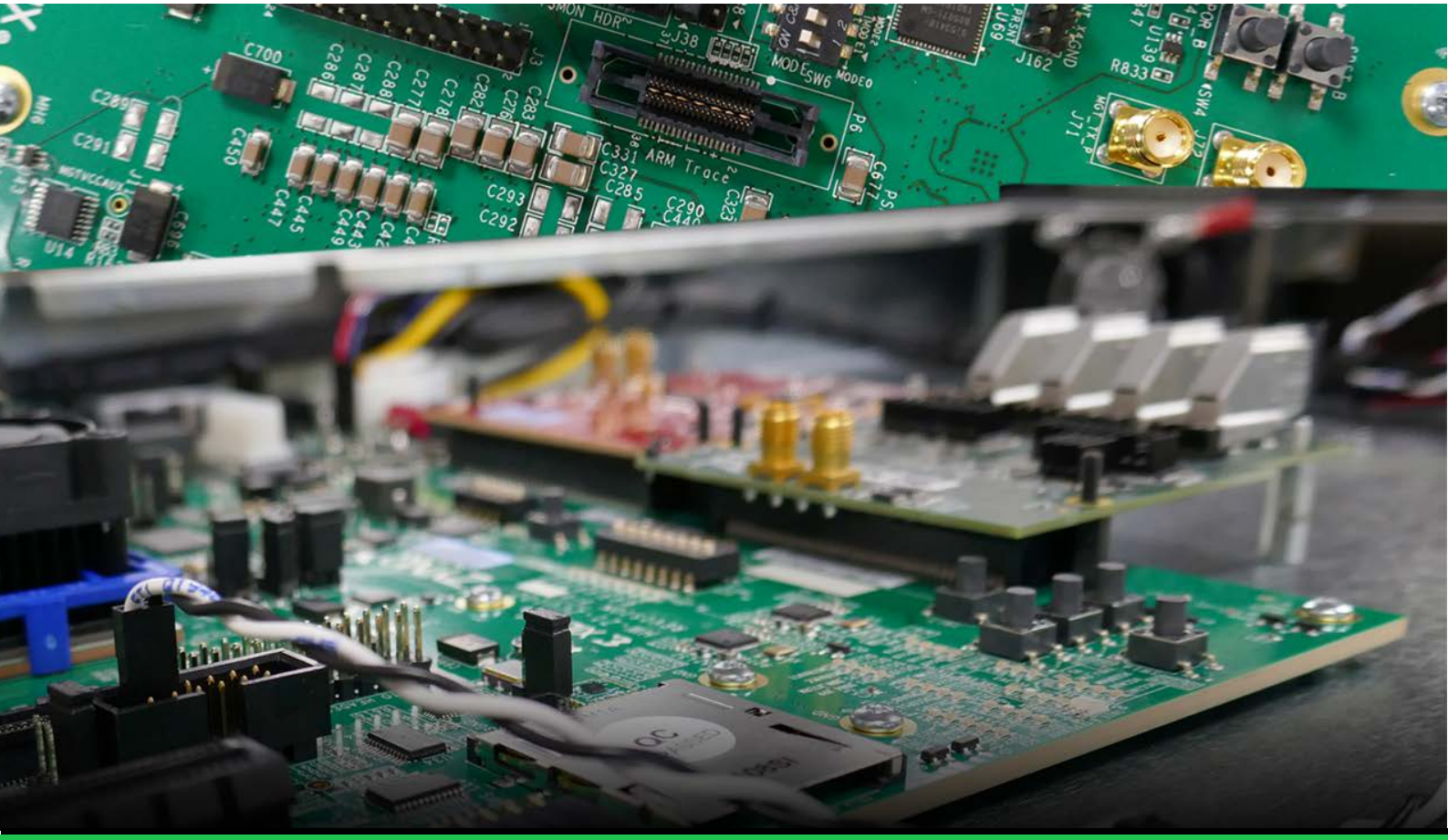
Delta Media Server

NVIDIA Display Setup

Technical Guide



NVIDIA Display Setup : Technical Guide

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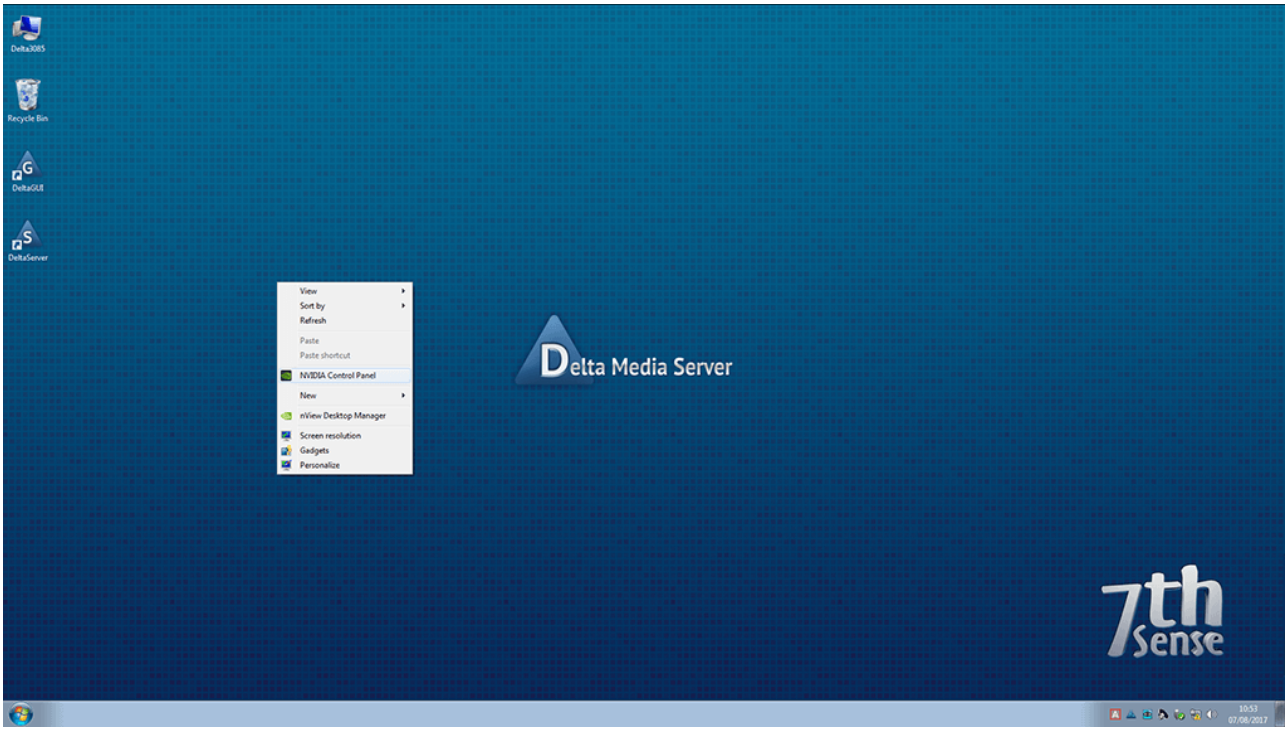
Emulating and Grouping Displays with NVIDIA

Please note that this document demonstrates how to emulate and group displays using NVIDIA Driver 368.86 as an example. For each graphics driver, location of functionality may vary so please see manufacturers guidance if you cannot find emulation and grouping options.

Note that the sequence: Emulate > Group > Sync should be followed.

NVIDIA Control Panel

Right click the Desktop, and left-click NVIDIA Control Panel:



EDID Emulation (Spoofing)

EDID (**E**xtended **D**isplay **I**dentification **D**ata):

- is a protocol to allow communication between a device (graphics card) and its connected displays (monitors)
- records display information to the GPU so that it doesn't have to repeatedly communicate with displays when drawing to them
- maintains the required arrangement on working displays if one (or more) display fails:

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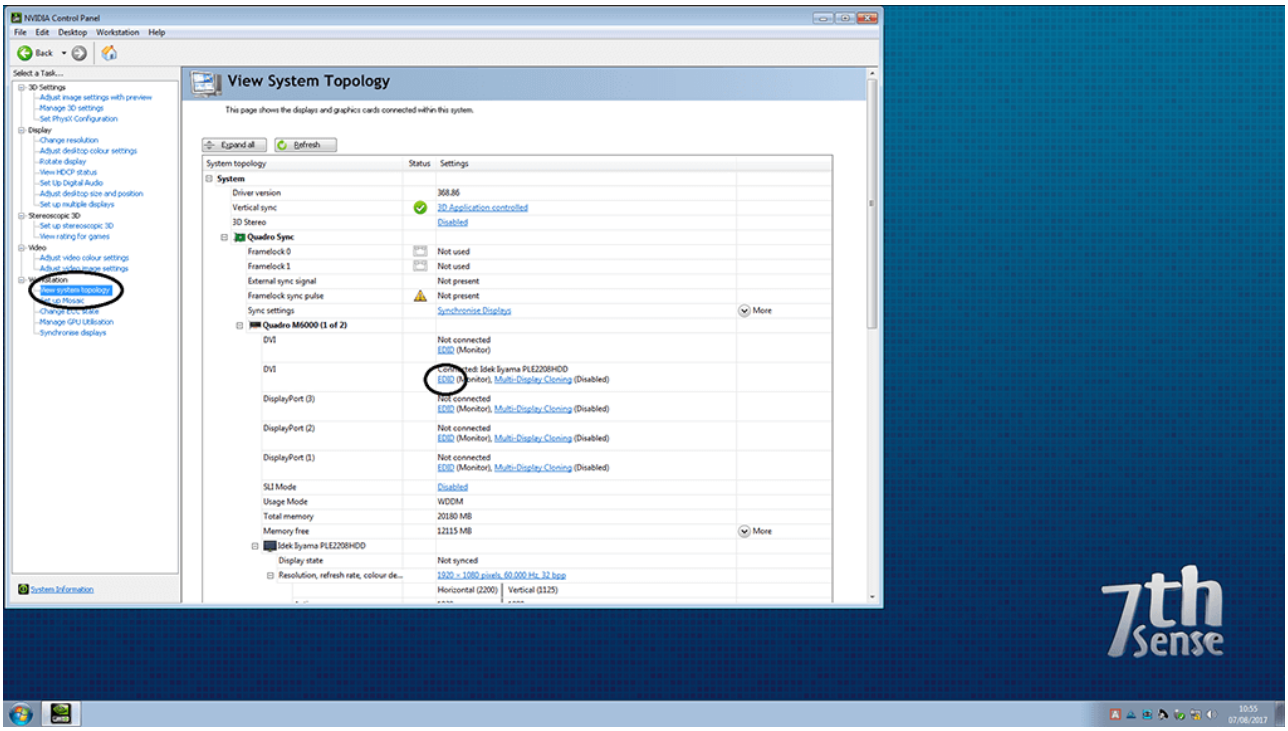
- If the displays are not spoofed, and connection between server and a display is broken, then the display arrangement reverts to single display mode, causing media distortion across the working displays, or black output across multiple displays.
- When spoofed, working displays maintain the output as if the broken connection (missing display) was still working, minimising disruption to the main output.

Note: it is advisable to keep a note of the relevant IP address of the server so that you can still VNC into the server if you happen to lose visuals – which can happen if an incorrect EDID is applied, such as a resolution forced that was unsupported by the connected display.

In the NVIDIA Control Panel go to *Workstation* > *View System Topology*:



Note: NVIDIA SDI Systems

These require Port 1 to be EDID-spoofed to 7thSense standard 1366 × 768@59.94 EDID to ensure performance during Delta playback. Without an EDID the driver does not load.

Begin EDID Emulation

Click *View System Topology* and then click EDID on the first output. NVIDIA cards tend to have 5 output connectors, 4 × DP + 1 × DVI ports on them; be wary not to spoof the wrong output, or more than are required. Notice the connector type mentioned for each output above. Please be advised that when spoofing outputs, **it is important that all necessary outputs are connected to the displays**,

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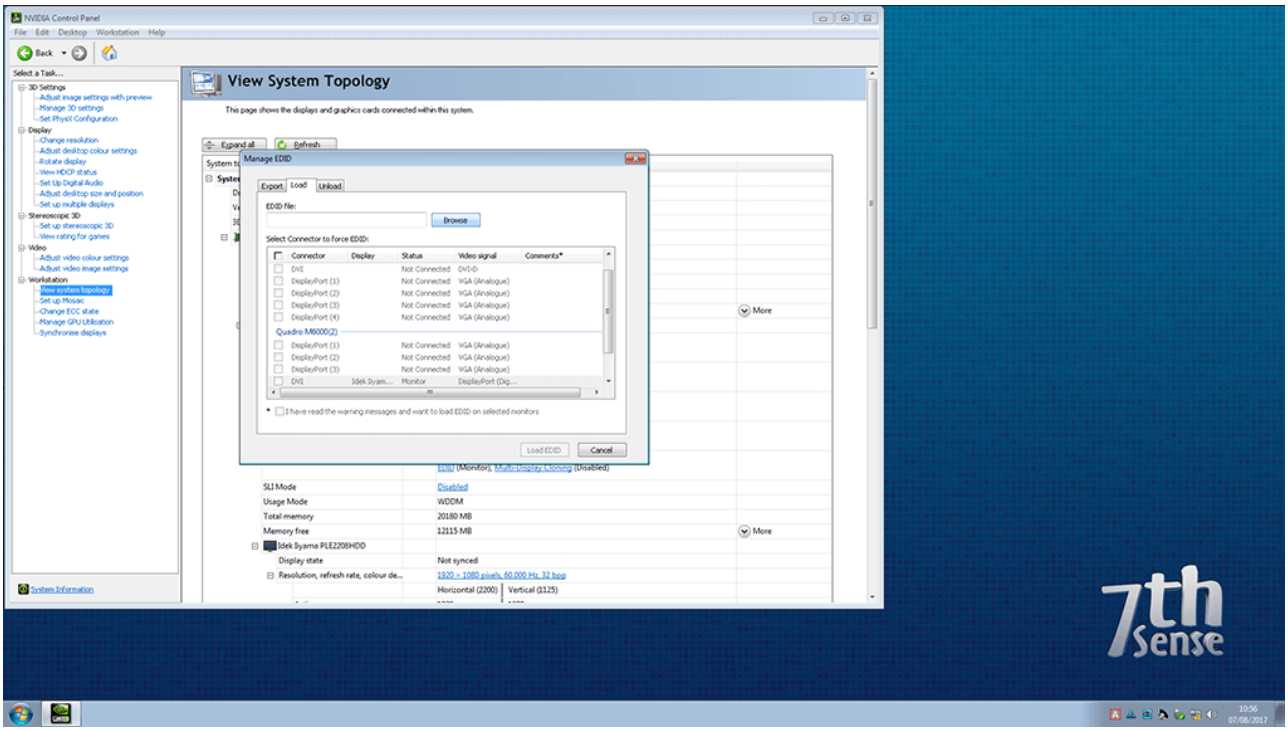
and that the adapter types are the same for all. It is not possible to spoof outputs with mixed resolutions or mixed adapter types.



This will then open the **Manage EDID** window. Ideally when spoofing EDIDs, you want to use the native display EDID file. 7thSense do provide a wide library of common EDID files on the server, though these should be used only If necessary.

As mentioned previously, ideally, we should spoof the outputs with the native EDID from the connected display. To do this, select / tick one of the outputs which currently has the appropriate an active display attached, then click the Export tab and save the file to an accessible location on the server. You should now be able to 'Load' this saved EDID into the wizard, and apply it to all the necessary GPU outputs. Again, be sure that all adapter types are correct before applying the EDID.

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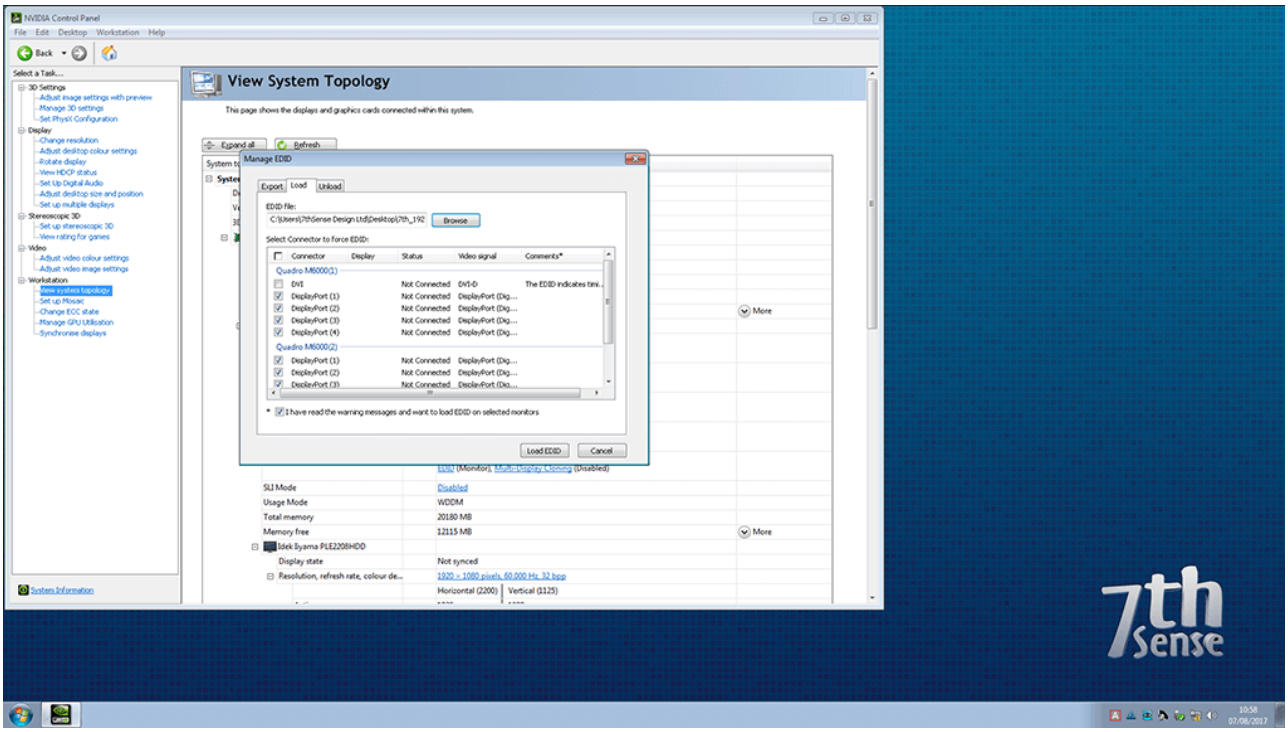

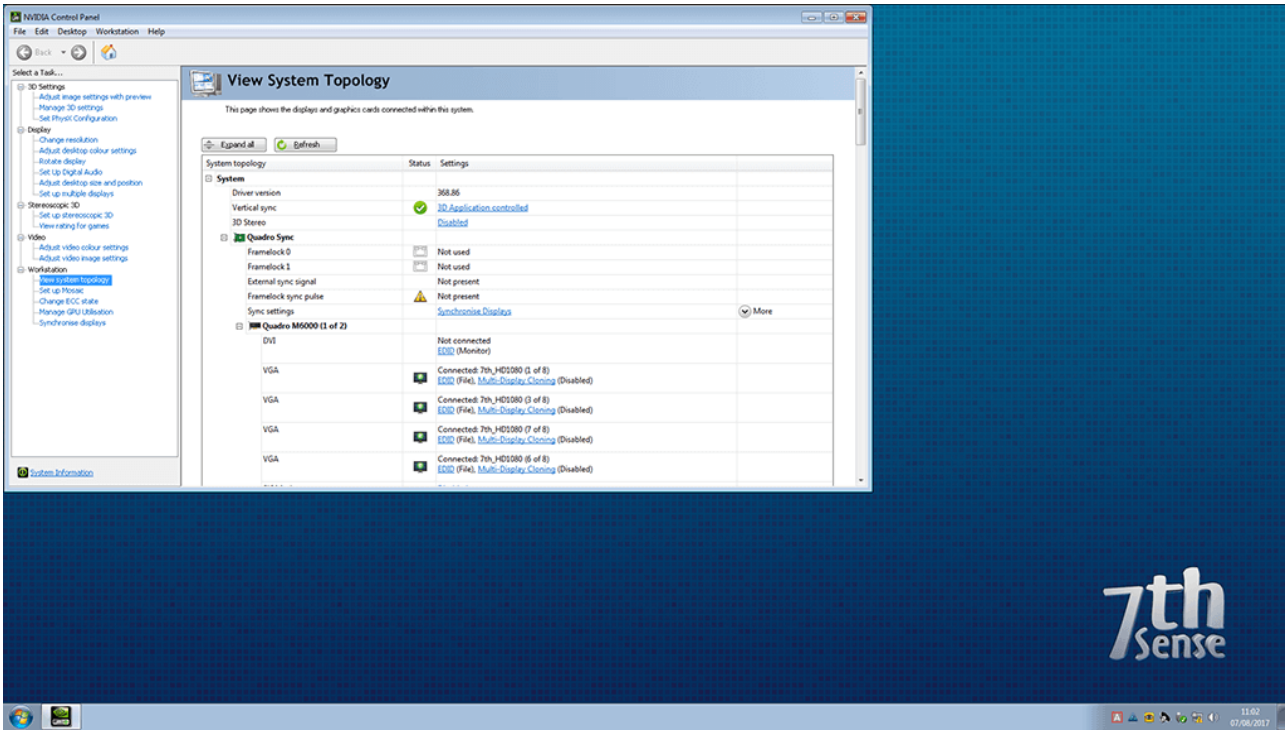

Once the EDID is applied, the outputs will flicker for anywhere up to 1 minute or so while it's being applied. When finished, all outputs will now show as: **Connected: (Name of EDID)**.

Finally open the 'Change Resolution' tab, and ensure that all connected displays are displaying at the correct resolution, refresh rate and bit depth – then hit apply. *It is important to do this before beginning the grouping process*.

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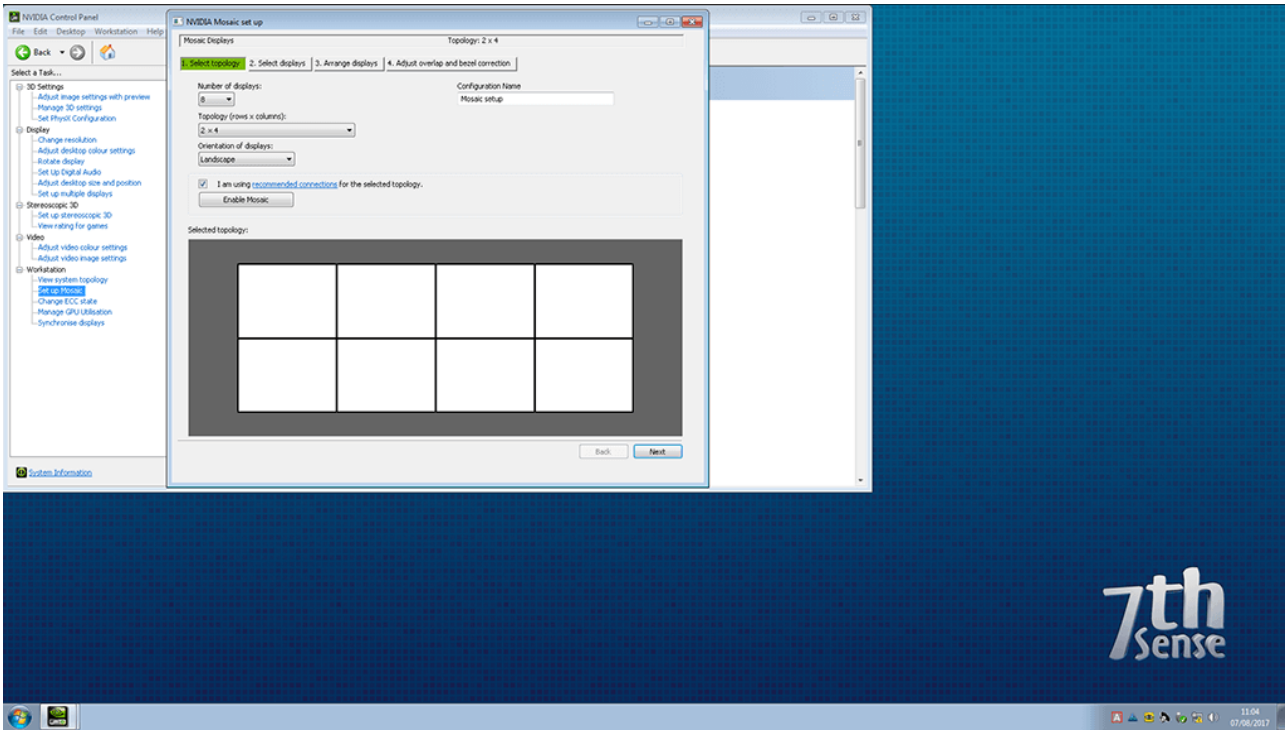
Setting up a Mosaic (Grouping)

When media is to be displayed over more than one display, the display outputs need to be Grouped: this is achieved in NVIDIA by creating a 'Mosaic'.

Multiple GPUs: unlike AMD, NVIDIA regards multiple GPUs in a server as a single system, enabling flexible grouping and layout of all available outputs together.

For example, a widescreen display with 3 projectors (left, centre, right channels) would use a 3 × 1 group, whilst a group of 8 monitors (as in this example) may use a 2 × 4 group. An NVIDIA 'matrix' is designated as rows × columns (the opposite of AMD systems, which would call the arrangement below 4 × 2).



Along the left-hand side, select *Set up Mosaic*. Select the number of outputs you wish to use, and then the arrangement you need. Click the tick box 'I am using recommended connections for the selected topology' and then click Next.

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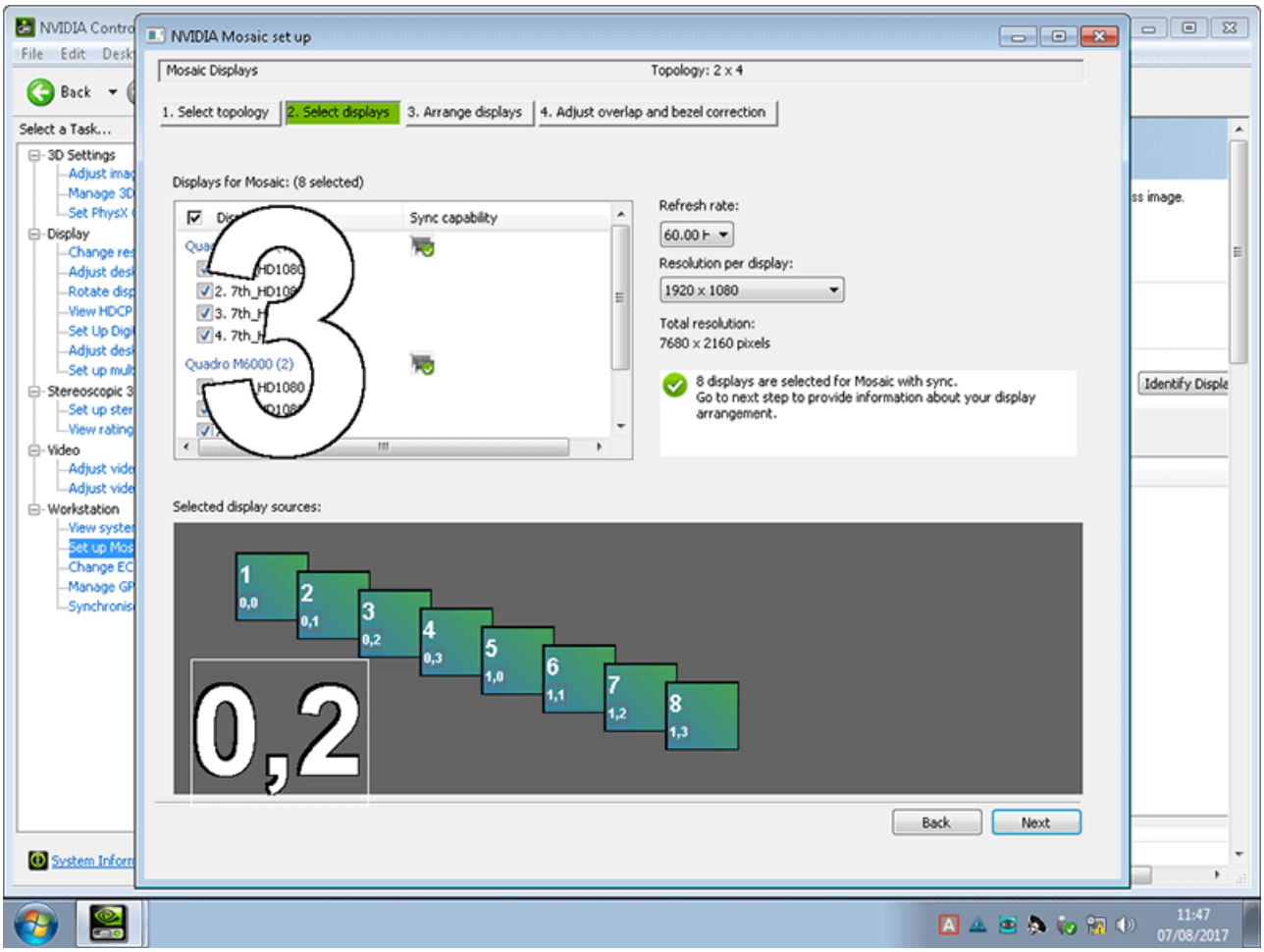

In the next stage, you can re check that the desired Refresh rate and Resolution will be set for each display. Each connected display will show with a number in the foreground for reference.

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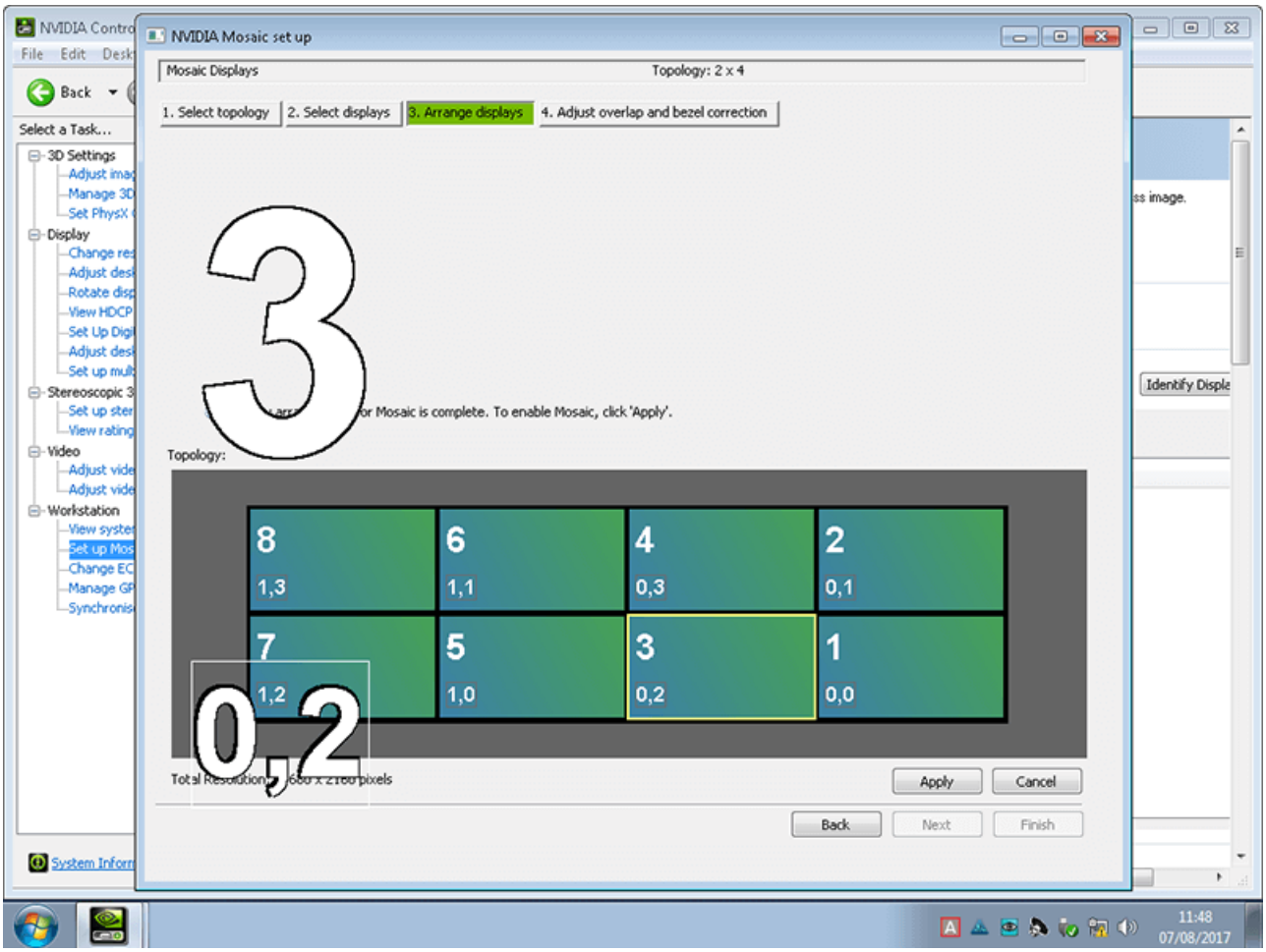
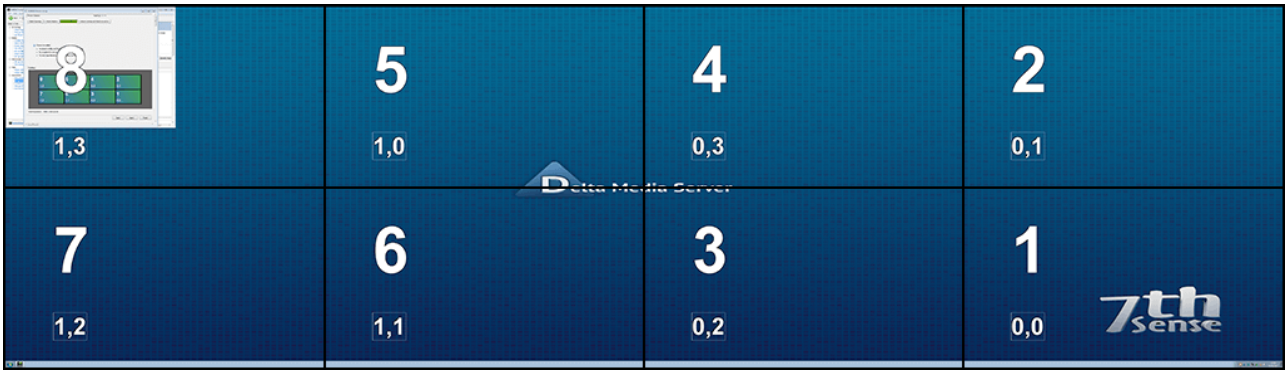


You will then need to drag the corresponding screen number on the top to the arrangement below to make sure the outputs are in the correct displayed order.

Then click Apply:



The outputs will then flash for up to 1 minute while the Mosaic is set up. When this is complete, double check all outputs are in the correct place. Once complete, click Finish. If bezel compensation if offered ignore it, it is advised that this is corrected for in the Delta canvas, rather than in the graphics driver. Once mosaic is complete, please restart the Delta server.

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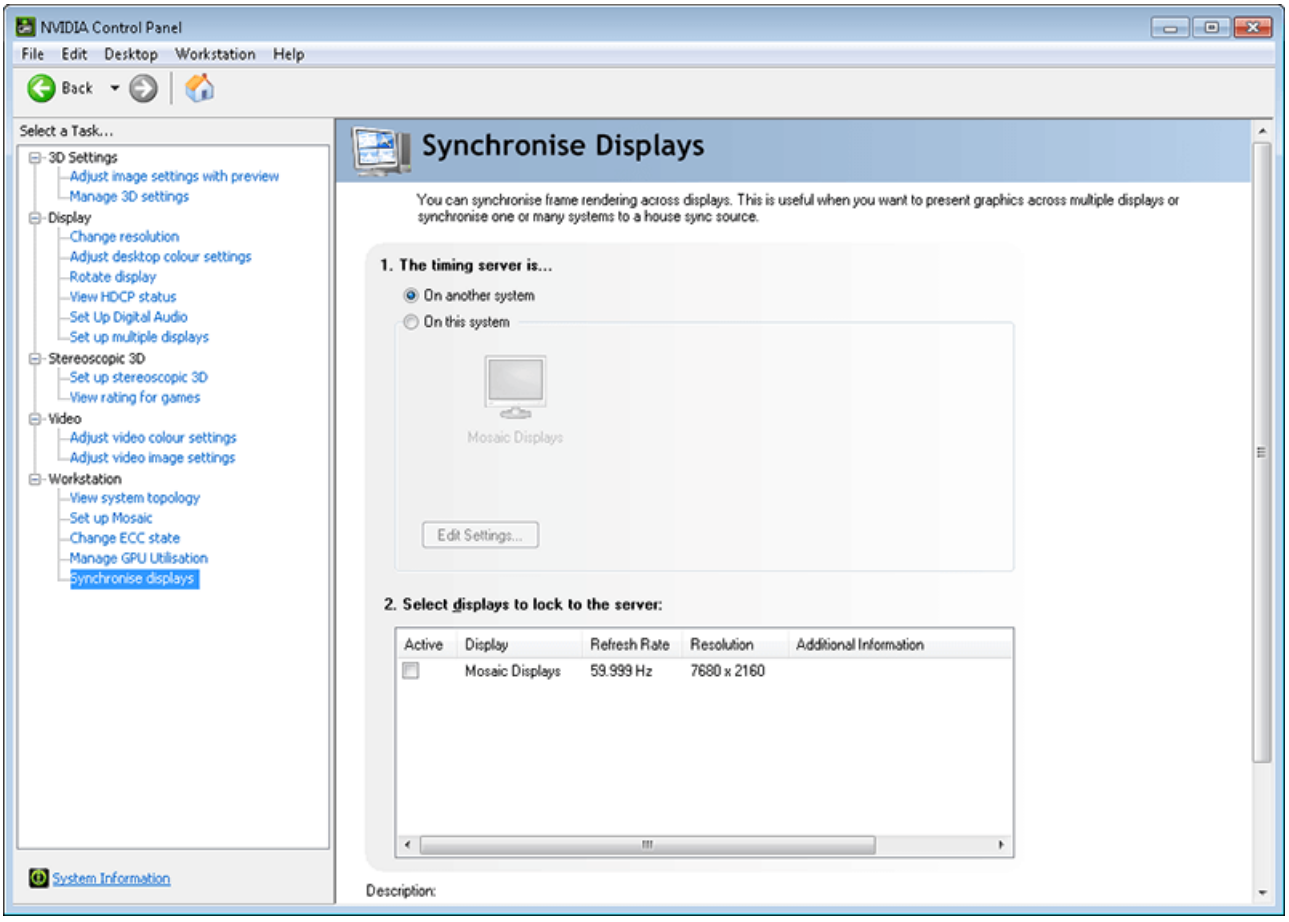
Synchronization (Genlocking)

Synchronization between GPUs, and/or with an external signal source (genlocking) requires installation of an NVIDIA® Quadro® Sync II card in each Delta Media Server. This can be linked to a central house sync/reference generator.

Genlocking your system ensures that all output/displays play at precisely the same rate to prevent media tearing. 7thSense recommend using House Sync genlocking via the BNC reference port, rather than the framelocking method using the RJ45 ports. This procedure will synchronise your server(s) to a house sync source when using NVIDIA GPUs.

Open up the NVIDIA Control Panel, and select Synchronise Displays along the left hand side:



Timing Server

This is the reference that enables the NVIDIA framelock. The GPU on one server *can* takes its reference from another NVIDIA GPU on another server as a timing master, so this timing should never be used on a single server system. This can be done via RJ45, or by utilising 'The server refresh rate' with 'BNC output enabled' as signal from the master system.

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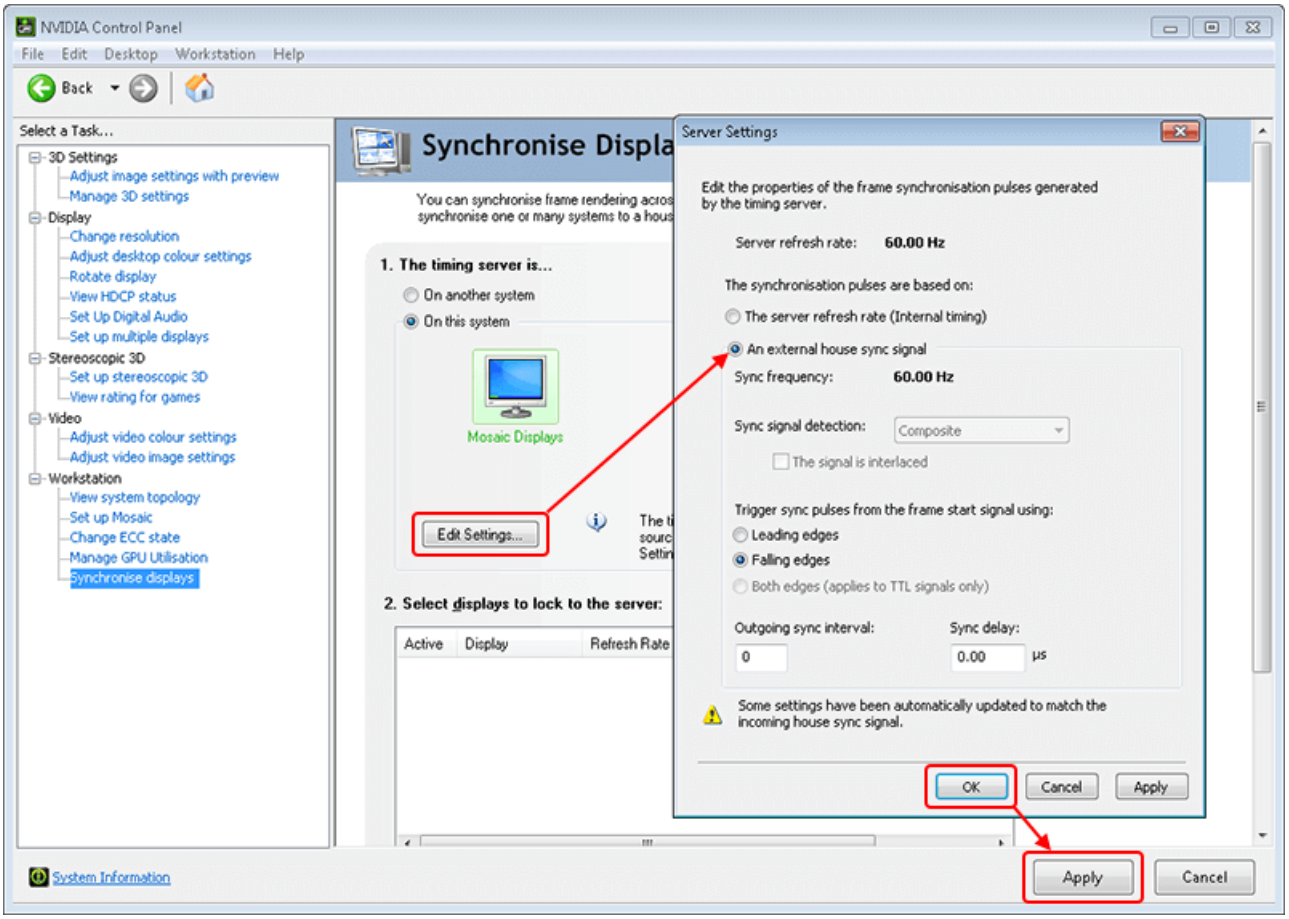
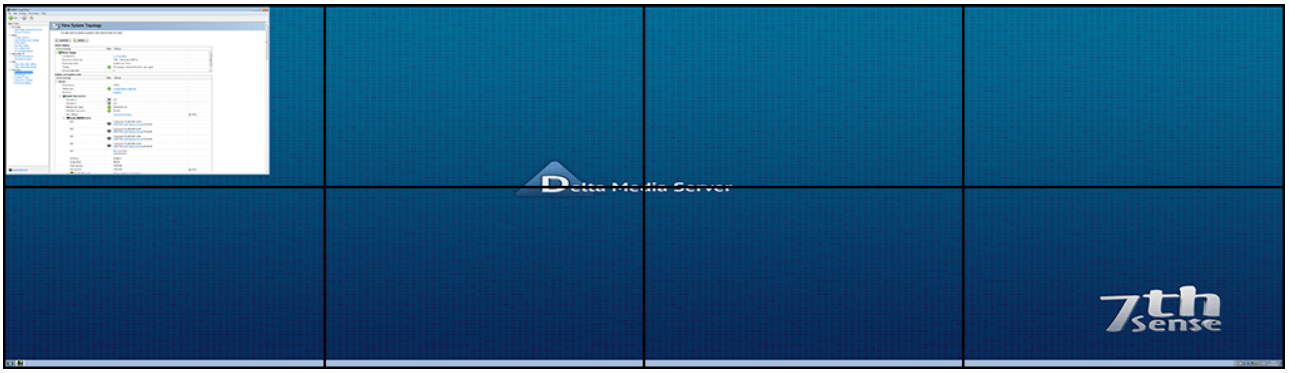
Normally we are using an external house sync, so select ‘On this system’ and then click *Edit Settings*.

Select ‘An external house sync signal’, ensuring that your house sync matches the frequency of the EDID that has been applied to each output, otherwise it will not synchronise.



Then click OK and Apply:



All outputs will then flash repeatedly for up to a minute while the synchronisation is completed.

Note: any Nvidia system locked to an external sync must state that the **framelock sync pulse** is ‘present’ and show a green tick before system testing, otherwise it will drop frames:

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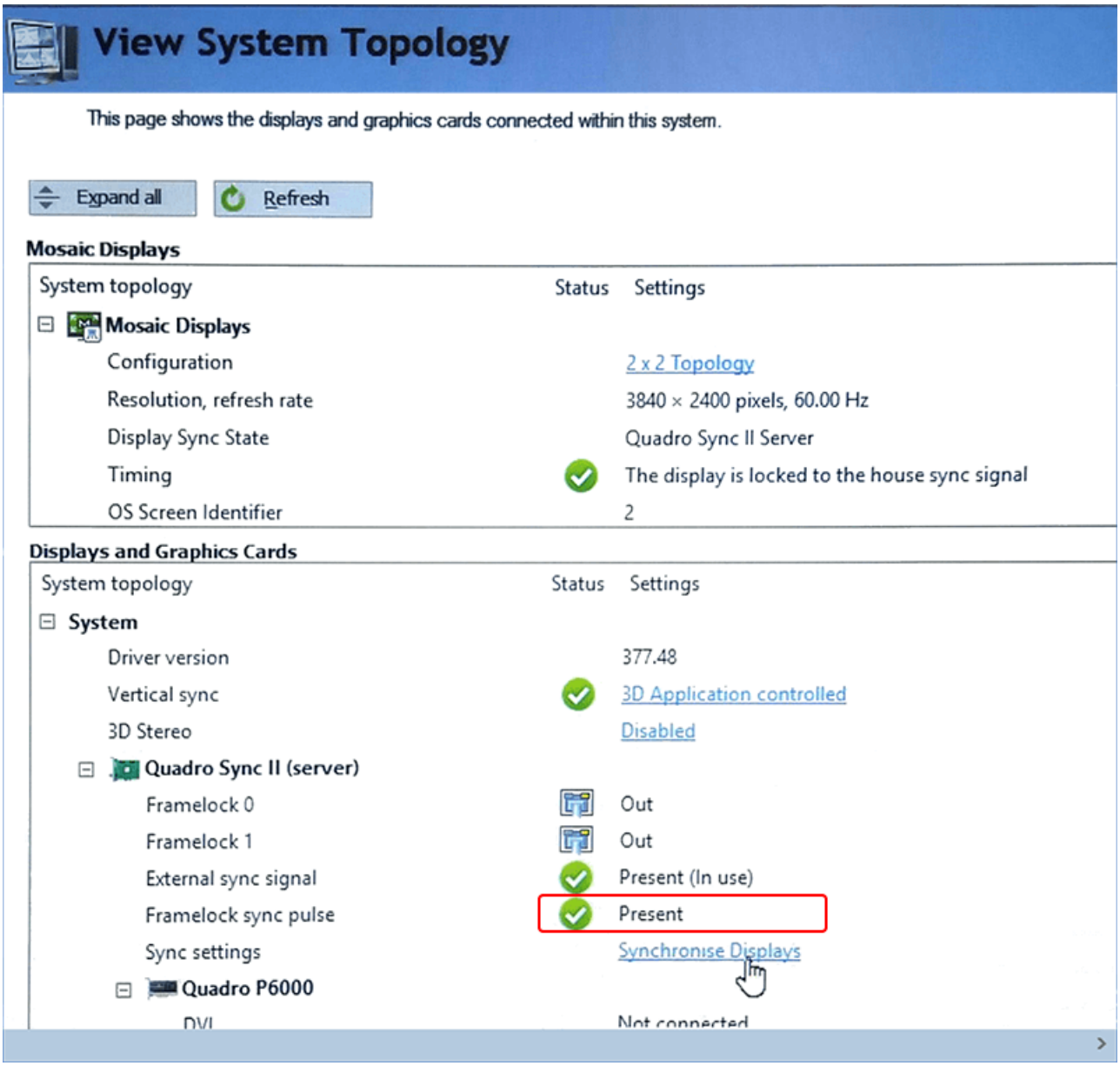

This same ‘framelock sync pulse’ confirmaton should have a green tick when using ‘on this system’ > ‘the server refresh rate (internal timing)’ too. If no external sync is available, this is how the system should be configured.

Finally restart the server to ensure all changes apply, and hold completely. The green tick(s) may not appear until after rebooting the system.

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Reconfiguring NIVIDIA displays

Sometimes there is a need to reconfigure your NVIDIA displays, so here is a straightforward guide to the procedure, covering multiple servers. At various points if you need assistance contact 7thSense support.

Using UltraVNC from a control PC, access each server remotely and open the NVIDIA Control Panel (as here [4]).

- Terminate **DeltaServer.exe** and **DeltaMonitor.exe** processes.
  Ensure that they remain closed during any changes to NVIDIA control panel (keep an eye on them after reboots, because they will try to start again on Windows boot).
- Physically disconnect house sync from all servers.
- Disable any enabled Mosaic, on each server, using 'Setup Mosaic' and then Disable.

In the System Topology menu of NVIDIA Control Panel, on each server:

- Click 'EDID' text available in the information of any given display, go to **Unload**, check all checkable outputs, and 'Unload EDID'.
- Now physically disconnect all display and adapter connections from all servers.
- If you are using adapters, at this time pick *one* adapter and connect it to its cable (leave all adapter+cable assemblies physically disconnected from the graphics card).
- Pick one server, which we shall treat here as the master setup box, and physically connect one adapter+cable assembly to the top DisplayPort output of the graphics card closest to the system power supply. We will call this 'Card 1 Output 1'.
- Reboot all servers at this point (you should only have 1 display connected to each of them at this point).
- After reboot, how many displays are now indicated as 'Connected (Name of Display)' on the 'master setup box'? This should be 1. If not, something is wrong, please seek further technical help. It is a good idea to also note the *Name of Display* indicated here.

Now in the 'Change Resolution' page of NVIDIA Control Panel on this 'master setup' box:

- Observe what resolution/refresh/color sampling options are being revealed by the received EDID. Pick any one of the available displays near the top of the Change Resolution menu (only 1 option will be available if you only have a single output connected to that server). If multiple options are available, take note of the 'X of X' indication of that display so that you can reference it later as necessary.
- Select the correct settings that you want to use for your system permanently and apply.
  Most commonly, you want to select the native resolution of your display, and the refresh applied should generally match the framerate of the media you will play in Delta. (*Example:* if your media

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is produced to play at 30 fps, then your desktop graphics refresh rate could be 30 Hz). If for any reason, the settings you need are not present, then this needs to be addressed now. Don't bother going any further until this is addressed. Please describe the issue and the 7thSense support team will try to help.

- After applying the resolution/refresh/color sampling settings you believe to be correct. You might choose to take a screenshot that shows the menu fields:
  - 'Connector' type (in example: 'HDMI - HDTV')
  - 'Resolution' selected in the list (in example: 4K × 2K, 3840 × 2160).
    Does this item fall in the resolution list under the heading 'Ultra HD, HD, SD', or 'PC', 'Custom', or 'Mosaic'? If this can't be seen in the screenshot due to length of their resolution list, just note what is is (as in example: UltraHD, HD, SD).
- Refresh rate (in example: 30 Hz)
- Output Colour Depth, format, dynamic range method (in example: 8 bpc, RGB, Limited).
- You will be able to tell if those settings have been applied because an 'Apply' button will appear if they have not yet.
- **Reboot now** (after you have successfully applied the settings you like, and confirmed that the image to your display looks correct).
- Check that settings have stuck, and that display still looks good, following reboot.

In the 'System Topology' menu:

- Click 'EDID' text available in the information of any given display, go to EXPORT, click on the connected head, and 'Export EDID'. Save the EDID (a .txt file) to C:\7thSense Data (because it can be easily accessed from here over the network from the other server.) Name it something logical that you will recognize later, such as 'EDID_Display Name_Date.txt'.
- Go to *Load* > *EDID File* > *Browse* and navigate to C:\7thSense Data and choose the EDID file you just exported.
- Now check the display box indicating 'Monitor' as Status (as opposed to 'Not Connected') and 'Load EDID'. After accepting the success popup, you should now see 'File' indicated as that display's status, instead of 'Monitor'.
- Close EDID Manager.
- Next, one output at a time (very important), physically move that adapter+cable assembly down to the next physical DisplayPort connector *on that graphics card*, and follow the same load steps, loading that same master EDID .txt file.
- Follow the same physical move-then-load procedure for all outputs of all GPUs that you will utilise on each server (copy the EDID .txt via the network at \\IP address\7thSense Data when you move on to other servers.

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It is recommended to load all GPUs evenly.

In other words, if you need 5 heads and you want to spread it over 2 GPUs, emulate 3 outputs to each GPU even though you only need (3+2). If your channel/mapping licence in DeltaServer supports the feasibility, consider just emulating all outputs of all GPUs on all boxes for organisational ease, even if you are not utilising all outputs.

Reboot now.

Double-check that you have all connections you desire indicated 'File' type EDID, whether physically connected or not. You can now physically connect as many heads to those prepared outputs as you like. If you see any additional QTY of outputs appear upon doing this, then something is wrong. Please take a screenshot of what you see and refer to 7thSense support.

Now in the 'Setup Mosaic' on each server:

- 'Create new Configuration'
- Choose the correct 'Number of Displays'. This will be the total QTY of outputs that you have prepared on that system (all GPUs sum).
- Choose a Topology layout that you prefer (all-in-a-row is most common. For example, 1 × 2 is 1 row of 2 displays.
- Click Next.
- Choose the correct 'Resolution per display' and 'Refresh'. If the options you need don't exist, then something is wrong from earlier in the EDID prep process. Describe the issue and 7thSense support will help resolve the issue.
- Click Next.
- Starting with ID '0,0' and going through '0,1','0,2','0,3' (all outputs on the first GPU) and then on to '1,0','1,1','1,2','1,3' (all outputs on the next GPU) and so on, drag and drop displays from 'Available Display Sources' onto the Topology layout in reading order (left-to-right, then top-to-bottom) and click 'APPLY'.
- Your desktop should go through some changes at this point. Keep a close eye, because at the end you may be presented with an 'Accept changes?' dialog, and if you miss it then your settings may revert, and you'll have to do the process again.

  If you are working via VNC, sometimes the access will become unavailable when the desktop layout changes, in which case you may want very quickly to disconnect and reconnect VNC to regain access (before the revert timer is up!). You can always just connect a keyboard and mouse if VNC is being too difficult.
- 'Finish'.

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Reboot now.

In ‘Change Resolution’ menu on each server:

- You should now only see ‘Mosaic’ type resolutions in the resolution list. Make sure the *total grouped resolution* you expect is applied.
- Check Refresh and Color sampling settings as well. If anything is not correct, set it.
- If you had to change anything, reboot now.

Now physically connect house sync to the BNC house sync input in each server.

In ‘View System Topology’:

- Look for any ‘Quadro Sync II’ indication. Observe the status of ‘External Sync Signal’. If it says not present, then your house sync has not been detected and you should investigate. Ensure that the house sync format that you connect matches the refresh rate of your display outputs (for example, 720p60 or 1080i60 tri-level house sync would be good if your displays are 60 Hz refresh). Do not bother going any further, if an appropriate sync format is not connected and detected on all servers at this point. Address the issue first, then *Sync Settings* > *Synchronise Displays*.
- At **The Timing Server Is...** ‘On this system’ > ‘Edit Settings’ > select ‘An external house sync signal’. You should see that the ‘Sync Frequency’ exactly matches your display output refresh here. If it does, click ’APPLY’ leaving other settings as default. If it does not, then do not apply, Cancel, and address the issue before going any further.
- In ‘View System topology’, you should now see External Sync Signal ‘Present (In Use)’ and Framelock sync pulse ‘Present’, on the Quadro Sync II status of each server. On each active output, you should also see Timing: ‘This display is locked to the house sync signal’. All of those statuses will show a green check mark.
- Reboot all servers. Make sure the system comes back up indicating exact same status once again. If it does not, please describe the issue to 7thSense support for assistance.
- Confirm that your display output looks correct. If it does, you are ready for DeltaServer. If it does not, describe the issue to 7thSense support.

Output status reports can be useful, and may be requested in case of further support:

- Open an administrative command prompt, run ‘sync_config.exe status’ and screenshot or copy-paste so a full output can be submitted.
- Open an administrative command prompt, run ‘nvtimingdiag.exe’ and screenshot or copy-paste so a full output can be submitted.

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Document Information

Date	Document edition	Software version	Revision Details	Author/Editor
August 2017	1	Delta: N/A NVIDIA 368.86	New release	Andrew Kennedy
July 2018	2	Delta: N/A NVIDIA 377.48	Clarification of framelock reference setting.	David Croney
June 2019	3	Win 10 LTSB Delta: N/A NVIDIA 377.48	Addition of DDU uninstall method	Andie Davidson

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