "X Server Display Configuration". You should see the projector as "**IFS DepthQDQ3120-A (Disabled)**" on the right of the main monitor (Philips 109P4). Click on it, and then click "Configure" and choose "**TwinView**". Change the resolution to **1024x768** with **120 Hz** refresh rate. After that, click "Apply".

Now you should see the extension of the desktop on the tabletop display. Within 15 seconds, click "OK" in the "**Confirm ModeSwitch**" dialog (or press **Alt+O**).

Having enabled desktop extension, now set the "**Position**" of the projector display to "**Above**" the main monitor. After this, some windows may move unwillingly to the projector window, so you may want to relocate them. This happens to "Confirm ModeSwitch" dialog too, so you have to find the dialog and click "Ok" fast, OR you can just press **Alt+O** again. (*Note: This is for fullscreen viewing on Linux, something you have to handle with `glutGameMode` rather than `glutFullScreen`.*)

Note: If somehow the display adapter / driver setup is corrupt, you may refer to an early document about these issues<sup>1</sup>.

## C. Executing the Project

If everything goes correctly, you should be able to start the program by clicking [HERE](#).

Or you can navigate to `/home/medialab/Projects/StereoViewer` and run `./stereo_viewer`

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<sup>1</sup>Stereo Viewing Report, Ozan Çetinaslan, [link](#)→

there. The most recent executable will always be there. If not, immediately contact MediaLab VW staff.

1. Initially, you may interact with the system by mouse. Left clicking and moving around the screen, you may simulate user position around the table.
2. To start the camera, press 'C'. Two windows will pop up: Left and Right images acquired from the camera.
3. Attach the 3-LED apparatus to Shutter Glasses, using the clips.

You should be looking like this:



*Figure 1. A viewer wearing the hardware.*

4. To determine the LED positions, there are two options:
    1. Left clicking around the 3-LED apparatus area: The system will try to locate the LED positions automatically, in both left and right windows.
    2. Middle clicking on each LED position: Starting from red and applying continuously, you can determine each LED position manually. For this option, you should open the image windows separately.
- Determined LED positions appear as red, green and blue dots on the camera images. However, you should be careful about the determined LED colors' order. They must match the ordering in *Fig. 1*, **red** as right-back, **green** as left-back and **blue** as middle-front.
5. When the LED positions are set in both image windows, the system should start producing viewer-oriented 3D images on the tabletop display.

## ***D. Shutting down the System***

Due to the finite lives of the precious projector lamps, we use the projector when necessary. Otherwise we shut it down.

After your work with the workbench is finished, open the **NVIDIA X Server Settings** again and **Configure** the projector as "**Disabled**" (.. "**Apply**", "**Ok**").

Then by pressing the **Power** button on the remote control two times, you should be able to switch the projector to **Standby** mode. The LED on the projector will flash for ~15 seconds then it will remain steadily on. At this point, you may turn the projector off.