

ICAVE

Service Documentation: Display and Projector Configuration / Calibration

Last Updated: 10-26-2020

Summary: The following provides documentation for properly servicing the configuration of the ICAVE's 5 projectors. A breakdown of the current awareness for the projector system's hardware setup will be provided along with the software configuration of these projectors.

Projector Model: [E-Vision Laser 8500 WUXGA](#)

Breakdown:

At the server rack The USB extension boxes have the end outputs for each video out of the projectors. They use a female to male DVI-D to DisplayPort to a specific arrangement of the output ports of the GPUs for the Render Node (See figure: Render Node GPU to projector video out assignment)

Two USB extension boxes at the projector's frame.



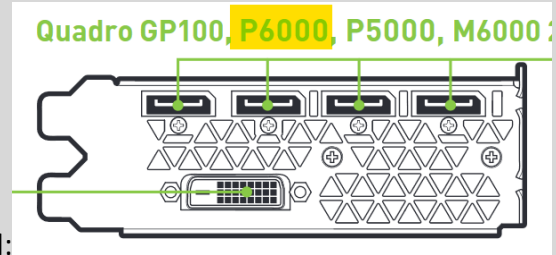
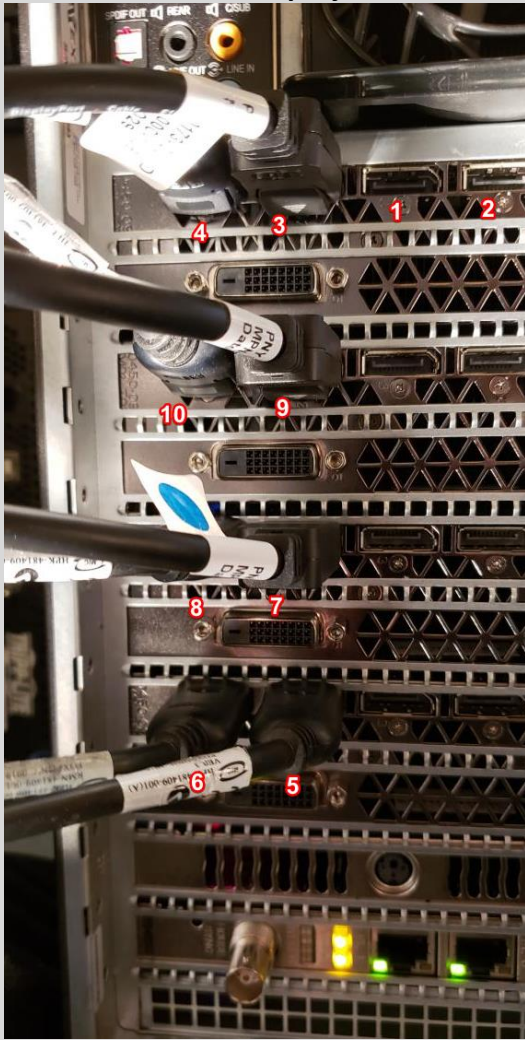
Head Node's desktop display USB extension endpoint.



Render node USB extension endpoints (Output goes to DisplayPort's of render node GPUs).



Render Node GPU to projector video out assignment:



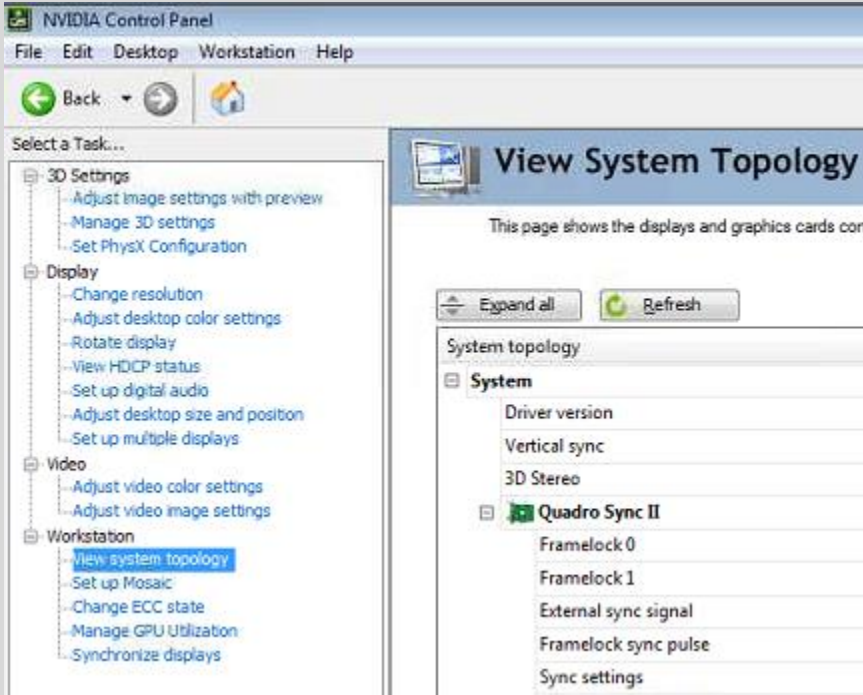
GPU Back Input Panel:

Each pair of two numbers (12, 34, 56, etc.) correspond to a pair of video signals from 1 projector.

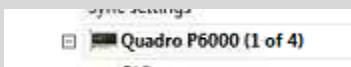
Projector Mapping:

Projector	Windows Mapping	Physical GPU Index	Nvidia Control Panel Listing
1	1, 2	1	10, 6
2	3, 4	1	5, 1
3	5, 6	4	8, 3
4	7, 8	3	9, 2
5	9, 10	2	4, 7

In the Nvidia control panel, the full system mapping can be found in the **Workstation** category's **View system topology** option:



Each physical GPU is listed in the hierarchy with its model name and assigned index:

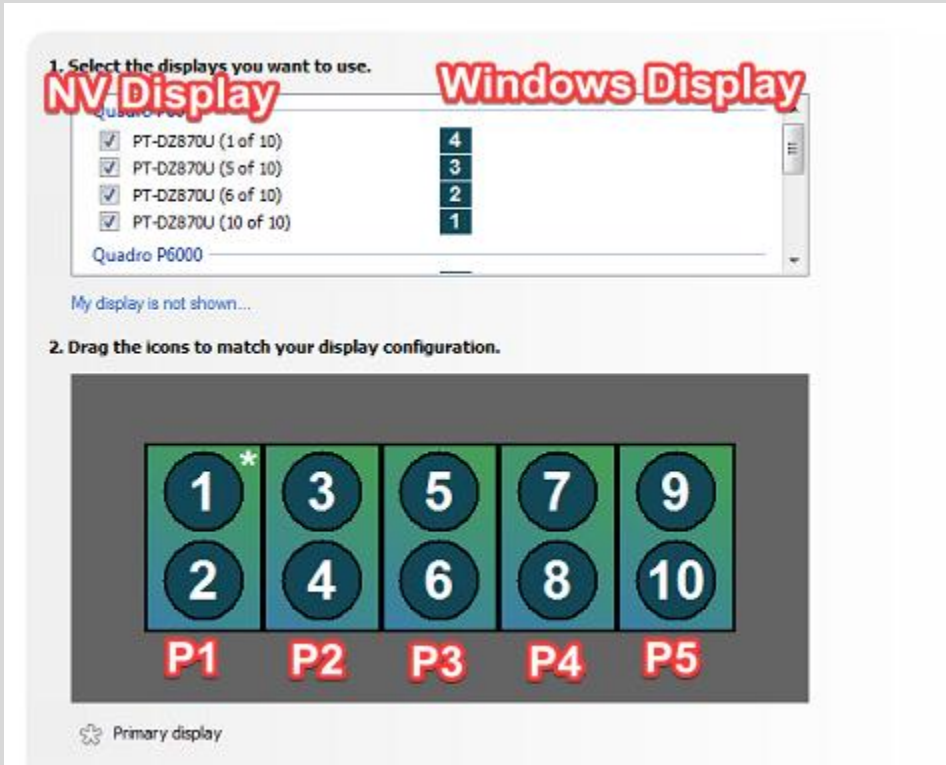


Within each GPU listing, the connected monitors are listed:

DVI	Connected: PT-DZ870U (1 of 10) EDID (File) , Multi-Display Cloning (Disabled)	
SLI Mode	Disabled	
Usage Mode	WDDM	
Total memory	122624 MB	
Memory free	24328 MB	
PT-DZ870U (1 of 10)		
Display state	Not synced	
Resolution, refresh rate, color de...	1920 x 1200 pixels, 59.949 Hz, 32 bpp	
	Horizontal (2080)	Vertical (1235)
Active	1920	1200
Border	0	0
Front porch	48	3
Sync width	32	6
Back porch	80	26
Polarity	Positive (+)	Negative (-)
Timing	The display is using internal timing	
EDID source		File
OS Screen Identifier	4	
HDCP		Not supported

Notable indexes can be found here including the Nvidia Control Panel listing, and the OS Screen Identifier (Windows display arrangement).

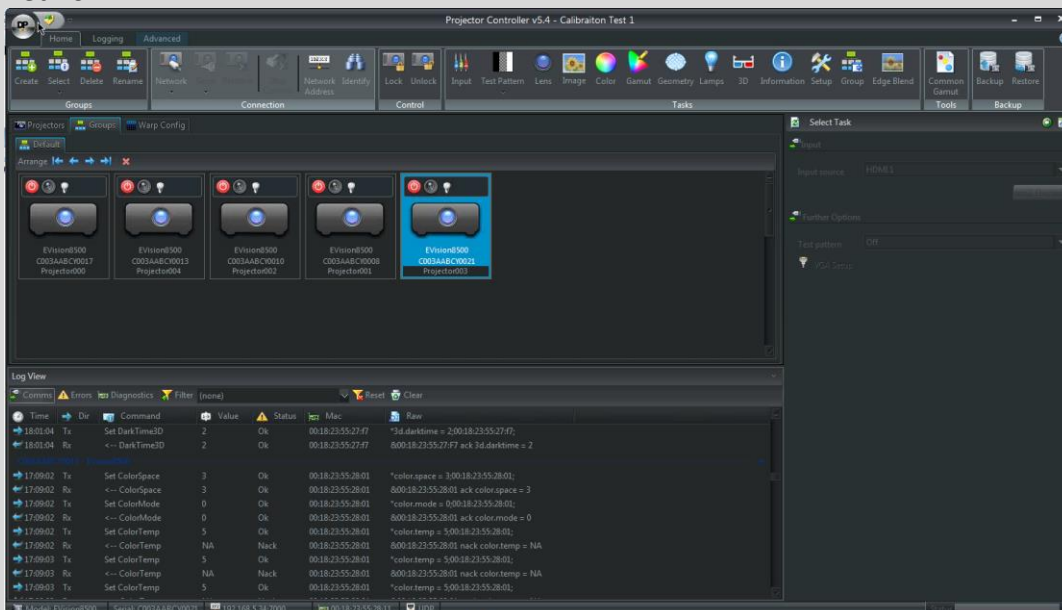
The display cloning and arrangement configuration: Each pair of outputs to the projector is cloned in the windows arrangement and are arranged in the same order that they are physically in the physical system.



Controller Patch Panel: Projector OSD menu is accessed through here using a aux cord to a compatible controller that came with the projectors. The patch panel is used if there are missing features or issues with accessing settings from the Projection Control Software provided by Digital Projection. (Needs pictures)

Configuration and Calibration Software: [Projector Controller Software](#) (PCS)

The PCS is the main interface for configuring and calibrating both the projector alignment / warping geometry and output settings. The application communicates to the projectors using TCP/UDP messages on the network.



The projectors for setting things up properly and having a proper ordered arrangement of the projectors to their physical counterparts were placed into a grouping:

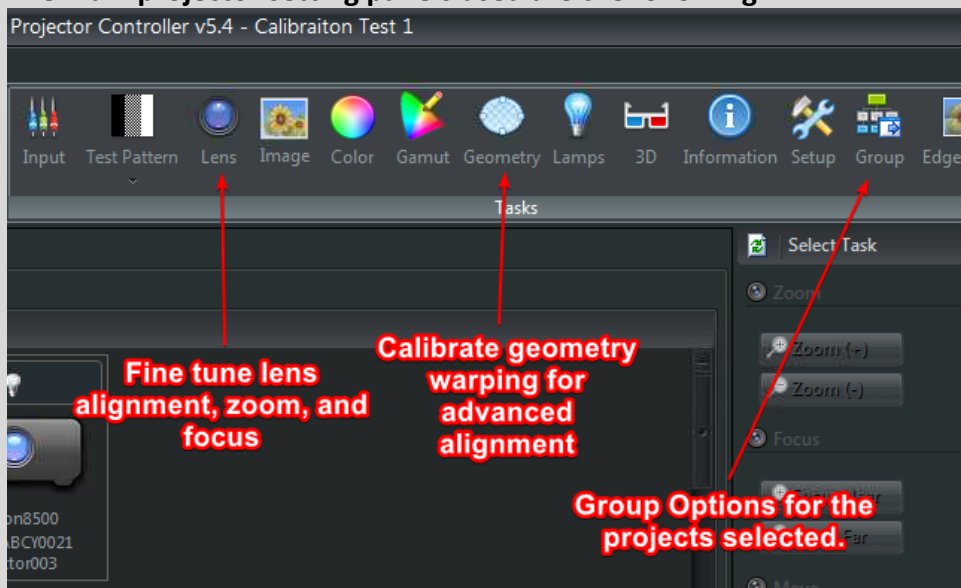


Mapping:

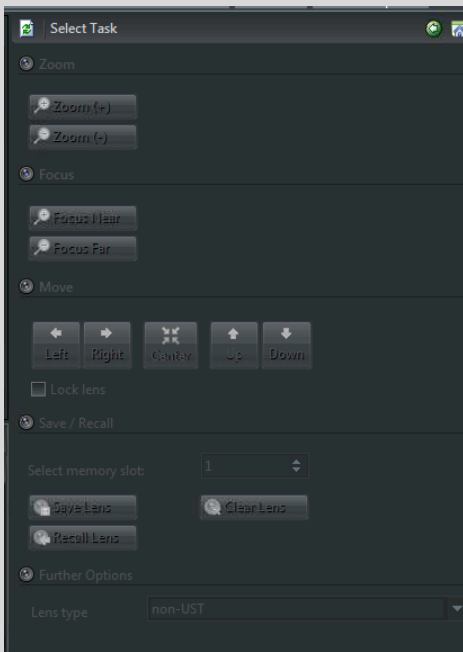
Physical Projector	PCS Index
1	0
2	4
3	2
4	1
5	3



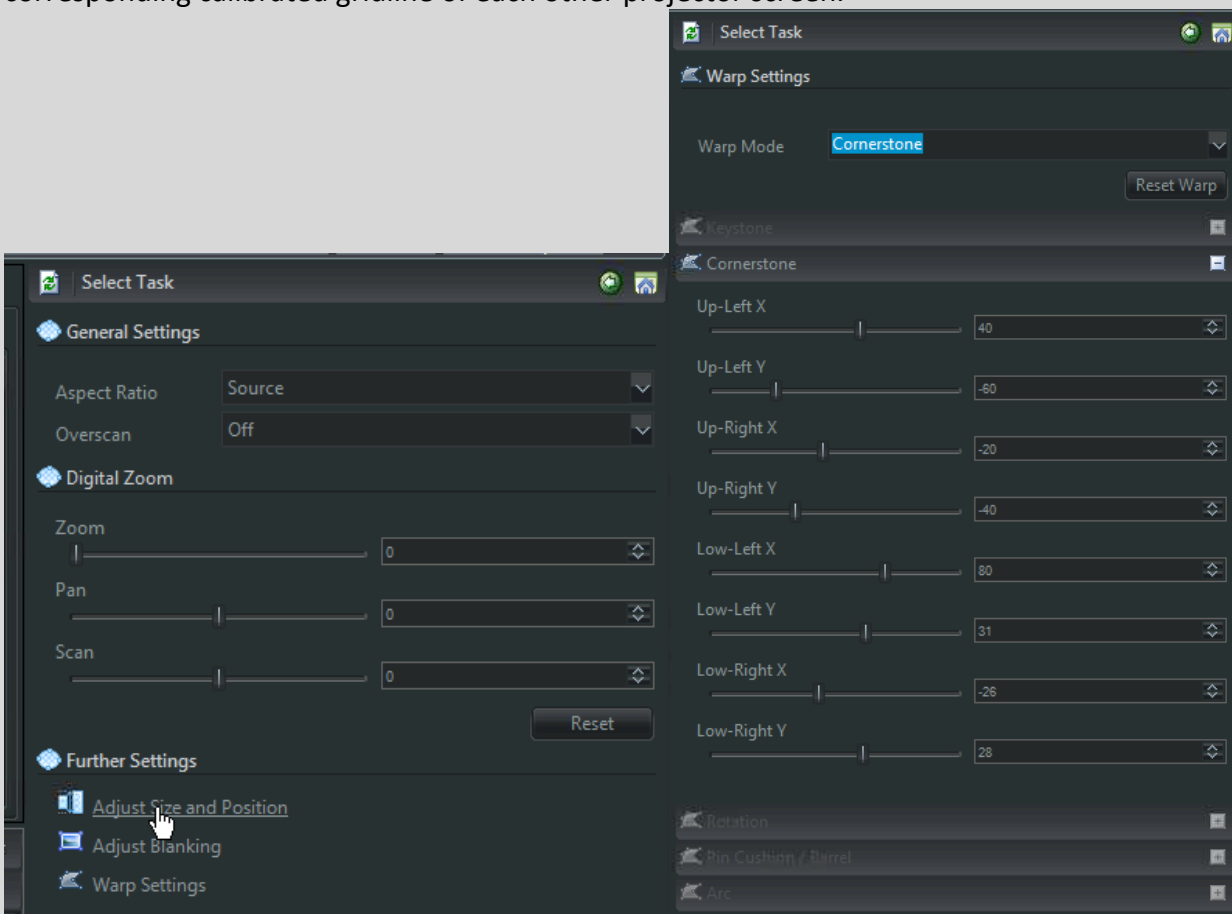
The main projector setting panels used are the following:



Lens: Its best to use this interface before doing the geometry as with a proper zoom and focus done with the ICAVE test pattern can minimize the amount of focus distortion. The lens position will have to be adjusted as the geometry is calibrated.

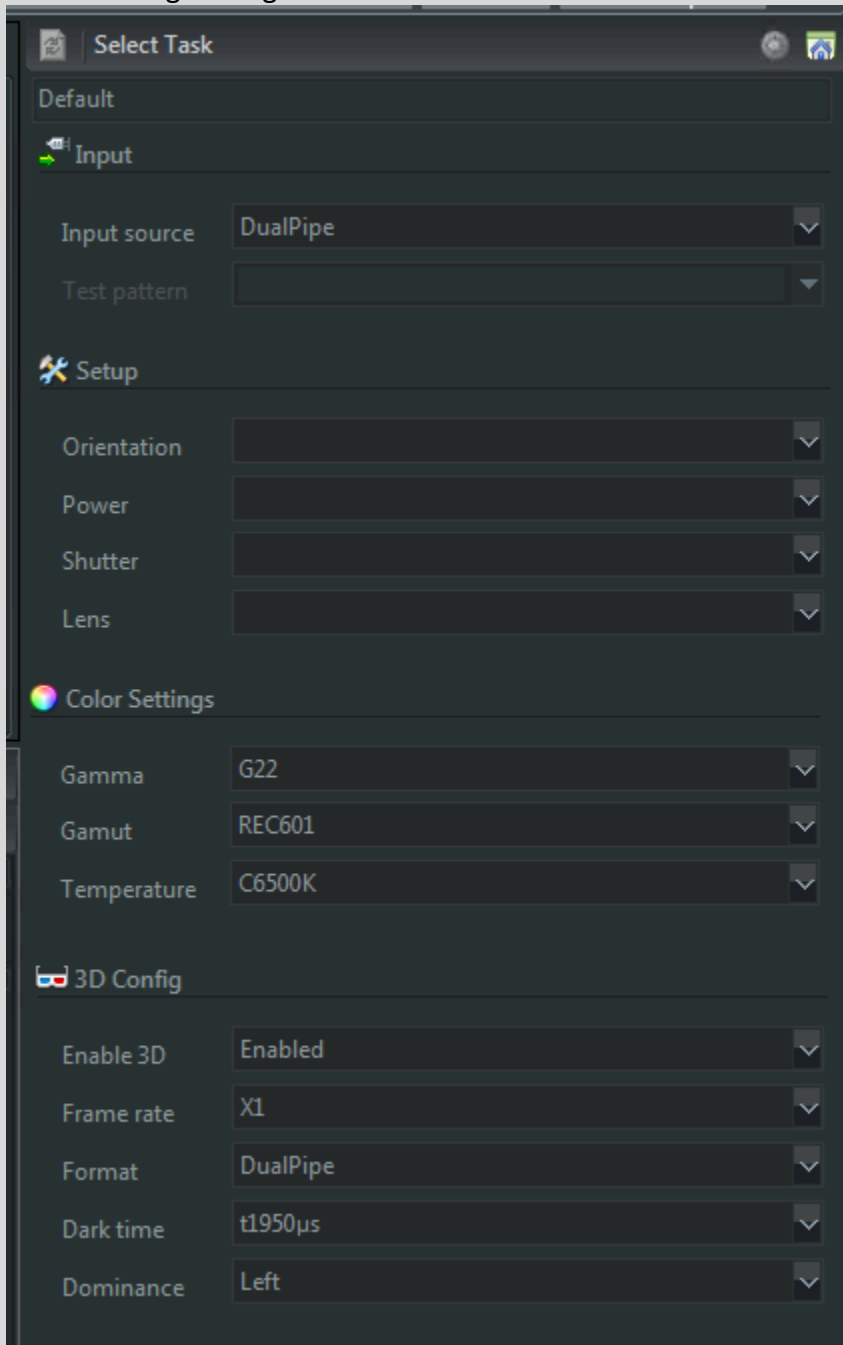


Geometry: The projectors are all calibrated with a cornerstone warping method. Using the warp, each corner is first made sure to fit within the bounds of the screen, then each grid line is position to match the corresponding calibrated gridline of each other projector screen.



Group: The group is used to manage the input and 3d settings of all the projectors. Any settings done individual for the projectors 3D wise has a chance of not showing proper results 3d anaglyphs artifacting on at least one of the screens.

The following settings are known to work:



3D Troubleshooting: If the 3D fails to work properly in a getReal3D loaded scene do the following steps:

1. Go to the projector group setting and toggle(disable then enable 3D) with a different dark time, then put back the t1950 us dark time.
2. If 3D fails to load properly or anaglyphs artifacts are showing, end the running scene, and stop the ART Controller using DTrack2.
3. Complete step 1 again and then start back up the ART Controller again using DTrack2.
4. From here launch the same scene again in getReal3D.
5. If there are still issues check to make sure that the glasses batteries are not bad by taking them out and putting them back in.
6. If step 5 fails to resolve the issue, complete steps 1-4 again until 3D works properly.

ICAVE Screen Calibration Grid:

