



## **Vislab Guide**

*Release 1.0*

**eResearch Centre**

July 15, 2014

## CONTENTS

<b>1</b>	<b>Welcome to the Vislab!</b>	<b>1</b>
<b>2</b>	<b>Caution and Warnings</b>	<b>2</b>
2.1	Room Equipment . . . . .	2
2.2	Health and medical issues . . . . .	2
<b>3</b>	<b>Support</b>	<b>3</b>
<b>4</b>	<b>Features and Technologies</b>	<b>4</b>
4.1	Features . . . . .	4
4.2	Tech Specs . . . . .	4
<b>5</b>	<b>Using the Vislab</b>	<b>6</b>
5.1	Introduction . . . . .	6
5.2	Getting started . . . . .	8
5.3	Connecting external equipment . . . . .	9
5.4	Configuring the Vislab . . . . .	11
5.5	3D via TriDef 3D . . . . .	18
<b>6</b>	<b>Troubleshooting</b>	<b>19</b>
6.1	3D content . . . . .	19
6.2	3D content on the web . . . . .	19
6.3	Power . . . . .	20
6.4	Everything else . . . . .	20

## WELCOME TO THE VISLAB!



As you have likely seen already, the Vislab is a 3D visualisation environment, which provides visitors with the opportunity to interact with 3D content and multimedia in an immersive environment.



Many applications support what's called "stereoscopic 3D" and will automatically work with the configuration here in the Vislab. This includes model creators and viewers, editing suites, games and more. Most 3D multimedia, including commercial movies and other videos, will play in the Vislab without any modification required. The Vislab also offers 3D Blu-Ray disc playback, and live high-definition terrestrial TV viewing, with 2D-to-3D content conversion where 3D television broadcasts are not available. Web-based 3D content, such as 3D pictures and videos, can also be accessed and viewed directly within a browser on the room's computer.

Enjoy the Vislab experience!

## CAUTION AND WARNINGS

**Warning:** All usage of the Vislab is at your own risk.

### 2.1 Room Equipment

- The 3D visualisation screen at the front of the room is extremely sensitive and **must not** be touched.
- The 3D projectors on the roof are sensitive and should only be turned on and off using the remote control provided.
- You are responsible for ensuring that you and all room visitors remain behind the marked areas and do not damage or remove any equipment from the room - especially peripherals, cables, and 3D glasses.

Visitors found contravening these instructions will be charged replacement costs and barred from use of the facility.

### 2.2 Health and medical issues

- The 3D visualisation being used has the ability to make viewers feel extremely uncomfortable and unwell, especially if used for lengthy periods of time.
- Those with pre-existing medical conditions should consult a medical professional prior to engaging in any activities held within the Vislab.
- Viewers should not attempt to look at 3D-based content on the screen without glasses for long periods of time as this may also cause headaches or other medical issues.
- As with the usage of other computational equipment, frequent breaks are recommended. Visitors can access the outside of the building via the door at the end of the corridor next to the Vislab.
- If you or other room visitors feel unwell at any time, cease viewing the content on the screen immediately, remove your glasses, and rest your eyes.

SUPPORT

If you have any questions or issues with equipment, please contact:

**Email** [eResearch Centre \(eresearch@jcu.edu.au\)](mailto:eresearch@jcu.edu.au)

**Telephone** x16084 or (07) 4781 6084

**In person** First floor, Building 17 (upstairs from the Vislab)

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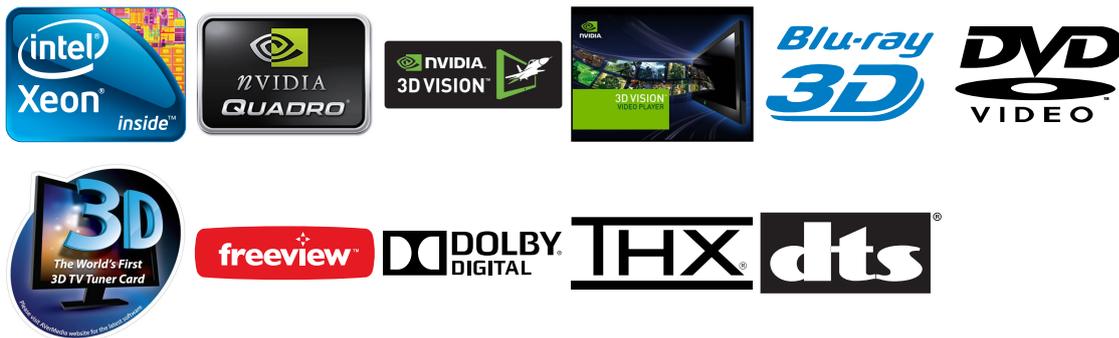
**Important:** Resist the urge to adjust equipment within the room.

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This includes disconnecting cables, adjusting projectors, moving equipment or making any modifications to the configuration or hardware. For your convenience, there are various connections available on the control desk for attaching external equipment. Please see *Connecting external equipment* for details on how to utilise them.

If you have specific requirements, the eResearch Centre is gladly able to assist. We are a phone call or an email away and will always endeavour to help.

## FEATURES AND TECHNOLOGIES



### 4.1 Features

- Professional-grade passive 3D visualisation for research, multimedia, and other applications
- High-resolution 4-metre projection display
- Powerful rack-mounted workstation for CPU/GPU/RAM intensive processing
- Full media centre functionality:
  - 3D multimedia playback and display
  - 3D and 2D Blu-ray and DVD playback
  - 3D and 2D HD TV playback and capture
  - 3D photography viewing and creation
  - High-fidelity surround sound and audio capture
  - FM and digital radio reception and capture
  - HD video conferencing and audio calling
- Seating capacity and polarised glasses for 45 people
- Special 3D-to-2D glasses for visitor accessibility

### 4.2 Tech Specs

- 4m Silver-beaded Stewart Filmscreen

- Dual roof-mounted Panasonic DLP projectors with circular polarisation (maximum resolution of 1920x1200)
- High-powered Dell R5500 Rack Workstation:
  - Dual Intel Xeon hexacore processors
  - NVIDIA Quadro and NVIDIA NVS graphics cards
  - 64GB RAM (ECC Registered)
  - Windows 7 Ultimate Edition (64 bit)
  - Creative Sound Blaster ZX professional audio card
  - AVermedia 3D HDTV tuner and HDMI capture card
  - Dell 1000W UPS as backup power source
- Rear-of-room control desk with dual-monitor output
- 45 lecture-style removable chairs
- Circular-polarised glasses for 3D visualisation
- Special 3D-to-2D glasses for accessibility. Each lens displays the same image, allowing users to see 2D only, and assisting visitors with medical or other conditions precluding them from viewing in 3D.

## USING THE VISLAB

### 5.1 Introduction

#### 5.1.1 How does it work?

As an overview, the Vislab computer processes 3D content into two discrete outputs that are sent to each of the projectors mounted on the roof. The Vislab uses these two *side-by-side* projectors to present two different polarised images onto the screen.

The three-dimensional technology used is called **passive 3D**, meaning the glasses that you wear have polarised lenses and require no batteries to operate. Each lens is polarised to coincide with the circular polarisation filter in front of each projector. Each of your glasses lenses blocks a specific type of light from reaching each eye, and thus your eyes see two independent, slightly offset, images. Your brain translates this into 3D imagery due to the perceived *depth* of the resulting imagery.

The technology used in the Vislab is effectively the same as what you may have seen in theatres (called **RealD**, **GetD**, or similar names). If you already have kept (or obtain) glasses from a movie theatre, bring them along and try them in the Vislab!

#### 5.1.2 Content Support

The 3D environment provided in the Vislab supports **NVIDIA's 3D Vision technology**. In real-world terms, this means that applications with support for any of the following should automatically work with the Vislab's equipment:

- Quad-buffered stereoscopic OpenGL
- Quad-buffered stereoscopic DirectX
- Explicit support for NVIDIA 3D Vision
- Applications with an NVIDIA 3D profile (known as “automatic” mode)

As software support varies wildly, especially when software developers refer to “stereoscopic 3D” support, the only way to check an application is to physically test it.

The Vislab has been successfully configured for and tested with:

- Commercially-produced 3D multimedia (including side-by-side and interlaced 3D)
- NVIDIA-certified 3D games and applications
- NVIDIA 3D Vision Live website content (see <http://www.3dvisionlive.com>)
- Several third-party 3D model viewing and photography applications, including:

- [Google Earth](https://earth.google.com) (<https://earth.google.com>) (and content able to be displayed within - buildings, Sky, Moon, Mars)
- [Slicer](http://slicer.org) (<http://slicer.org>) (visualisation and medical DICOM imagery)

### 5.1.3 2D Usage

It is possible to use the Vislab as a standard computer, without 3D functionality. In 2D mode, you will not require your 3D glasses.

To use the Vislab room without 3D functionality, simply run any standard applications as you normally would on a Windows-based computer. Web browsers, Office applications, and all other standard applications will automatically work in 2D, and will not cause the projection to change to 3D mode.

Certain applications, such as the **NVIDIA 3D Vision Player** and **AVer MediaCenter 3D**, will automatically engage stereoscopic mode when invoked. In order to use these programs without 3D, please refer to their respective internal settings to disable this functionality or explicitly disable stereoscopic 3D operation (see *3D Configuration*).

## 5.2 Getting started

### 5.2.1 Glasses

Start by putting on a pair of the 3D glasses provided. They will typically fit over and work with any prescription glasses you may already have.

Cleaning wipes are provided and all visitors should wipe their glasses prior to usage. Please wipe and return all glasses to the relevant storage area after usage.

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**Note:** Several pairs of special 3D-to-2D glasses have been provided for use by visitors with special requirements (such as medical conditions and other reasons why they may not be able to view 3D). These glasses allow a viewer to see the 3D content as 2D and allow the viewer to continue to participate in the experience. Please ensure these special pairs of marked glasses remain available for those that require them.

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### 5.2.2 Powering up

During times the room is not being used, we power off all equipment (including monitors, projectors, speakers, and the computer) to save electricity.

- To turn on the **computer**:
  - Open the computer case at the rear of the room using the button on the right-hand side
  - Press the power button on the top-left of the computer. The computer is the top-most item in the rack.
- To turn on the **control desk monitors**, use the power buttons on the front of each of the monitors on the desk.
- To turn on the **projectors**, use the **Panasonic** remote control on the desk. Aim the remote at both projectors and press the power button. The same remote control performs the same action on the projectors simultaneously. **Do not use the buttons physically on the projectors.**
- To turn on the **speakers**, use the power button on the Logitech control pod on the desk. The speakers must be configured to use the **optical** input to accept sound from the computer.

### 5.2.3 Logging in

The Vislab computer allows access via standard JCU credentials, being your username and password. All users that can authenticate to standard JCU computers have access to the Vislab, though typically, users will not have administrative rights or be able to reconfigure the computer, install or remove software, or make other changes.

For visitors external to the University, we are able to create custom local accounts for access.

If you require a level of special access, please *contact us* with your requirements. We can likely install or test your software for you, or if the need arises, provide select users with temporary administrative access.

### 5.2.4 Remote access

The Vislab computer is accessible remotely by special request. The high-powered graphics card in the computer, as well as the processors present, can represent a faster way of data or number crunching, especially for software that support these specific technologies. Please *contact us* with your requirements.

We will prioritise access to users physically within the room, and reserve the right to kill processes running by remote users without notice. In rare situations, the room's computer may also need to be powered down or restarted for maintenance reasons. We will endeavour to notify users ahead of time of such situations.

### 5.2.5 User input

The Vislab features a keyboard and mouse which are present on the control desk. The keyboard is backlit for usage in the dark. Backlighting on the keyboard can be controlled using the “cog” button at the top-middle of the keyboard.

The room also features a wireless keyboard and a gyroscopic mouse, both of which can be moved anywhere in the room to control the computer from a distance. The gyroscopic mouse, located in its cradle on the control desk, can be used either on a flat surface or used to gesture in mid-air and control the current application configured on the main computer.

To engage “gyroscopic” operation, hold the trigger button at the back of the mouse and move the mouse through the air. To enable constant gyroscopic operation, double-tap the trigger button on the mouse - the cursor will now move freely without requiring the trigger to be held down. Repeat this action to disengage this mode. Combine gyroscopic motion with clicking the left or right mouse buttons to easily interact with content in 3D space.

Use the provided software to configure specific gestures to invoke application-specific functionality. Always return the mouse to its cradle after use.

## 5.3 Connecting external equipment

- **USB peripherals:** the two computer monitors and the keyboard present on the control desk have USB 2.0 hubs built into them. The USB 2.0 hubs are located on the sides of the respective monitors and accept self-powered or bus-powered devices.

For higher-speed USB 3.0 devices, there is a female USB extension cable present on the control desk. You can identify this by its unique *blue* colouring, indicative of USB 3.0.

- **HDMI capture input:** the HDMI cable on the control desk is directly connected to a capture card inside the computer. A HDMI-DVI adapter is provided if you require the ability to connect DVI-based equipment. The capture card is able to capture HD resolutions up to and including 1080i (not 1080p, however; 720p is recommended), and is compatible with most digital equipment, including:
  - Laptops or other computer equipment
  - iPads, tablets and phones with HDMI connections
  - Games consoles
  - Video cameras
  - Any other multimedia devices of a similar nature

Plug the cable into your device, configure your device to output HDMI signal, and launch either a capture or display program on the main control computer. For example, *AVer MediaCenter 3D* will allow you to pass the HDMI video through to the displays (or projectors), allows displaying supported 3D content, and can perform 2D-to-3D live conversion.

- **Analog video input:** the capture equipment provided can display or store analog content from various sources (such as component and composite inputs) via the computer. These inputs are not currently user-exposed so please *contact us* if you wish to use this functionality.
- **Audio equipment:**

Use the Creative Sound Blaster software present on the computer to configure how audio input and output should operate.

- **Speakers:** the Vislab features surround-sound speakers which are connected via optical connection to the control pod on the desk. Any audio output from applications running on the computer will be directed to the speakers.

The speakers also accept a 3.5mm jack input connection for directly playing analog audio on the sound system and bypassing the main computer. You may wish to do this for laptops or other external equipment. Adjust the input on the speakers to be *Direct* and plug the audio jack into your equipment.

- **Headphones:** may be attached to the audio control module on the control desk, either with 3.5mm or 6.3mm jacks. The volume control knob at the top of the module can be used to control the overall volume level for the headphones. The sound card software can be configured to direct audio output to headphones rather than the room's sound system.
- **Microphones and line-in equipment:** Using the audio control module on the control desk, audio input equipment (such as laptop computers or microphones) can be connected directly into the computer's high-fidelity sound card. The audio module supports both 3.5mm and 6.3mm headphones and microphones, with the 6.3mm jacks taking precedence if both are plugged in simultaneously.

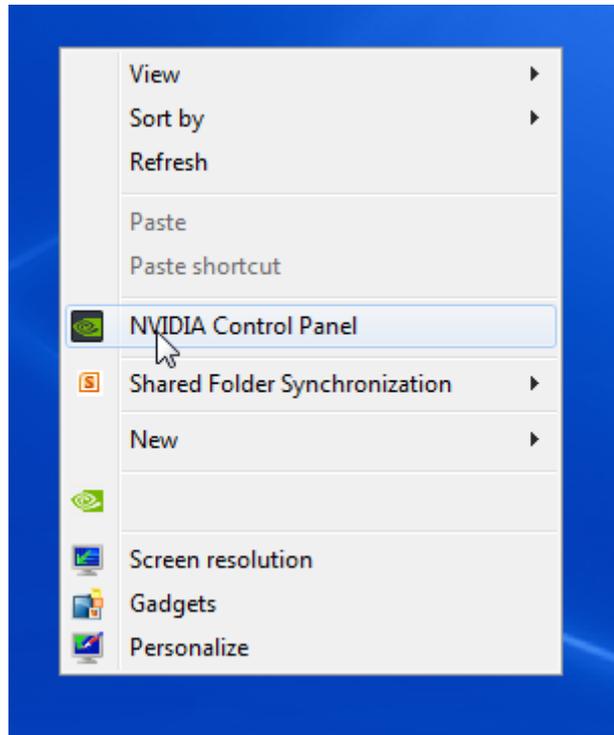
The audio control module also features a built-in "beamforming" microphone array which can be used for video and audio conferencing calls within the Vislab.

- **Digital audio:** the sound card provided can capture or pass-through digital audio via an optical (TOSLINK) connector. This input is not currently user-exposed so please *contact us* if you wish to use this functionality.

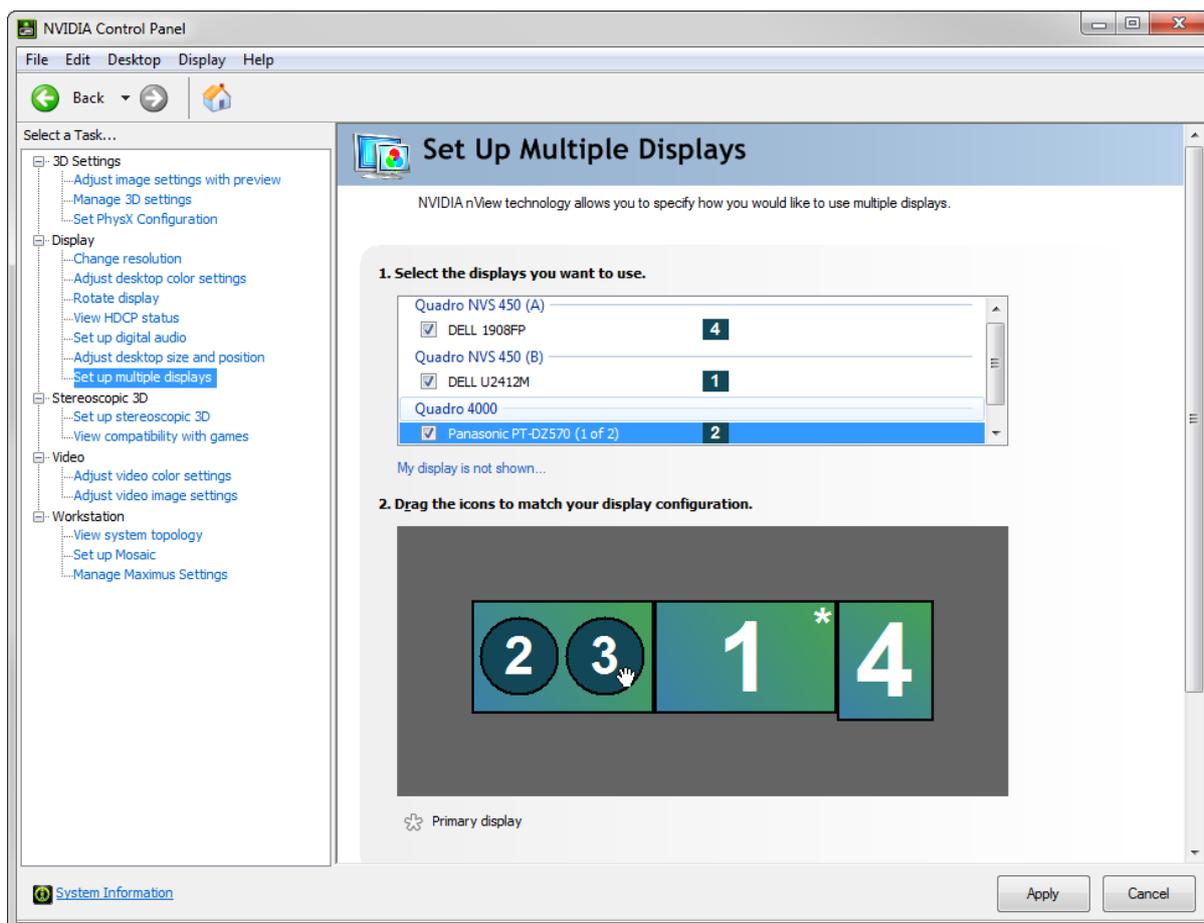
## 5.4 Configuring the Vislab

Getting started with the Vislab is straight forward - the computer system has been pre-configured with 3D settings applicable to most applications. Make sure you've followed the basic instructions in *Using the Vislab* first and have powered up the equipment as mentioned in *Getting started*.

Open the NVIDIA Control Panel by either right-clicking the desktop or using the search in the Start Menu.



The monitor configuration will be displayed in the NVIDIA Control Panel as follows:



By default, the main control desk monitor (powered by the NVS 450 graphics card) is configured as the primary display for the system. Within Windows, this means the start menu, desktop icons, and new windows will appear on this display first for ease of management within the room.

In general, the process for displaying 3D content is simply to start your 3D application, and drag the application window onto the projectors, which are located to the left of the main control desk monitors (in the multi-screen configuration above). Once the application window enters the projection display, you may notice a slight black flicker as the 3D projection is enabled. Don a pair of polarised 4D glasses to see the full effects.

If you're unsure whether 3D is working, try removing your glasses. If you can see what appears to be a doubled-up, slightly offset image on the screen in front of you, then 3D is functional. Otherwise, if you see a readable 2D image, then you may need to check your settings, or the application does not support 3D. Essentially, if the screen is hard to see with your glasses off, the 3D projection is likely working.

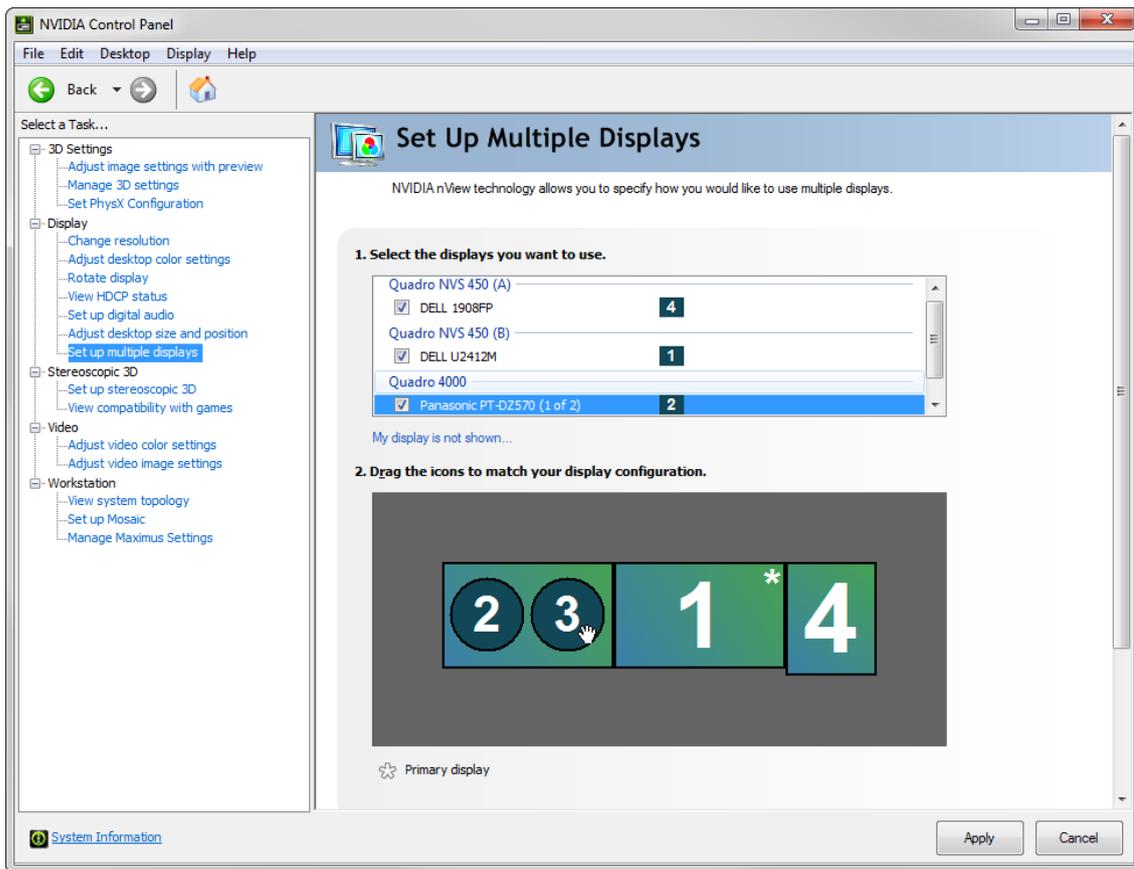
### 5.4.1 Display configuration

Firstly, the two stereoscopic projectors (which are connected to two independent outputs on the main graphics card) must be configured to be “clones” of one another in the NVIDIA Control Panel. This will be the default configuration and should never change.

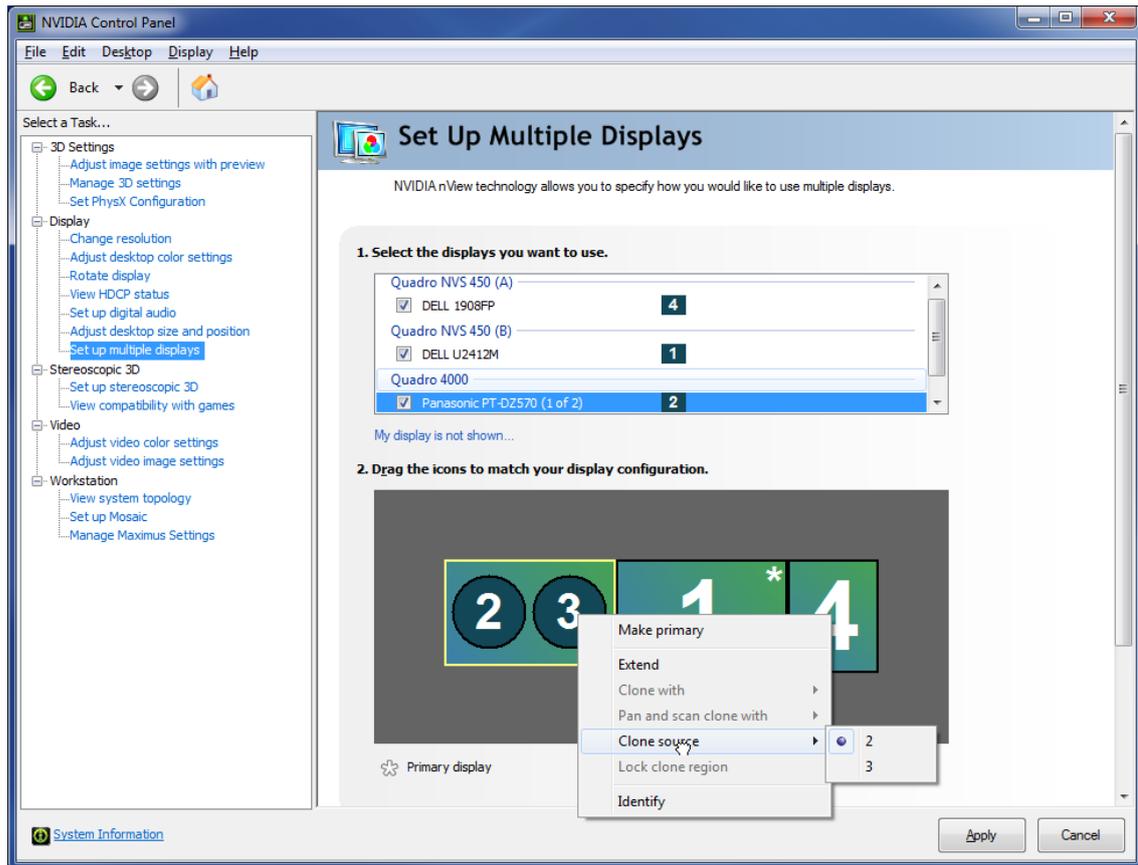
However, if you need to confirm this configuration, do this:

1. Open the NVIDIA Control Panel by either right-clicking the desktop or using the search in the Start Menu.
2. Click `Set up multiple displays` in the tasks list on the left.

3. Confirm that the two displays connected to the Quadro card are clones of each other, like so:



If this happen to have been changed by an application or user, locate one of the displays attached to the Quadro card, right-click and choose `Clone source` to select the number of the other display listed like so:

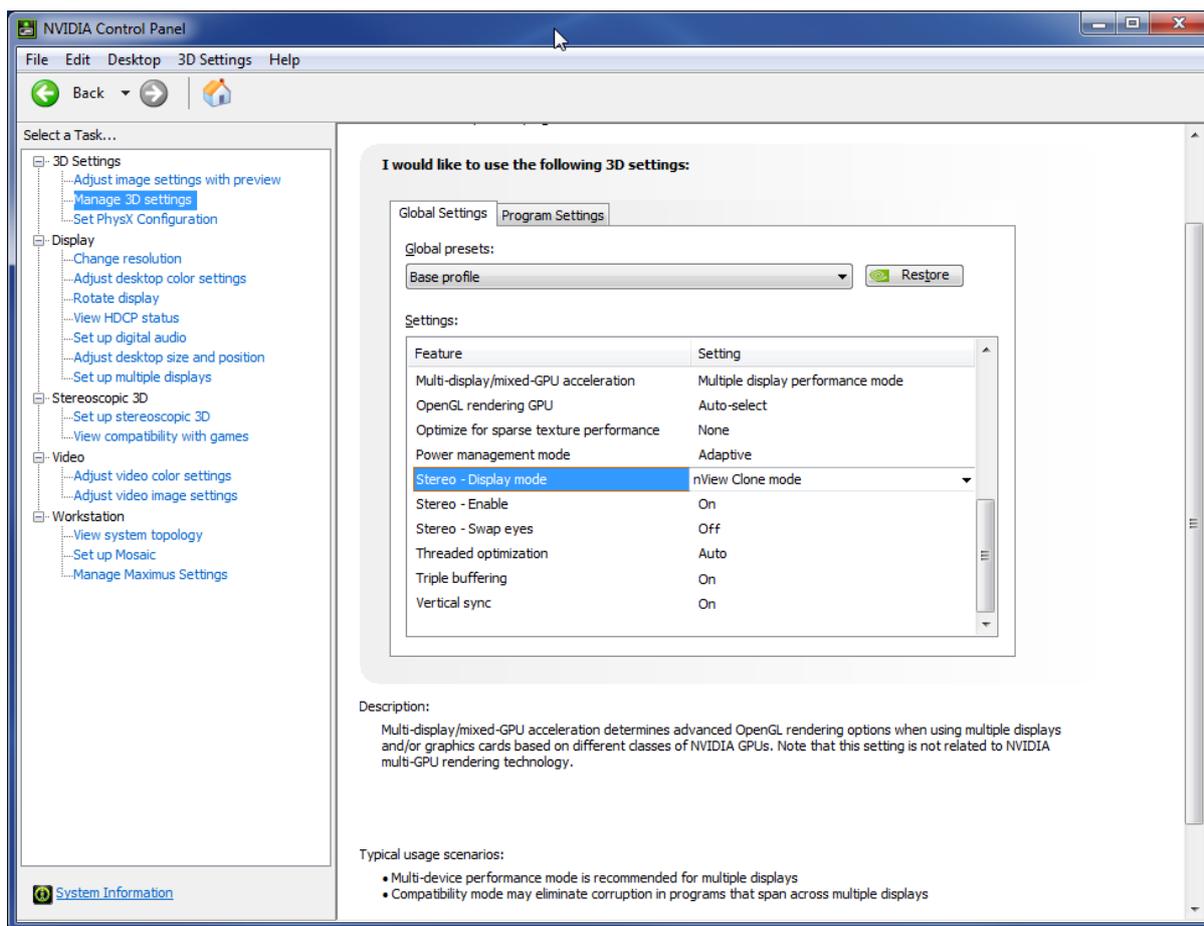


- If you have had to make any changes, click **Apply** at the bottom of the window, and ensure that you accept the confirmation window afterwards. You will have 15 seconds before your changes are automatically reverted.

### 5.4.2 3D Configuration

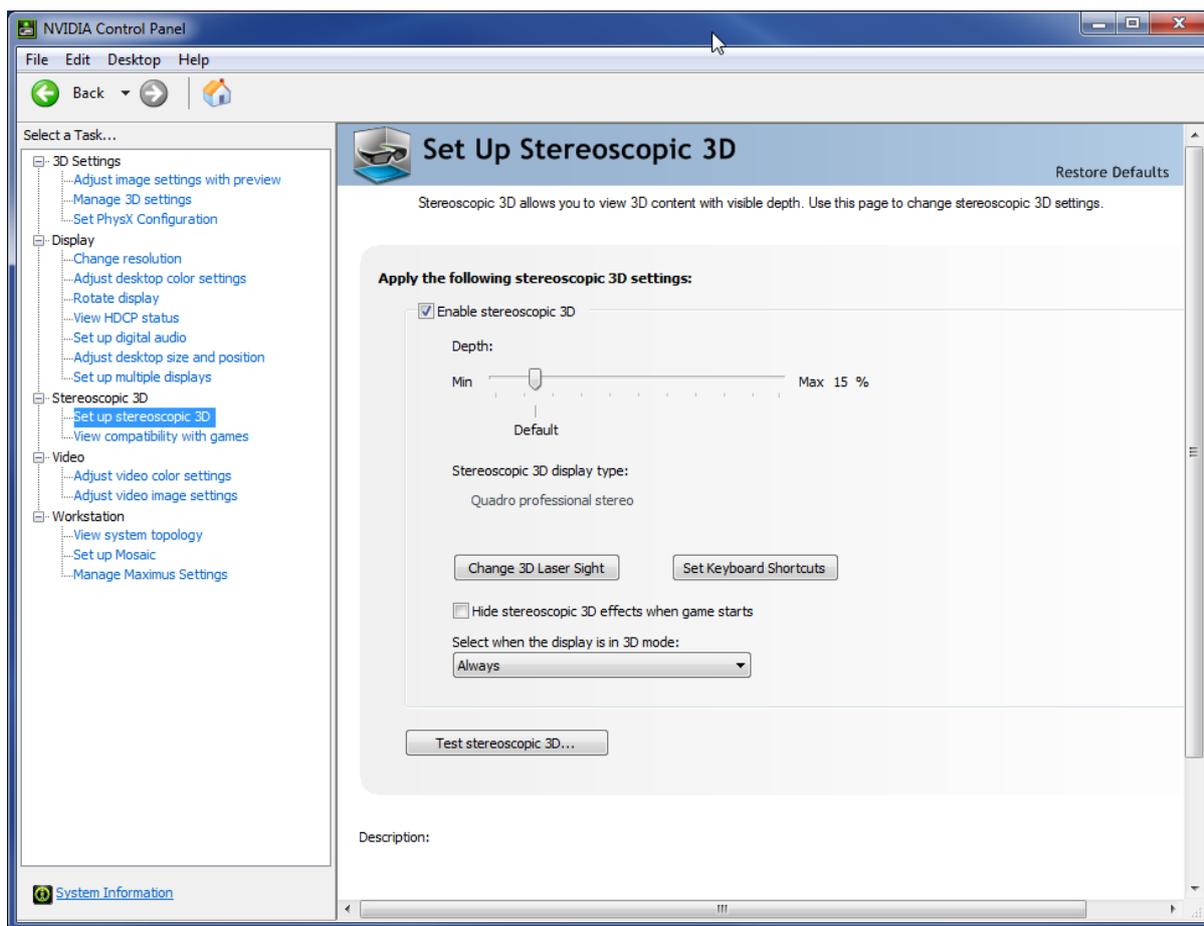
**Important:** To configure specific 3D settings, you must first configure the 3D projectors as the primary display. If you do not do this, it will appear as though stereoscopic 3D is not enabled as you will be viewing configuration for the control desk graphics card.

The standard configuration for 3D within the Vislab is as follows, organised by task/screen name as shown in the NVIDIA Control Panel:



## Manage 3D Settings

- **Stereo - Display mode** - nView Clone mode. Affects how the drivers communicate with the projectors and **must** never be changed.
- **Stereo - Enable** - On. Enables or disables 3D stereoscopic mode globally and should not be disabled.
- **Stereo - Swap eyes** - Off. Configures which projector receives which image. **Must** always be disabled due to projector ordering.
- **Triple buffering** - On. Should usually remain on to improve performance when Vertical sync is enabled. Some applications may require this option to be disabled.
- **Vertical sync** - On. Should usually remain on to prevent 'tearing' of images seen by viewers, though disabling may yield improved performance.



### Set up stereoscopic 3D

- **Enable stereoscopic 3D** - Checked. Should always be enabled, unless explicit 2D operation is required.
- **Depth** - Default (15%). Configures depth of 3D projection and default typically yields the best quality 3D display, but can be configured if required.
- **Select when the display is in 3D mode** - Always. Configures when the 3D display functionality should be activated. In testing, seems to have little effect even if options are changed, so leaving to be always active is the most compatible option.
- **Test stereoscopic 3D** - runs the 3D vision test on the primary display.
- Click **Set Keyboard Shortcuts** to see the available shortcuts available for easily configuring depth, convergence and other in-application options.

If you require specialised settings, it is possible to adjust them in the NVIDIA control Panel. Take extreme care when adjusting settings for stereoscopic 3D as some options must never be changed, as outlined above. Users should restore all options to their original settings prior to leaving the Vislab.

### 5.4.3 Other common configuration

Due to the usage of multiple graphics cards in the computer, certain applications may require you to configure the 3D projection as the primary display before starting 3D projection, or disable the control desk monitors (powered by the secondary graphics card) first.

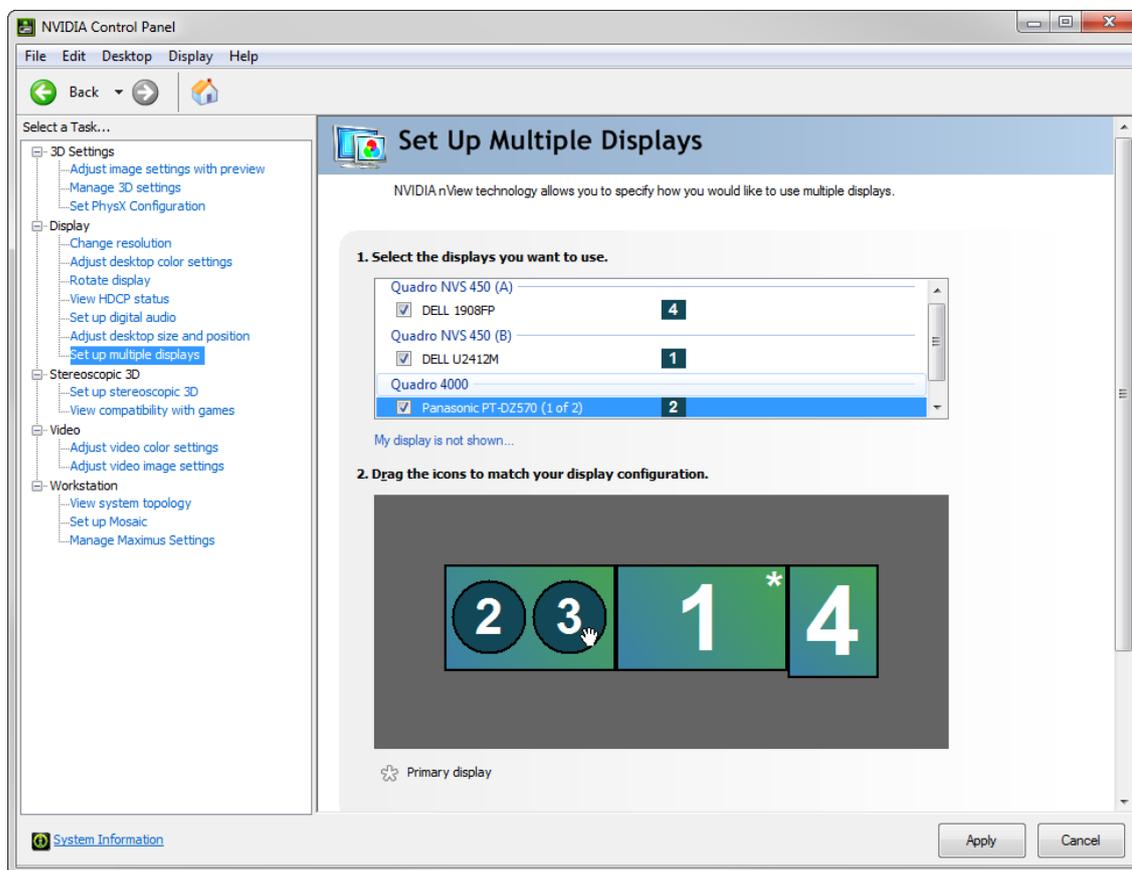
## Changing the primary display

Typically, applications that require pure full-screen configuration and do not run in a window (such as 3D games) will need to have the 3D projectors configured as the primary display first before being launched.

You can identify if this is the case if your application appears in full-screen on the projectors rather than the control desk monitors. Bear in mind that some applications may have built-in monitor configuration options, and may be able to configure the application independent of the rest of the computer. Check your application first before proceeding.

To change the primary display:

1. Open the NVIDIA Control Panel by either right-clicking the desktop or using the search in the Start Menu.
2. Click `Set up multiple displays` in the tasks list on the left.
3. Right-click the cloned (overlapped) displays and click `Make primary`:



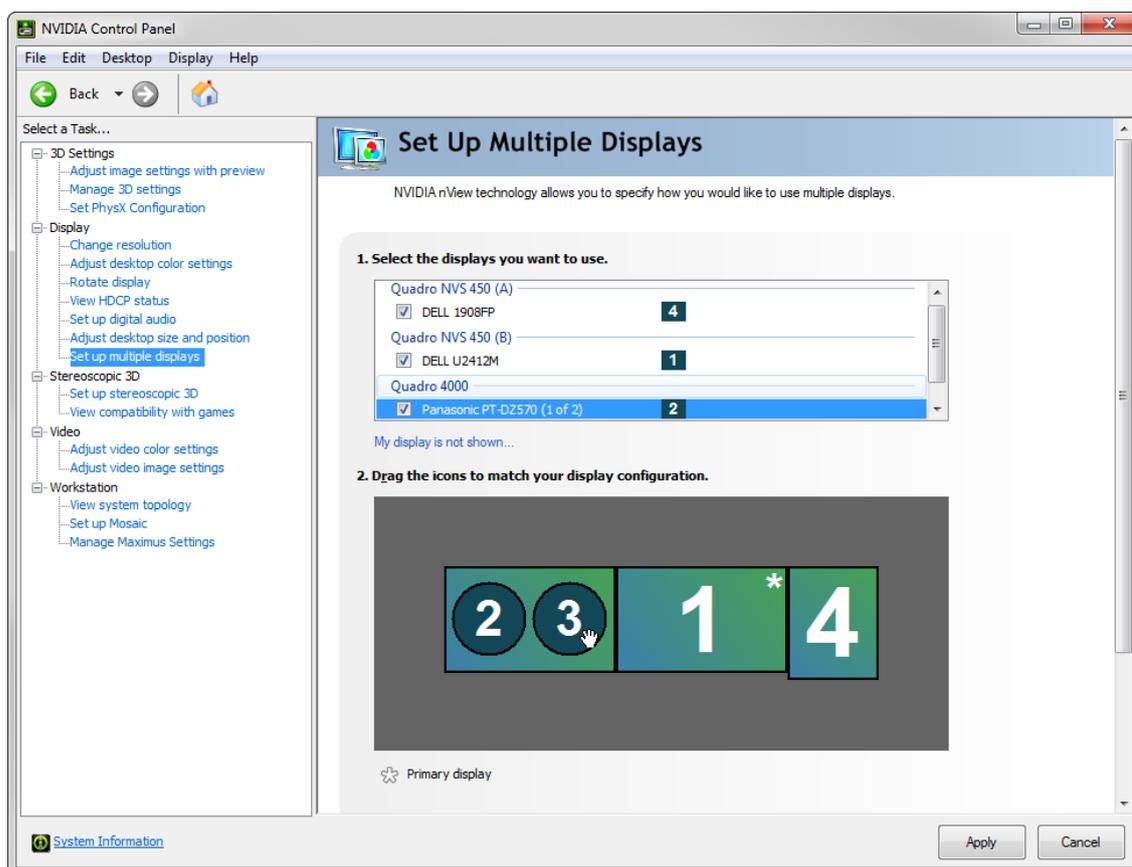
4. Click `Apply` at the bottom of the window, and ensure that you accept the confirmation window afterwards. You will have 15 seconds before your changes are automatically reverted.

## Disabling the control desk graphics card

Some applications are quite specific in that they will only function with the primary graphics card driving the 3D projection enabled. One notable example is any 3D-based content being displayed within your web browser, using the NVIDIA 3D Vision plugin (such as <http://www.3dvisionlive.com> or YouTube 3D).

Use this configuration as the *last ditch effort* in confirming whether or not your test application supports the Vislab 3D environment.

1. Open the NVIDIA Control Panel by either right-clicking the desktop or using the search in the Start Menu.
2. Click *Set up multiple displays* in the tasks list on the left.
3. Uncheck the boxes next to each of the displays listed against the Quadro NVS 450 graphics card to disable these outputs. There will be several entries displayed:



4. Click *Apply* at the bottom of the window, and ensure that you accept the confirmation window afterwards. You will have 15 seconds before your changes are automatically reverted.
5. The cloned 3D display will now function as the primary display and the control desk monitors will be turned off.
6. Launch the 3D content to be displayed. If in a web browser, you may need to display some content from <http://www.3dvisionlive.com> to *kick* the display drivers into displaying stereoscopic 3D. You will notice a visible change in the projection when this happens and Windows will likely inform you that your display theme has changed to *Windows basic*.

## 5.5 3D via TriDef 3D

Some applications, such as Google Earth, will only operate in 3D mode when started using TriDef 3D, a helper application that is installed on the Vislab machine. To access TriDef 3D, launch *TriDef 3D Ignition* from the Start menu. You may be required to detect “games” (a term meaning simply all applications installed) prior to launching your application.

## **TROUBLESHOOTING**

### **6.1 3D content**

If your 3D content does not display using one of the approaches mentioned in *3D Configuration*, try resetting the system:

1. Disable stereoscopic 3D in the NVIDIA Control Panel.
2. Restart the computer.
3. Log back in and re-enable stereoscopic 3D in the NVIDIA Control Panel.

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**Note:** If you are prompted by the NVIDIA Control Panel to select a mode of 3D operation, ensure that the 3D projectors are configured as the primary display first before proceeding.

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Once you have done this, try re-launching your 3D application. You may also need to adjust your application's settings to explicitly output stereoscopic 3D in one of the correct formats required.

### **6.2 3D content on the web**

Web-based 3D content is made interesting due to limited interoperability with platforms, drivers, and plugins. The following sets out what you should check if 3D playback is not functioning correctly on the web:

1. Ensure that you are using Mozilla Firefox. Other browsers will not work at this time.
2. Check that Firefox has hardware acceleration enabled in its preferences. HTML-based videos will not function without this enabled.
3. Ensure that the latest Silverlight and NVIDIA 3D Vision browser plugins are installed. The former is installed separately, whilst the latter should be automatically installed as part of the NVIDIA graphics driver setup.
4. Ensure that only the 3D projectors are enabled. Disable all other displays connected to the computer through the NVIDIA Control Panel.
5. Try playing a video from <http://www.3dvisionlive.com> before playing or displaying any other 3D content. This is required to *enage* the 3D vision functionality and certain 3D content (such as YouTube) will not do this automatically.

## 6.3 Power

For any of the following, check the devices are turned on using their respective switches, buttons or remotes:

- Room computer
- Desk monitors
- Speakers
- Projectors

If something isn't functioning correctly, try turning it off and back on again.

## 6.4 Everything else

Sometimes things are just stubborn and refuse to work in the way you expect. Contact us for help and we'll do our best to help you on your way.