

# Delta Media Server Display Configuration

User Guide





#### **Trademark Information**

The 7thsense logo, and various hardware and software product names are trademarks of 7thSense Design Ltd. Product or company names that may be mentioned in 7thSense publications are tradenames or trademarks of their respective owners, and such trademarks may also be registered in their respective countries. Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

#### **Copyright Information**

All Rights Reserved. This document is copyrighted © by 7thSense Design Ltd and shall not be reproduced or copied without express written authorisation from 7thSense Design Ltd.

The information in this document is subject to change without notice. 7thSense Design Ltd assumes no responsibility for errors, and/or omissions contained in this information.

Printed: March 2023

This edition is for software version N/A Document ref.: MC264-8

E: info@7thsense.one W: 7thsense.one

7thSense Design Ltd

2 The Courtyard, Shoreham Road Upper Beeding Steyning West Sussex BN44 3TN UK

T: +44 (0) 1903 812299

7thSense Design LLC 4207 Vineland Rd Suite M1 Orlando, FL 32811 USA

T: +1 407 505 5200

Emulating, Grouping, Synchronising Displays	5
Emulating, Grouping and Syncing AMD Displays	7
AMD FirePro (Win 7)	8
AMD Radeon Pro 18.Q2.1	38
AMD Radeon Pro 21.Q1.2	54
Pico AMD Radeon	68
Emulating and Grouping Displays with NVIDIA	73
EDID Emulation (Spoofing)	73
Setting up a Mosaic (Grouping)	77
Synchronization (Genlocking)	80
Reconfiguring NIVIDIA displays	82
Emulating and Grouping Matrox C680 Displays	87
Video Walls	93
Video Walls: Bezel Compensation	95
Portrait-Grouped Video Walls	97
Multi-channel Video Walls	107
Non-rectangular video walls	112
Mixed-Pitch LED Displays	115
Datapath Fx4 Display Controller	119
Conceptual Overview	120
Connections	122
Wall Designer: Monitors	123
Wall Designer: Inputs	125
Wall Designer: Devices	128
Wall Designer: Status	130
Projection Alignment	133
Working in 10-bit Colour Depth	135
Standard Display Resolutions	139
Document Information	141
Index	143

Please note that this document demonstrates how to emulate EDIDs (spoof), group and synchronise (genlock) displays using AMD FirePro and Radeon Pro GPUs, and for NVIDIA GPUs. For each graphics driver, location of functionality may vary so please see manufacturers guidance if you cannot find emulation and grouping options.

#### Important for Reliable and Predictable Performance

All utilized desktop-based outputs must be configured as a single  $\underline{\text{Mosaic Group}}^{(7)}$  (NVIDIA), or as a single  $\underline{\text{FirePro Eyefinity Group}}^{(9)}$  (AMD), or <u>Radeon Pro Display Group</u> (4) (AMD) per graphics card.

All outputs from a single server must be configured to the same video format and refresh rate. See Delta User Guide <u>Movie Formats</u> and <u>Timing Configuration</u>.

- Emulating, Grouping and Syncing AMD Displays
- Emulating and Grouping Displays with NVIDIA<sup>3</sup>

# **Emulating, Grouping and Syncing AMD Displays**

This guide covers AMD FirePro and Radeon Pro GPUs, for Windows 7 and Windows 10. It covers requirements for even numbers of graphics outputs in rectangular arrangements, within the maximum available pixel width of 16384 px.

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

EDID (Extended Display Identification Data):

- 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:
  - If the display EDIDs are not emulated ('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 EDID-emulated, 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.

# AMD FirePro (Win 7)

**For FirePro W5100 / W7100 / W9100 under Windows 7, using AMD driver 15.[n].** The location of settings may vary between AMD graphics drivers, so please see manufacturers guidance if you cannot find emulation and grouping options.



Alternatively, you can emulate, group and Genlock your system through the web interface (see the <u>Stack Control</u> User Guide).

- FirePro Advanced Settings<sup>®</sup>
- FirePro EDID Emulation (Spoofing)<sup>9</sup>
- Dual GPU EDID Emulation<sup>15</sup>
- FirePro Evefinity Grouping<sup>(19)</sup>
- Dual GPU Grouping<sup>26</sup>
- FirePro Synchronization (Genlocking)<sup>34</sup>

## **FirePro Advanced Settings**

Right click the Desktop, and left-click AMD FirePro Advanced Settings:



# FirePro EDID Emulation (Spoofing)

Right click on the desktop to gain access to the AMD FirePro Advanced Settings, and Click AMD *FirePro > EDID Emulation > Accept* to continue. In the example here, one GPU (AMD FirePro W9100) has been identified:

	FirePro Advanced Settings	×
> Presets 🧭	EDID Emulation	?
<ul> <li>✓ AMD FirePro™</li> <li>AMD FirePro™ Settings</li> <li>Synchronization</li> <li>Error-Correcting Code (ECC)</li> <li>SDI/DirectGMA</li> </ul>	Manage EDID emulation for display connections. Configuration outside of official AMD specifications is not covered under AMD product warranty.	*
EDID Emulation	Force EDID Emulation     Refresh	
Desktop Color My Digital Flat- Panels Properties (Digital Flat- Panel) Display Color (Digital Flat-Panel) HDTV Support (Digital Flat-Panel) Custom Resolutions (Digital Flat-Panel)	AMD FirePro W9100 1	m
✓ Audio Oevice	EDID Emulation Options:	
	Remove Manage branch Manage EDID	•
	Defaults     Discard     Apply	

> See here (15) for dual GPU installations.

## **Begin EDID Emulation**

Click on the + icon on the left-hand side of the GPU. This will bring up a drop-down menu to show how many ports are available on the GPU. Click to expand 'Display Connections':

	⊖ × FirePro Advanced Settings Preferences
> Presets 🧔	EDID Emulation ?
<ul> <li>&gt; AMD FirePro™</li> <li>AMD FirePro™ Settings</li> <li>Synchronization</li> <li>Error-Correcting Code (ECC)</li> <li>SDI/DirectGMA</li> <li>EDID Emulation</li> <li>&gt; Desktop</li> <li>Desktop Color</li> <li>&gt; My Digital Flat- Panels</li> <li>Properties (Digital Flat- Panel)</li> <li>Display Color (Digital Flat-Panel)</li> <li>HDTV Support (Digital Flat-Panel)</li> <li>Custom Resolutions (Digital Flat-Panel)</li> <li>Custom Resolutions (Digital Flat-Panel)</li> <li>&lt; Audio</li> <li>Default Audio Device</li> </ul>	Manage EDID emulation for display connections.         Image EDID emulation outside of official AMD specifications is not covered under AMD product warranty.         Image EDID Emulation         Refresh         Select display connections to configure:         Image AMD FirePro W9100 1         Image Scard Display Connectors         Image Connection 1 - Mini DisplayPort (Connected : PLE2208HDD)         Image Connection 2 - Mini DisplayPort (Connected : PLE2208HDD)
	Connection 4 - Mini DisplayPort (Connected : PLE2208HDD)   Connection 5 - Mini DisplayPort (Connected : PLE2208HDD)   Connection 6 - Mini DisplayPort (Connected : PLE2208HDD)

On this GPU, there are 6 available ports, showing what type of connections there are. In this instance, the GPU supports Mini DisplayPort

**Note**: Earlier versions of AMD may not have EDID Emulation as an option – you can emulate with DeltaMonitor through the Stack web interface if you can't find the option in the Control Center (see the <u>Stack Control</u> User Guide).

## Manage EDID emulation for display connections

To apply EDID emulation to any connection, check its left-side box. Moving over a connection will reveal three icons on the right-hand side:

	FirePro Advanced Settings
> Presets 🧭	EDID Emulation ?
<ul> <li>✓ AMD FirePro™ (€)</li> <li>AMD FirePro™ Settings</li> <li>Synchronization</li> <li>Error-Correcting Code (ECC)</li> <li>SDI/DirectGMA</li> </ul>	Manage EDID emulation for display connections. Configuration outside of official AMD specifications is not covered under AMD product warranty.
EDID Emulation	Force EDID Emulation Refresh
Desktop Color	Select display connections to configure:
Vy Digital Flat-	AMD FirePro W9100 1
Properties (Digital Flat- Panel) Display Color (Digital Flat-Panel) HDTV Support (Digital Flat-Panel) Custom Resolutions (Digital Flat-Panel) ✓ Audio Default Audio Device	<ul> <li>&gt; Graphics Card Display Connectors</li> <li> <ul> <li>Display Connections</li> <li>Connection 1 - Mini DisplayPort (Connected : PLE2208HDD)</li> <li>Connection 2 - Mini DisplayPort (Connected : PLE2208HDD)</li> <li>Connection 3 - Mini DisplayPort (Connected : PLE2208HDD)</li> <li>Connection 4 - Mini DisplayPort (Connected : PLE2208HDD)</li> <li>Connection 5 - Mini DisplayPort (Connected : PLE2208HDD)</li> <li>Connection 6 - Mini DisplayPort (Connected : PLE2208HDD)</li> </ul> </li> </ul>
	Remove Manage branch Manage EDID
	Defaults Discard Apply

- The Magnifier shows raw information about the current EDID.
- The page icon downloads the current EDID, in this case, the PLE2208HDD EDID from the connected monitor.
- The large + will add an EDID to connections with a ticked check box. This will open a dialog:

EDID Em	nulation
EDID emula confi <u>c</u> Any e	emulation may affect any existing AMD Eyefinity configurations that include ted displays. To minimize this impact, configure EDID emulation before juring AMD Eyefinity. xisting EDID emulation settings for the selected connections will be lost.
Apply EDID em	ulation to these connections:
🗄 AMD Fire	Pro W9100 1
Select EDID:	
🔘 From Displa	ay:
PLE2208HD	D( AMD FirePro W9100 1 Port 1 - Mini DisplayPort) -
From File: C:\Program	Files\7thSense\Delta\Utilities\EDID Files\7th
View	Raw EDID
Connection Pro	operties:
Emulation	Emulate always
Connection	DisplayPort (Active Adapter)
Lanes	2
Bit Rate	2.7 GHz
Bandwidth	2.7 GHz
Color Depth	8 bit
3D Caps	None
	Discard Apply

#### In the Connection Properties:

- Lanes should be set to 4.
- Bit Rate: dual link or above, 5.4 GHz, otherwise 2.7 GHz.
- Bandwidth should be changed to 5.4 GHz for higher output EDIDs, e.g. 4096 × 2160@60.
- **Color Depth** 8 bit or 10 bit depending on output required. This is important for <u>Working in 10-bit</u> <u>Colour Depth</u>.

Select the EDID that you want to use and change the properties underneath. You can either apply the EDID from the display (if connected) or load a \*.bin file in the local directory (select 'From File' and Browse to the file).

#### Finding the right EDID

7thSense provides a collection of available EDIDs, located in: C:\Program Files\7thSense\Delta\Utilities\EDID Files. Change the file type (bottom right) to binary to see these files:

🖳 Open			×
← → × ↑ 📙 « Local Disk	→ Program Files → 7thSense → Delta → Ut	tilities > EDID Files 🛛 🗸 진	Search EDID Files
Organise 🔻 New folder			III - (?)
7thConnect	Name Date m	odified Type Size	^
📙 Delta	7th 800x600@50.bin 09/08/2	2017 11:40 BIN File	1 KB
Guides	7th_800x600@60.bin 09/08/2	2017 11:40 BIN File	1 KB
HelpFiles	7th_800x600@75.bin 09/08/2	017 11:40 BIN File	1 KB
Licencing	7th_1024x768@50.bin 09/08/2	2017 11:40 BIN File	1 KB
Logs	7th_1024x768@60.bin 09/08/2	2017 11:40 BIN File	1 KB
MI MEx64	7th_1024x768@75.bin 09/08/2	2017 11:40 BIN File	1 KB
MI MEV96	7th_1280x720@50.bin 09/08/2	2017 11:40 BIN File	1 KB
	7th_1280x720@60.bin 09/08/2	2017 11:40 BIN File	1 KB
Sequences	7th_1280x720@75.bin 09/08/2	2017 11:40 BIN File	1 KB
Shows	7th_1280x720@96_Stereo.bin 09/08/2	2017 11:40 BIN File	1 KB
System	7th_1280x720@120_Stereo.bin 09/08/2	2017 11:40 BIN File	1 KB
Thumbs	7th_1280x768@50.bin 09/08/2	2017 11:40 BIN File	1 KB
Utilities	7th_1280x768@60.bin 09/08/2	2017 11:40 BIN File	1 KB
BootStrap	7th_1280x768@75.bin 09/08/2	2017 11:40 BIN File	1 KB
EDID Files	7th_1280x800@50.bin 09/08/2	2017 11:40 BIN File	1 KB
	7th_1280x800@60.bin 09/08/2	2017 11:40 BIN File	1 KB
	7th_1280x800@75.bin 09/08/2	2017 11:40 BIN File	1 KB
Logs	7th_1280x800@96_Stereo.bin 09/08/2	2017 11:40 BIN File	1 KB 🗸
File <u>n</u> ame:			✓ Binary files(*.bin) ✓
			Open Cancel

Select the EDID for the right resolution, bit depth as well as frame rate. Display devices (projectors, monitors) have their own set of embedded EDIDs that can also be used. Open the selected EDID then 'Apply', to apply it to all of the selected AMD display connections.

The Advanced Settings page will now display which EDID is connected to the relevant ports. In this instance, the **7th\_WUXGA@60** has been applied to all six of the ports of the GPU:

	⊂ × FirePro Advanced Settings Preferences		
> Presets 🧭	EDID Emulation ?		
<ul> <li>✓ AMD FirePro™</li> <li>AMD FirePro™ Settings</li> <li>Synchronization</li> <li>Error-Correcting Code (ECC)</li> <li>SDI/DirectGMA</li> </ul>	Manage EDID emulation for display connections. Configuration outside of official AMD specifications is not covered under AMD product warranty.		
EDID Emulation V Desktop Management	Force EDID Emulation     Refresh		
Desktop Color	Select display connections to configure:		
Vy Digital Flat-	AMD FirePro W9100 1		
Properties (Digital Flat- Panel) Display Color (Digital Flat-Panel) HDTV Support (Digital Flat-Panel) Custom Resolutions (Digital Flat-Panel) ✓ Audio Default Audio Device	<ul> <li>&gt; Graphics Card Display Connectors</li> <li>&gt; Display Connections</li> <li>Connection 1 - Mini DisplayPort (Emulated : 7th_WUXGA@60)</li> <li>Connection 2 - Mini DisplayPort (Emulated : 7th_WUXGA@60)</li> <li>Connection 3 - Mini DisplayPort (Emulated : 7th_WUXGA@60)</li> <li>Connection 4 - Mini DisplayPort (Emulated : 7th_WUXGA@60)</li> <li>Connection 5 - Mini DisplayPort (Emulated : 7th_WUXGA@60)</li> <li>Connection 6 - Mini DisplayPort (Emulated : 7th_WUXGA@60)</li> </ul>		
	EDID Emulation Options:  Remove Manage branch Manage EDID		
	Defaults         Discard         Apply		

## **Dual GPU EDID Emulation**

This is very similar to single GPU servers. Dual GPU operation for adding graphics power uses AMD CrossFire to link the cards. Delta servers instead simply need the extra display heads, so first of all ensure Crossfire is disabled. Open 'AMD FirePro Advanced Settings', and select 'AMD CrossFire' from the left-hand menu:



Now select 'EDID Emulation' from the left-hand menu. If asked whether to 'Force EDID', click 'Apply'.

Now click the + markers to expand the list of connections per GPU detected. For each GPU in turn: tick all heads required, then move over the top connection and click the big + icon on the right:



A new dialog will open. Select the EDID from the current display, or from a specific EDID file if available by clicking browse:

EDID En	nulation
EDID emula config Any e	emulation may affect any existing AMD Eyefinity configurations that include ated displays. To minimize this impact, configure EDID emulation before juring AMD Eyefinity. xisting EDID emulation settings for the selected connections will be lost.
Apply EDID em	ulation to these connections:
AMD Fire	ePro W9100 5
AMD Fire	ePro W9100 11
	-
Select EDID:	
From Displ	
PLEZZUBHD	D( AMD FirePro W9100 5 Port 1 - Mini DisplayPort)
From File:	
C:\Program	Files\7thSense\Delta\Utilities\EDID Files\7th Browse
View	Raw EDID
Connection Pr	operties:
Emulation	Emulate always
Connection	DisplayPort (Active Adapter)
Lanes	2
Bit Rate	2.7 GHz
Bandwidth	2.7 GHz
Color Depth	8 bit
3D Caps	None
	Discard Apply

#### Finding the right EDID

7thSense provides a collection of available EDIDs, located in: C:\Program Files\7thSense\Delta\Utilities\EDID Files. Change the file type (bottom right) to binary to see these files.

All heads should show with the EDID information. Restart the server.

	FirePro Advanced Settings	×
> Presets 🧭	EDID Emulation	?
<ul> <li>✓ AMD FirePro™ (€)</li> <li>Disable Display</li> </ul>	Manage EDID emulation for display connections.	
AMD FirePro™ Settings AMD CrossFire™	Force EDID Emulation Refresh	*
Synchronization SDI/DirectGMA	Select display connections to configure:	
EDID Emulation	AMD FirePro W9100 5	
Desktop Management	> Graphics Card Display Connectors	
AMD Eyefinity™	<ul> <li>Display Connections</li> </ul>	
Create Eyefinity Display	□ ⊞ Connection 1 - Mini DisplayPort (Connected : PLE2208HDD)	
Re-enable Eyefinity	□ ⊞ Connection 2 - Mini DisplayPort (Connected : PLE2208HDD)	
My Digital Flat-	□ ⊞ Connection 3 - Mini DisplayPort (Connected : PLE2208HDD)	
Properties (Digital Flat- Panel)	Connection 4 - Mini DisplayPort (Connected : PLE2208HDD)	
Display Color (Digital Flat-Panel)	Connection 5 - Mini DisplayPort (Connected : PLE2208HDD)	
HDTV Support (Digital Flat-Panel)	Connection 6 - Mini DisplayPort (Connected : PLE2208HDD)	
Custom Resolutions (Digital Flat-Panel)	AMD FirePro W9100 11	
~ Audio	> Graphics Card Display Connectors	=
Default Audio Device	<ul> <li>Display Connections</li> </ul>	
	□      Connection 1 - Mini DisplayPort (Connected : PLE2208HDD)	
	Connection 2 - Mini DisplayPort (Connected : PLE2208HDD)	
	Connection 3 - Mini DisplayPort (Connected : PLE2208HDD)	
	Connection 4 - Mini DisplayPort (Connected : PLE2208HDD)	
	Connection 5 - Mini DisplayPort (Connected - PLE2208HDD)	
	Connection 5 - Mini DisplayFort (Connected - PLE220010D)	
	Connection of Mini Displayi of (Connected : PLE2200HDD)	J
	EDID Emulation Options:	
	Remove Manage branch Manage EDID	•
	Defaults Discard Apply	

# FirePro Eyefinity Grouping

For the most reliable results, first ensure that each display to be grouped has the correct resolution applied to it in Windows. (Windows search: 'display settings'.) These must all be the same, since mixed resolution displays are not supported in AMD Eyefinity groups. Failure to do this can often result in a Eyefinity group of the wrong resolution being created.

## Troubleshooting: a Note on Scaling

Scaling is a feature in AMD for handling media of non-native resolution. When switched on, it will either maintain aspect ratio, force-fill the screen, or centre a lower-resolution in a higher-resolution display. Occasionally an EDID has the scaling flag enabled in the CEA extension block, and AMD seems to want to default to a scaled output.

If on the actual display (not VNC) you are seeing black borders, or the aspect ratio appears incorrect, check for scaling before Eyefinity Grouping.

Scaling options can be found under older AMD Catalyst<sup>™</sup> Control Center > *My Digital Flat Panels*, either as an option or within Properties.

## Grouping

When media is to be displayed over more than one display, the display outputs need to be Grouped. Select 'Create Eyefinity Display Group' on the left. This will show how many monitors are connected:

	FirePro Adva	nced Settings		Preferences
> Presets 🧭	Create Eyefini	ty Display Group		?
✓ AMD FirePro™ (€) Disable Display	Create an AMD Ey	yefinity display group. Combine mu	ltiple displays to work toget	her as a single desktop.
AMD FirePro <sup>™</sup> Settings	Supported config	gurations for your display group:		Show more
Error-Correcting Code (ECC)	standard n	nixed dimension mixed alignme	nt	
SDI/DirectGMA				
Desktop	-			
Desktop Color	-			
AMD Eyefinity™ Multi-Display				
Create Eyefinity Display Group	*			
My Digital Flat-	(1)	2	3	4
Properties (Digital Flat- Panel)				
Display Color (Digital Flat-Panel)				
Flat-Panel)				
(Digital Flat-Panel)	-			
v Audio 🜘				Identify All
Default Audio Device	Select a display	y arrangement for your display g	roup:	
	Use the c	current arrangement		
	Use a ne	w arrangement		
		Create a new arra	ngement using a different g	roup of displays.
				Next

Click on 'Use a new arrangement' and then 'Next' and choose the matrix you want (AMD format: columns × rows):



Here a standard 2 × 2 arrangement has been selected: if the appearance is correct, click 'Next' and then 'Start arrangement' for correct placement of the displays in actual physical order:

	FirePro Advanced Settings	Preferences
> Presets 🥩	Create Eyefinity Display Group	?
✓ AMD FirePro™ (E) Disable Display	Create an AMD Eyefinity display group. Combine multiple displays to work together as a single d	esktop.
AMD FirePro™ Settings	Supported configurations for your display group (2x2):	Show more
Synchronization Error-Correcting Code	standard mixed dimension mixed alignment	
(ECC) SDI/DirectGMA	Rearrange your displays as needed.	
EDID Emulation		
V Desktop Management	Start arrangement	
Set Preferred Display		
Desktop Color		
AMD Eyefinity™ Multi-Display		
Create Eyefinity Display Group		
My Digital Flat- Panels		
Properties (Digital Flat- Panel)		
Display Color (Digital Flat-Panel)	1 4 3	
HDTV Support (Digital Flat-Panel)		_
Custom Resolutions (Digital Flat-Panel)		
~ Audio		
Default Audio Device		
	2 4	
	Back	Next

Each monitor will illuminate blue in turn. Click the square in the dialog corresponding to its physical position:



When finished, the actual correspondence will be displayed:



When you click Next you can save the .xml file of the arrangement:

Save Eyefinity Display Group	
*	
Save this display group as:	
My Display Group 2018Jul24_1221	
	<u>O</u> K

Now that you have a grouped display, return to the Windows display resolution configuration to verify that the resolution of the overall grouping matches the sum of the individual display resolutions.

You are now ready to synchronise displays to an external sync source if required.

## **Dual GPU Grouping**

For dual GPU grouping, open 'AMD FirePro Advanced Settings'. Select 'Create Eyefinity Display Group'. This will show the available displays, but not which GPU they are connected to. With AMD, displays are grouped as desktops, not as one entire group of displays. You therefore need to address each GPU in turn and group its outputs, following the same process as for a single GPU.

To select the first desktop to group, just click on the blue square of first display. You will see that the number sequence may appear a bit random:



With the first display selected, click Next:



Select a layout for this display group (i.e. the outputs for one of the graphics cards). AMD format is: columns × rows:

	Create Eyef	inity Display G	roup		
AMD FireProm 👔	Create an AMI	) Evefinity display (	aroup. Combine mult	tiple displays to work togeth	er as a single desktop.
Disable Display	create an rank	s cyclinity chipping	group: comonic man	ipie displays to mone togeth	er as a single acontopi
AMD FirePro™ Settings	Supported co	ofigurations for you	r display group (2v1	1	Show more
AMD CrossFire™	Supported to			<i></i>	<u>snow more</u>
Synchronization	standard	mixed rotation	mixed dimension	mixed alignment	
Error-Correcting Code (ECC)					
SDI/DirectGMA	Select a lave	out for the display	group:		
EDID Emulation		. ,			
Desktop	2x2		•		
Management 🔊					
AMD EvofinityTM					
Multi-Display					
Create Eyefinity Display Group					
My Digital Flat- Panels					
Properties (Digital Flat- Panel)					
Display Color (Digital Flat-Panel)					
HDT∨ Support (Digital Flat-Panel)			<i></i>	1	
Custom Resolutions (Digital Flat-Panel)					
Audio 💿					
Default Audio Device					

Click 'Next' and then 'Start arrangement'. Displays can now be rearranged into the actual physical order for this part of the overall display.

Each monitor will illuminate blue in turn. Click the square in the dialog corresponding to its physical position:



When finished, the actual correspondence will be displayed. Click Next and save the .xml file for this display group:

Save Eyefi	nity Display Group		
	*		
		1	
Save this	display group as:		
My Disp	olay Group 2018Jul24	_1221	
			<u>O</u> K

With the first group made, return to 'Create Eyefinity Display Group', where you will see the group you have just made, and the ungrouped displays. Click on one of the ungrouped displays (i.e. the next desktop):



Click 'Next' and, as before, select the matrix layout and proceed to arrange the displays so that they correspond to their physical layout.

When all displays have been grouped, save the .xml file for this display group:

Save Eyef	ïnity Display Group		
		2	
Save thi My Dis	s display group as: play Group 2018Jul24_1;	221	Ōĸ

It may be that your desktops, as far as Windows is concerned, are not in the right order. Right-click the Windows desktop and select 'Screen Resolution':

🕞 🗢 💆 « Disp	lay   Screen Resolution	✓ 4 Search Co	ontrol Panel	
Change the ap	pearance of your displays			
	1	2	Dete <u>c</u> t Identify	
Di <u>s</u> play:	1. PLE2208HDD 👻			
<u>Resolution:</u> <u>Multiple displays:</u>	3840 × 2160 ▼ Extend these displays ▼			
🔽 Ma <u>k</u> e this my m	ain display		Advanced settings	
Make text and othe What display settin	er items larger or smaller gs should I choose?			

Drag the desktop groups into the right order, 'Apply' and click 'OK'.

#### Restart the server.

You are now ready to synchronise displays to an external sync source if required. The procedure is the same as for a single GPU, so this time, open 'AMD FirePro Advanced Settings'.

### FirePro Synchronization (Genlocking)

Synchronization between GPUs, and/or with an external signal source (genlocking) requires installation of an AMD FirePro S400 Synchronization Module 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 Design 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 AMD GPUs.

#### Ensure that a House Sync Generator is plugged in to the S400 Genlock card.

#### **Timing Clients**

From the FirePro Advanced Settings, select Synchronization. Each port that has been connected will be displayed. With the Sync Generator connected, the 'House Sync' will show the refresh rate of the Sync Generator instead of 'Idle'. The displays will always appear as a red cross at first, this is just to show that they have been registered in the Advanced settings.

	FirePro Advanced Settings	Preferences
> Presets 🧔 🎓	Synchronization	?
<ul> <li>✓ AMD FirePro™</li> <li>MD FirePro™</li> <li>Settings</li> <li>Synchronization</li> </ul>	Synchronize video output across multiple displays using a synchronization module.	
Error-Correcting Code		
SDI/DirectGMA	None	•
EDID Emulation		Configure
Desktop Management	Timing Clients	
Desktop Color	Direlay Carve V Sure State	
AMD Eyefinity™	Display Display Group V-Sync State	
Set Preferred Display	1./th_WUXGA@60: AMD FirePro W9100 60 Hz	
Create Eyefinity	🔲 📃 1.7th_WUXGA@60 : AMD FirePro W9100 60 Hz 🗙	
Position Windows	🔲 🧱 1.7th_WUXGA@60 : AMD FirePro W9100 60 Hz 🗙	
Taskbar Arrange Eyefinity Display Group	[I] 1.7th_WUXGA@60 : AMD FirePro W9100     60 Hz	
Disable Eyefinity Display Group	RJ-45(1)	
Adjust Bezel Compensation	RJ-45(2)	
Adjust Overlap Compensation	Identify Detect	Configure
Customize Eyefinity Desktop Resolution	External Connectors Status	
V My Digital Flat-	💼 👁 🕷 RJ-45(1): Idle	
Properties (Digital Flat-Panel)	🚔 🌑 🜑 RJ-45(2): Idle	
Display Color (Digital Flat-Panel)	💿 🔹 House Sync: 720p 60 Hz	
HDTV Support (Digital Flat-Panel)	Refresh	
Custom Resolutions (Digital Flat-Panel)		
v Audio 💿 v	Digcard	

Check all the displays you want to sync.

Click the 'Configure' button to select the sync source:

Configure Timing Client				
1.PLE2208HDD : AMD FirePro V7900 (ATI FireGL) (60 Hz) Display Group 2				
Timing Signal Source:				
House Sync 🔹				
Signal configuration				
Signal Type:	720p 60 Hz Sync to field 1			
Triggering Edge:	Rising			
Scan Rate Coefficient:				
Sync Delay (µs):	0 🚔			
Use these settings for all selected timing clients.				
	<u>O</u> K <u>C</u> ancel			

#### **Timing Source Signal**

can either be the first display and sync from that or just the normal House Sync. The signal type is displayed here as resolution and refresh rate, e.g. 720p 60 Hz.

#### **Triggering Edge**

by default, Rising. Only critical in mixed-GPU scenarios where another default differs.

#### **Scan Rate Coefficient**

The EDID rate and Sync rate must match to some extent, either equal, or one a multiple of the other.

Examples:

EDID is 1920x1080@25, House Sync must be 25 Hz (1:1) or 50 Hz (1:2). EDID is 1920x1080@120, House Sync must be 120 Hz (1:1) or 60 Hz (2:1).

Check 'Use these settings for all timing clients'.

Click 'Apply'. The red crosses will all now be green ticks, and the green light for House Sync will flash on and off:
	FirePro Advanced Settings	Preferences
> Presets 🧔 🕯	Synchronization	?
<ul> <li>AMD FirePro™</li> <li>AMD FirePro™</li> <li>Settings</li> </ul>	Synchronize video output across multiple displays using a synchronization module.	
Synchronization	Timing Server	
Error-Correcting Code (ECC)	Neze	-
SDI/DirectGMA	None	
EDID Emulation		Configure
Desktop Management	Timing Clients	
Desktop Color		
AMD Eyefinity™	Display Display Group V-Sync State	
Set Preferred Display	V 📃 1.7th_WUXGA@60 : AMD FirePro W9100 3 60 Hz 🔘 🏑	
Create Eyefinity Display Group	☑	
Position Windows Taskbar	☑	
Arrange Eyefinity Display Group		
Disable Eyefinity Display Group	RJ-45(1)	
Adjust Bezel	RJ-45(2)	
Adjust Overlap Compensation	Identify Detect	Configure
Customize Eyefinity Desktop Resolution	External Connectors Status	
My Digital Flat-	💼 🌑 🕷 RJ-45(1): Idle	
Properties (Digital Flat-Panel)	🚔 🌑 🕷 RJ-45(2): Idle	
Display Color (Digital Flat-Panel)	💿 🔹 House Sync: 720p 60 Hz	
HDTV Support (Digital Flat-Panel)	Refresh	
Custom Resolutions (Digital Flat-Panel)		Areta
v Audio 💿 v	Digcard	Арру

All ports are now synced together.

Restart the server, then navigate back to the Advanced Settings and check that the connections are still present.

# House Sync

House sync is shown along bottom, this is updated as soon as 'Refresh' is clicked, and the House Sync indicator will flash green. The LED on the S400 card in the server will now be illuminated steady green. So if the incoming signal from the generator changes, the House Sync will reflect this.

# Genlock Polling via DeltaMonitor

Remote server control via the Stack web interface enables AMD graphics sync systems to be addressed remotely. By enabling DeltaMonitor's <u>Genlock Polling</u> you can ensure that any temporary loss of sync signal can be re-established automatically.

# Lost Sync?

Genlock can be lost if the signal is interrupted (for example if a cable falls out or the sync generator rate is changed): this S400 LED will change from steady green to a slow flash.

If genlock is lost, check all connections and sync generator settings. Restart the server to re-grab the genlock settings.

**Note**: It is good practice to check all linked servers if there has been genlock loss. If it was due to the source sync generator, genlock will be lost and need resetting on all master and slave servers.

# AMD Radeon Pro 18.Q2.1

For AMD Radeon<sup>™</sup> Pro WX4100, WX 5100, VII and WX 7100 graphics cards, and for FirePro<sup>™</sup> W600, using Radeon Pro Software, Enterprise Edition, version 18.Q2.1, under Windows 10.



Note that currently only one of these cards can be used per server in Windows 10. A single GPU can be synced, but not two in the same server.

- Advanced Settings<sup>39</sup>
- ➢ EDID Emulation <sup>40</sup>
- Display Grouping<sup>44</sup>
- Synchronization (Genlocking)<sup>50</sup>

# **Advanced Settings**

First connect display adapters into all required GPU ports. These must all be of the same type.

From Windows Start, open AMD Radeon Settings:



# **EDID Emulation**

Select EDID Emulation from the left-hand menu, then click to small + box under 'Select display connections to configure', to expand the available GPU connections:

radeon PRO	Radeon Pro and AMD FirePro Advanced Settings	- ×
<ul> <li>&gt; Presets</li> <li>AMD Radeon Pro</li> <li>&gt; and AMD</li> <li>FirePro™</li> <li>AMD Radeon Pro and AMD Radeon Pro and AMD FirePro™ Settings</li> <li>Synchronization</li> <li>SDI/DirectGMA</li> <li>EDID Emulation</li> <li>My Digital Flat- Panels</li> <li>Properties (Digital Flat- Panel)</li> </ul>	EDID Emulation         Manage EDID emulation for display connections.         Configuration outside of official AMD specifications is not covered under AMD product warranty.         Force EDID Emulation         Refresh         Select display connections to configure:         AMD Radeon (TM) Pro WX 7100 Graphics 3         Graphics Card Display Connectors         Display Connections         Onnection 1 - DisplayPort (Connected : PLE2208HDD)         Connection 2 - DisplayPort (Not Connected)         Connection 3 - DisplayPort (Not Connected)         Connection 4 - DisplayPort (Not Connected)         Connection 5	?
	Defaults Discard Ap	ply

In this example, a single Radeon WX 7100 in installed, and you can see that whilst we have four adapters in the GPU ports, only one is connected. Select the connected port:

- the magnifier shows raw information about the current EDID
- the page icon downloads the current EDID, in this case, the PLE2208HDD EDID from the connected monitor
- the large + will add an EDID to connections with a ticked check box. Click this to open a dialog:



From the dialog, select EDID 'From File' (file type \*.bin) and browse to C:\Program Files\7thSense\Delta\Utilities\EDID Files:

# Emulating, Grouping, Synchronising Displays

EDID E	Emulation					
EDID emulation may affect any existing AMD Eyefinity configurations that include emulated displays. To minimize this impact, configure EDID emulation before configuring AMD Eyefinity. Any existing EDID emulation settings for the selected connections will be lost.						
Apply EDID	emulation to these connections:					
🗄 AMD	Radeon (TM) Pro WX 7100 Graphics 3					
Select EDIE	):					
O From D	Display: 9HDD( AMD Radgen (TM) Pro WY 7100 Graphics 3 Port 1 - DisplayPort)					
From F	ile:					
Qv	/iew Raw EDID					
Connection	n Properties:					
Emulation	Emulate always					
Connection	n DisplayPort (Active Adapter)					
Lanes	2					
Bit Rate	2.7 GHz					
Bandwidth	2.7 GHz					
Color Dept	th 8 bit					
3D Caps	None					
	Discard Apply					

## In the Connection Properties:

- Lanes should be set to 4.
- Bit Rate: dual link or above, 5.4 GHz, otherwise 2.7 GHz.
- **Bandwidth** should be changed to 5.4 GHz for higher output EDIDs, e.g. 4096 × 2160@60.
- **Color Depth** 8-bit or 10-bit depending on output required. This is important for <u>Working in 10-bit</u> <u>Colour Depth</u>.

Select the EDID that you want to use and change the properties underneath. You can either apply the EDID from the display (if connected) or load a \*.bin file in the local directory (select 'From File' and Browse to the file).

#### Finding the right EDID

7thSense provides a collection of available EDIDs, located in: C:\Program Files\7thSense\Delta\Utilities\EDID Files. Change the file type (bottom right) to binary to see these files:

# Emulating, Grouping, Synchronising Displays

🛃 Open					×
← → × ↑ 📙 « Local Disk (C	:) > Program Files > 7thSense > De	lta → Utilities → E	DID Files	✓ Ö Search ED	ID Files 🔎
Organise 🔻 New folder					III 🕶 🚺 😲
7thConnect	Name	Date modified	Туре	Size	^
Delta	7th 800x600@50.bin	09/08/2017 11:40	BIN File	1 KB	
Guides	7th 800x600@60.bin	09/08/2017 11:40	BIN File	1 KB	
HelpFiles	7th 800x600@75.bin	09/08/2017 11:40	BIN File	1 KB	
Licencing	7th 1024x768@50.bin	09/08/2017 11:40	BIN File	1 KB	
Logs	7th_1024x768@60.bin	09/08/2017 11:40	BIN File	1 KB	
	7th_1024x768@75.bin	09/08/2017 11:40	BIN File	1 KB	
MLMFx64	7th_1280x720@50.bin	09/08/2017 11:40	BIN File	1 KB	
MLMFx86	7th_1280x720@60.bin	09/08/2017 11:40	BIN File	1 KB	
Sequences	7th_1280x720@75.bin	09/08/2017 11:40	BIN File	1 KB	
Shows	7th_1280x720@96_Stereo.bin	09/08/2017 11:40	BIN File	1 KB	
System	7th_1280x720@120_Stereo.bin	09/08/2017 11:40	BIN File	1 KB	
Thumbs	7th_1280x768@50.bin	09/08/2017 11:40	BIN File	1 KB	
Utilities	7th_1280x768@60.bin	09/08/2017 11:40	BIN File	1 KB	
BootStrap	7th_1280x768@75.bin	09/08/2017 11:40	BIN File	1 KB	
	7th_1280x800@50.bin	09/08/2017 11:40	BIN File	1 KB	
EDID Files	7th_1280x800@60.bin	09/08/2017 11:40	BIN File	1 KB	
HDSDI Audio	7th_1280x800@75.bin	09/08/2017 11:40	BIN File	1 KB	
Logs 🗸	7th_1280x800@96_Stereo.bin	09/08/2017 11:40	BIN File	1 KB	<b>~</b>
File name:				✓ Binary fil	es(*.bin) 🗸
				<u>O</u> pe	n Cancel

Select the EDID for the right resolution, bit depth and frame rate. Some EDIDs indicate specific interface types (HDMI, DVI); take care to select the correct option. Display devices (projectors, monitors) have their own set of embedded EDIDs that can also be used. Open the selected EDID then 'Apply', to apply it to all of the selected AMD display connections.

The Advanced Settings page will now display which EDID is connected to the relevant ports.

#### **Unexpected screen resolution?**

If, after emulation, the resolution is different from what you are expecting (an EDID can contain multiple resolutions and refresh rates), you will need adjust Windows display settings.

Right-click on the desktop and select 'Display Settings'. In 'Customize your display', scroll down to the bottom of the page and select 'Advanced Display Settings'. Then select 'Display Adapter Properties.

In the Display Adapter Properties window, click 'List all Modes' at the bottom and then select the resolution from the drop-down menu (this may need to be applied per output).

With the correct resolution now set for each output, proceed to grouping configuration your displays.

# **Display Grouping**

From AMD Radeon Settings, select from the left-hand menu, 'Create Eyefinity Display Group':



Select 'Use a new arrangement' and click 'Next'.

Now select your primary display (the one marked with an asterisk in its top left-hand corner) and click Next:



Select your desired matrix from the dropdown menu and press 'Next':



If you need to rotate any display, do this here, or just click 'Next':



Click 'Start Arrangement' which will cause each screen to turn blue:



Click each display in sequence for its matrix position. When correct, click Next.

The next step allows for alignment should you require it. Finally click 'Next'.

The displays will go black, the group will now configure itself, and once complete, will bring up a window where you can save the group name as 'My Display Group [Date]' – or as you prefer – and press 'OK':

Save Eyefinity Display Group	
*	
1	
Shue this display group as	1
My Display Group 2018/ul10 1303	
	<u>O</u> K

# Synchronization (Genlocking)

Synchronization with an external signal source (genlocking) requires installation of an AMD FirePro S400 Synchronization Module in each Delta Media Server. This is 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 Design 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 AMD GPUs.

# **Timing Clients**

From the Radeon Pro Advanced Settings, select Synchronization. Each port that has been connected will be displayed. They will always appear as a red cross at first, this is just to show that they are being registered in the Advanced settings.



Check the displays you want to sync.

Click the 'Configure' button to select the sync source:

Configure Timing Client						
1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics (60 Hz) Display Group 1						
The settings for thi display group.	s timing client are shared with other timing clier	nts that are connected to the same				
Timing Signal Source:						
House Sync		~				
Signal configuration						
Signal Type:	720p 60.00 Hz	Sync to field 1				
Triggering Edge:	Rising	~				
Scan Rate Coefficient:	1:1	¥				
Sync Delay (µs):		0 🚔				
Use these settings for all selected timing clients.						
		<u>O</u> K <u>C</u> ancel				

#### **Timing Source Signal**

can either be the first display and sync from that or just the normal House Sync. The signal type is displayed here as resolution and refresh rate, e.g. 720p 60 Hz.

## **Triggering Edge**

by default, Rising. Only critical in mixed-GPU scenarios where another default differs.

#### Scan Rate Coefficient

The EDID rate and Sync rate must match or (a feature of AMD GPUs) be a valid multiple. *Examples*: EDID is 1920x1080@25, House Sync must be 25 Hz (1:1) or 50 Hz (1:2).

EDID is 1920x1080@60, House Sync must be 60 Hz (1:1) or 30 Hz (2:1).

Check 'Use these settings for all timing clients'.

Click 'Apply'. The red crosses will all now be green ticks:

RADEON		
PRO	Radeon Pro and AMD FirePro Advanced Settings	Preferences
> Presets 🧭	Synchronization	?
AMD Radeon Pro ✓ and AMD FirePro™	Synchronize video output across multiple displays using a synchronization module.	
AMD Radeon Pro and AMD FirePro™ Settings	Timing Server	
Synchronization	Thinking Server	
SDI/DirectGMA	None	~
EDID Emulation		Castin
AMD Eyefinity™ Multi-Display		Configure
Set Preferred Display	Timing Clients	
Create Eyefinity Display Group	Display Display Group V-Sync	State
Position Windows Taskbar	☑ 📃 1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics 1 60 Hz	<b>⊘</b> √
Arrange Eyefinity Display Group	☑ 📕 1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics 1 60 Hz	<b>⊚</b> √
Disable Eyefinity Display Group	☑ 📃 1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics 1 60 Hz	<b>⊚</b> √
Adjust Bezel Compensation	☑ 📃 1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics 1 60 Hz	<b>I</b>
Adjust Overlap Compensation	□ 🔒 RJ-45(1)	
Customize Eyefinity Desktop Resolution	□ 🔒 RJ-45(2)	
Vy Digital Flat-	Identify Detect	Configure
Properties (Digital Flat- Panel)	External Connectors Status	
	💼 👁 🜑 RJ-45(1): Idle	
	🚔 🌑 🕷 RJ-45(2): Idle	
	House Sync: 720p 60.00 Hz	
	Refresh	
	Discar	d <u>Apply</u>

All ports are now synced together.

Restart the server, then navigate back to the Advanced Settings and check that the connections are still present.

# **House Sync**

House sync is shown along bottom, this is updated as soon as 'Refresh' is clicked, and the House Sync indicator will flash green. The LED on the S400 card in the server will now be illuminated steady green. So if the incoming signal from the generator changes, the House Sync will reflect this.

# Genlock Polling via DeltaMonitor

Remote server control via the Stack web interface enables AMD graphics sync systems to be addressed remotely. By enabling DeltaMonitor's <u>Genlock Polling</u> you can ensure that any temporary loss of sync signal can be re-established automatically.

# Lost Sync?

Genlock can be lost if the signal is interrupted (for example if a cable falls out or the sync generator rate is changed): this S400 LED will change from steady green to a slow flash.

If genlock is lost, check all connections and sync generator settings. Restart the server to re-grab the genlock settings.

**Note**: It is good practice to check all linked servers if there has been genlock loss. If it was due to the source sync generator, genlock will be lost and need resetting on all master and slave servers.

# AMD Radeon Pro 21.Q1.2

For AMD Radeon<sup>™</sup> Pro WX 5100 and WX 7100 graphics cards, using Radeon Pro Software, Enterprise Edition, version 11.Q1.2.



Note that currently only one of these cards can be used per server in Windows 10. A single GPU can be synced, but not two in the same server.

On the Delta server, find the AMD Radeon Pro Settings Desktop app, and select the 'Settings' gearwheel icon:

				@ _ □ ×	
🔁 Home Create Stre	aming Performance			० 🚯 🌲 👛 📧	
System Graphics Display	Video Hotkeys Accounts	s Devices General			
Software & Driver	Release Notes	> Hardware		Shop AMD Products >	
✓ More	Details				
Settings Snapshot ⑦ Import/export a snapshot of all user settings		AMD Rade	GPU AMD Radeon (TM) Pro WX 7100 Graphi 8 Primary/Discrete GDD		
Factory Reset ⑦ Restores all user settings and profiles to def		5	✓ More Deta	ills	
Reset Application Statistics ⑦ Reset statistics for all applications		5			
About Radeon <sup>™</sup> Pro Software		CPU AMD Ryzen Threadripper PRO 3955W 16 Cores		RAM <b>64 GB</b>	

In the Graphics tab, you may need to select Quad buffer (if using 3D stereo), or 10-bit format:

🔁 Home Create Strea	aming Performance			۹	3	۹	\$ £
System Graphics Display	Video Hotkeys Account	s Devices	General				চ
Texture Filtering Quality ③							
Surface Format Optimization (?)							
Wait for Vertical Refresh 🕥							
Tessellation Mode ⑦							
OpenGL Triple Buffering ③							
10-Bit Pixel Format (?)	Disabled	•					
GPU Workload 🕜							
Reset Shader Cache 🏼		5					
DGMA Enable/Disable DirectGMA support and confi							
Platform Compatibility Adjust settings based on the grouping of har	Open Radeon Pro Settings	*					
Quad Buffer Stereo ⑦ Enable Quad Buffer Stereo to control the ste	Disabled	•					

- ➢ EDID Emulation<sup>56</sup>
- Display Grouping<sup>61</sup>
- > Synchronization (Genlocking) (B)

# **EDID Emulation**

Select Display on the top menu, and scroll down to 'Additional Settings' to 'Adjust EDID Settings':

# Emulating, Grouping, Synchronising Displays

Aome Create Strea	aming Performance			Search	٩	3	٩	\$ E
System Graphics <b>Display</b> Radeon * Pro Image Boost (?)	Video Hotkeys Account	s Devices	General					
			Brightness					
GPU Scaling ⑦	Disabled	-	Hue					
Scaling Mode 🕜			nue					
			Contrast				-0-	
Color Depth 🕜	8 bpc		Saturation				-	
Pixel Format 🕜	RGB 4:4:4 Pixel Format PC Stan		> Custom Resolution					
> Display Specs								
Additional Settings								
Adjust EDID Settings Manage EDID emulation for display connection								
Adjust FL/GL Settings Synchronize video output across multiple dis								
Eyefinity								
AMD Eyefinity Combine multiple displays to act as one		+						
Advanced Eyefinity		+						

Open Radeon Pro Settings, and expand the GPU section:

AMDZ RADEON PRO SETTI	N G S		? _ 🗆 ×
Manage EDID emulation for display connections			
Configuration outside of official AMD S	pecifications is not covered under AMD product v	varranty.	
Remove All Emulations Removes all EDID emulations	Emulate All Displays Emulates all displays to their EDID		
— AMD Radeon (TM) Pro WX 7100 Graphi	ics		
1 2 (	-10 -11 -11 -11 -11 -11 -11 -11 -11 -11		
Connection 1 (DisplayPort) E Connected (LCD Monitor17)	Connection 2 (DisplayPort) E	Connection 3 (DisplayPort)	Connection 4 (DisplayPort)
<b>+</b>	EDID	•••• /	Advanced

Select 'Emulate All Displays' then click the 3-dot selector in the first display and choose 'Emulate':

AMDA RADEON PRO SETTINGS	○ _ □ ×
Manage EDID emulation for display connections	
Configuration outside of official AMD Specifications is not covered under AMD produ	ict warranty.
Remove All Emulations Emulate All Displays Removes all EDID emulations Emulates all displays to their EDID	
— AMD Radeon (TM) Pro WX 7100 Graphics	
1 2 3 4	
Connection 1 (DisplayPort) Connected (LCD Monitor1) Connected (LCD Monitor2)	Connection 3 (DisplayPort) Connected (LCD Monitor 3) E Connected (LCD Monitor 4) E
Emulate Export EDID	
←	••• Advanced

Now select 'Source', choose 'From File' and then the source file arrow, to browse to select the correct EDID:

AMDZI RADEON PRO SET	TINGS				? –	□ ×
< 🔆 Emulate						
Create and configure EDID Emulation connect	lons					
EDID emulation may effect any exist Eyefinity. Any existing EDID emulati	ing AMD Eyefinity configurations that include emu on settings for the selected connections will be los	ulated displays. To mir t.	nimize this impact, c	onfigure EDID emula	ation before configuri	ng AMD
Source ~	Source File Select source from file					
GPU 0 - AMD Radeon (TM) Pro WX 7100 Graph From File	Destination Connection Connection 1 (DisplayPort)	1	2	ڪ	4	
Destination Connection Properties Maximum Resolution: 1280x1024, Connection	: Active dongle, Lanes: 2, Bit Rate: 2.7 GHz, >					
		_				
<del>~</del>	EDID			••• Advanced		

Select the EDID (\*.bin file) that you want to use. 7thSense supplied EDID are found in C:\Program Files\7thSense\Delta\Utilities\EDID Files.

## **Finding the right EDID**

7thSense provides a collection of available EDIDs, located in: C:\Program Files\7thSense\Delta\Utilities\EDID Files. Change the file type (bottom right) to binary to see these files:

🖳 Open					×
← → × ↑ 📙 « Local Disk (C	:) > Program Files > 7thSense > De	lta → Utilities → E	DID Files	✓ Ö Search EDID Fi	es p
Organise 🔻 New folder					III ▼ 🔲 😮
7thConnect	Name	Date modified	Туре	Size	^
📙 Delta	7th_800x600@50.bin	09/08/2017 11:40	BIN File	1 KB	
Guides	7th_800x600@60.bin	09/08/2017 11:40	BIN File	1 KB	
HelpFiles	7th_800x600@75.bin	09/08/2017 11:40	BIN File	1 KB	
Licencing	7th_1024x768@50.bin	09/08/2017 11:40	BIN File	1 KB	
Logs	7th_1024x768@60.bin	09/08/2017 11:40	BIN File	1 KB	
MI MEx64	7th_1024x768@75.bin	09/08/2017 11:40	BIN File	1 KB	
MI MEv86	7th_1280x720@50.bin	09/08/2017 11:40	BIN File	1 KB	
	7th_1280x720@60.bin	09/08/2017 11:40	BIN File	1 KB	
Sequences	1280x720@75.bin	09/08/2017 11:40	BIN File	1 KB	
Shows	17th_1280x720@96_Stereo.bin	09/08/2017 11:40	BIN File	1 KB	
System	7th_1280x720@120_Stereo.bin	09/08/2017 11:40	BIN File	1 KB	
	17th_1280x768@50.bin	09/08/2017 11:40	BIN File	1 KB	
Utilities	7th_1280x768@60.bin	09/08/2017 11:40	BIN File	1 KB	
BootStrap	1280x768@75.bin	09/08/2017 11:40	BIN File	1 KB	
EDID Files	7th_1280x800@50.bin	09/08/2017 11:40	BIN File	1 KB	
	7th_1280x800@60.bin	09/08/2017 11:40	BIN File	1 KB	
- HDSDI Addio	7th_1280x800@75.bin	09/08/2017 11:40	BIN File	1 KB	
Logs	7th_1280x800@96_Stereo.bin	09/08/2017 11:40	BIN File	1 KB	¥
File <u>n</u> ame:				<ul> <li>✓ Binary files(*.t)</li> </ul>	oin) 🗸 🗸
				<u>O</u> pen	Cancel

Select the EDID for the right resolution, bit depth and frame rate. Some EDIDs indicate specific interface types (HDMI, DVI); take care to select the correct option. Display devices (projectors, monitors) have their own set of embedded EDIDs that can also be used. Open the selected EDID then 'Apply', to apply it to all of the selected AMD display connections.

Note that the Destination Connection Properties will show the current values of the display being addressed. Typical post-emulation properties will be:

- Lanes: 4
- Bit Rate: dual link or above, 5.4 GHz, otherwise 2.7 GHz
- Bandwidth should be changed to 5.4 GHz for higher output EDIDs, e.g. 4096 × 2160@60
- **Color Depth** 8-bit or 10-bit depending on output required. This is important for <u>Working in 10-bit</u> <u>Colour Depth</u>.

Repeat for all displays:

AMDZ RADEON PRO SETTINGS	? _ 🗆 ×						
Manage EDID emulation for display connections							
Configuration outside of official AMD Specifications is not covered under AMD pr	oduct warranty.						
Remove All Emulations Emulate All Displays Removes all EDID emulations Emulates all displays to their EDID							
— AMD Radeon (TM) Pro WX 7100 Graphics							
1 2 4							
Connection 1 (DisplayPort)         Emulated (7th_HD1080@60)         Connection 2 (DisplayPort)           Emulated (7th_HD1080@60)         Emulated (7th_HD1080@60)	Connection 3 (DisplayPort) Connected (LCD Monitor 3)         E         Connection 4 (DisplayPort) Connected (LCD Monitor 4)         E						
	Emulate						
← □ EDID	•••• Advanced						

#### **Unexpected screen resolution?**

If, after emulation, the resolution is different from what you are expecting (an EDID can contain multiple resolutions and refresh rates), you will need adjust Windows display settings, accessible from here, and go to the Windows 'Advanced Display Settings' and find 'Display Adapter Properties' at the bopttom:

🔁 Home Create Streaming Performance	Search 🔍 🔇 🌲 🚈 📧
System Graphics <b>Display</b> Video Hotkeys Accounts Devices	; General
Clobal Display Display 1 Display 2 Display 3 Display 4 7th HD1080@60 - DISPLAYPORT (AMD Radeon (TM) Pro WX 7100 Graphics)	Arrange Displays 7 Desktop Color 7 Enable Clone 🖵
Display Options	Custom Color
AMD FreeSync ③ Not Supported ●	Custom Color ③ Enabled

In the Display Adapter Properties window, click 'List all Modes' at the bottom, and then select the resolution from the drop-down menu (this may need to be applied per output).

With the correct resolution now set for each output, proceed to grouping configuration your displays.

# **Display Grouping**

From the main page of Display, scroll down to 'Additional Settings', 'Eyefinity', and select 'Advanced Setup':

其 Home Create Strea	aming Performance			Q	3	<u>ب</u>	\$ E
System Graphics <b>Display</b> Radeon <sup>~</sup> Pro Image Boost (?)	Video Hotkeys Accounts	Devices	General				
GPU Scaling ③	Disabled		Brightness			0	 ÷.
Scaling Mode 🕜			Hue Contrast				_
Color Depth 🕜		~	Saturation				 _
Pixel Format 🕜	RCB 4:4:4 Pixel Format PC Stan		> Custom Resolution				
<ul> <li>Display Specs</li> <li>Additional Settings</li> </ul>			> Overrides				
Adjust EDID Settings Manage EDID emulation for display connection							
Adjust FL/GL Settings Synchronize video output across multiple dis							
Eyefinity							
AMD Eyefinity Combine multiple displays to act as one		+					
Advanced Eyefinity		+					

This will show your displays in a default row. Use 'Select Layout' for a different arrangement.

	ID Eyefinity F	Pro Configu	ration Tool			≡×
Available Displays (1) - 7th_HD1080@60	Use drag and drop to arrang	9				
(2) - 7th_HD1080@60 (3) - 7th_HD1080@60 (4) - 7th_HD1080@60	displays into the Eyefinity gri	d				
(+) - / II_ID 1000@00	(1) - 7th_HD1080@60	(2) - 7th_HD1080@60	(3) - 7th_HD1080@60	(4) - 7th_HD1080@60		
ldentify Select Layout		Layout Mode	Fit	Reset Creat	e AMD Eyefinity Config	guration

Select the arrangement of the required displays (example: 2 × 2):

elect Layo	out			
4 x 1 4 x 1				
2 x 2				
1 x 4 3 x 1				X
1 x 3 2 x 1	1080@60	(2) - 7th_HD1080@60	(3) - 7th_HD1080@60	(4) - 7th_HD1080@60
1 x 2				

You can now drag the displays into the correct locations:



Use the 'Identify' button if unsure of the physical correspondence. Then click the red 'Create' button to complete the layout.

# Synchronization (Genlocking)

Synchronization with an external signal source (genlocking) requires installation of an AMD FirePro S400 Synchronization Module in each Delta Media Server. This is 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 Design 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 AMD GPUs.

From the main page Display tab, scroll down to 'Additional Settings', 'Adjust FL/GL Settings':

🔁 Home Create Strea	aming Perfo	mance			Search	٩	3	۹	٠	E
System Graphics Display	Video Hotkeys	Accounts	Devices	General						
Sync Width										
Polarity										
Interlaced/Progressive	Progressive									
G.Pixel Clock (KHz)										
G.Refresh Rate (Hz)	59.9988									
HDMI Link Status Monitoring	Disabled									
Current Link Settings	2.7 Gbps x 2									
Additional Settings										
Adjust EDID Settings Manage EDID emulation for display connection										
Adjust FL/GL Settings Synchronize video output across multiple dis	Open Radeon Pro A	dditional Setti	·*							
Eyefinity										
AMD Eyefinity Combine multiple displays to act as one			+							
Advanced Eyefinity			+							

# **Timing Clients**

From the Radeon Pro Advanced Settings, select Synchronization. Each port that has been connected will be displayed. They will always appear as a red cross at first, this is just to show that they are being registered in the Advanced settings.



Check the displays you want to sync.

Click the 'Configure' button to select the sync source:

Configure Timing Client							
1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics (60 Hz) Display Group 1							
The settings for thi display group.	The settings for this timing client are shared with other timing clients that are connected to the same display group.						
Timing Signal Source:							
House Sync			~				
Signal configuration							
Signal Type:	720p 60.00 Hz		Sync to field 1				
Triggering Edge:	Rising	~					
Scan Rate Coefficient:	1:1	¥					
Sync Delay (µs):		0 羮					
Use these settings for	or all selected timing clients.						
	[	<u>о</u> к	Cancel				

#### **Timing Source Signal**

can either be the first display and sync from that or just the normal House Sync. The signal type is displayed here as resolution and refresh rate, e.g. 720p 60 Hz.

## **Triggering Edge**

by default, Rising. Only critical in mixed-GPU scenarios where another default differs.

#### Scan Rate Coefficient

The EDID rate and Sync rate must match or (a feature of AMD GPUs) be a valid multiple. *Examples*: EDID is 1920x1080@25, House Sync must be 25 Hz (1:1) or 50 Hz (1:2).

EDID is 1920x1080@60, House Sync must be 60 Hz (1:1) or 30 Hz (2:1).

Check 'Use these settings for all timing clients'.

Click 'Apply'. The red crosses will all now be green ticks:

RADEON					
PRO	Radeon	Pro and AMD FirePro Advanced	Settings		Preferences
> Presets	Synchro	nization			?
AMD Radeon Pro	Synchroniz	e video output across multiple displays using a synchr	onization modul	e.	
AMD Eyefinity™ Multi-Display	Timing Ser	ver			
Re-enable Eyefinity Display Group	None				~
					Configure
	Timing Clie	ents			
		Display	Display Group	V-Sync	State
	V 📃	1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics	1	60 Hz	<b>I</b>
	🗹 🥃	1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics	1	60 Hz	<b>I</b>
	V 🥃	1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics	1	60 Hz	<u>ار ا</u>
	V 📜	1.7th_4K : AMD Radeon (TM) Pro WX 7100 Graphics	1	60 Hz	01
		RJ-45(1)			
	□ <b>≟</b>	RJ-45(2)			
	ldentify	Detect			Configure
	External Co	nnectors Status			
		RJ-45(1): Idle			
	200	RJ-45(2): Idle			
	۲	House Sync: 720p 60.00 Hz			
		Refresh			
				Disca	rd <u>A</u> pply

All ports are now synced together.

Restart the server, then navigate back to the Advanced Settings and check that the connections are still present.

# **House Sync**

House sync is shown along bottom, this is updated as soon as 'Refresh' is clicked, and the House Sync indicator will flash green. The LED on the S400 card in the server will now be illuminated steady green. So if the incoming signal from the generator changes, the House Sync will reflect this.

## **Genlock Polling via DeltaMonitor**

Remote server control via the Stack web interface enables AMD graphics sync systems to be addressed remotely. By enabling DeltaMonitor's <u>Genlock Polling</u> you can ensure that any temporary loss of sync signal can be re-established automatically.

## Lost Sync?

Genlock can be lost if the signal is interrupted (for example if a cable falls out or the sync generator rate is changed): this S400 LED will change from steady green to a slow flash.

If genlock is lost, check all connections and sync generator settings. Restart the server to re-grab the genlock settings.

**Note**: It is good practice to check all linked servers if there has been genlock loss. If it was due to the source sync generator, genlock will be lost and need resetting on all master and slave servers.

# **Pico AMD Radeon**

Note that we only support active adapters for the Pico.

Emulating and grouping AMD Radeon displays with the Pico is slightly different. From Windows Start (or right-click the desktop), open AMD Radeon Settings:



# Display

Select Display and then EDID Emulation:

AMDZ RADEON SETTIN	I G S				? ☆ _ □ ×		
Displays			EDID Emulation				
Manage EDID emulation for display conne	ections						
Configuration outside of official	AMD Specifications is not co	vered under AMD product war	rranty.				
Remove All Emulations Removes all EDID emulations	Emulate All Displays Emulates all displays	to their EDID					
+ AMD Radeon(TM) Vega 11 Grap	hics						
A Caming	► Video	© Connect	Display	🕼 System	••• Advanced		

Emulate all four connections, or select a port to configure by expanding the Radeon bar:

AMDZ RADEON SETTIN	I G S		? ☆ _ □ ×
	Displays	EDID	Emulation
Manage EDID emulation for display conne	ections		
Configuration outside of official	AMD Specifications is not covered under AMD produ	ct warranty.	
Remove All Emulations Removes all EDID emulations	Emulate All Displays Emulates all displays to their EDID		
- AMD Radeon(TM) Vega 11 Grapi	hics		
4 4	21		
Connection 4 (DisplayPort) Not Connected	E Connection 3 (DisplayPort) E Not Connected	Connection 2 (DisplayPort)	Connection 1 (DisplayPort) Connected (SAMSUNG)
A Caming	► Video 🔮 Connect	Display 🜍	* System •••• Advanced

For the required connection, click the three dots and then 'Emulate'. Reading across, you have the Destination, the Connection and the graphic, with highlights in green (connected), blue (current selected) and black (not connected). Click 'Source' for the EDID of the selected connection:

AMDZ RADEON SETTINGS			? ☆ _ □ ×			
Dis	plays	EDID Emulation				
< 🗲 Emulate						
Create and configure EDID Emulation connectio			√ Save			
EDID emulation may effect any existin Eyefinity. Any existing EDID emulation	g AMD Eyefinity configurations that include em settings for the selected connections will be los	ulated displays. To minimize this impact, t.	configure EDID emulation before configuring AMD			
Source	Source Connection Select a connection					
Destination GPU 0 - AMD Radeon(TM) Vega 11 Grap	Destination Connection Connection 2 (DisplayPort)	4 3	² L			
Destination Connection Properties Connection: Display Port, Lanes: 4, Bit Rate: 2.7	GHz					
A Gaming	► Video @ Connect	Display	🐨 System •••• Advanced			

'Source Connection' changes to 'Source File'; click and browse to select the txt format EDID file you want.

Next, Click on Destination Connection Properties, and make sure the Bit Rate is correct. This needs to be 5.4 GHz for anything above WQHD (2560 × 1440):

AMDZ RADEON SETTING	i S		? ☆ _ □ ×					
	Displays			EDID Emulation				
<ul> <li>Connection Properties</li> </ul>								
Connection Display Port	V Lanes 4	~	Bit Rate 2.7 GHz	~				
			1.62 GHz					
			2.7 GHz					
			3.24 GHz					
			5.4 GHz					
A Gaming	► Video	©∰ Connect	Display	🕅 System	••• Advanced			

Now step back to the 'Emulate' page (there is no user confirmation) and click 'Save' on the right:

AMDA RADEON				? 🌣 _	. 🗆 ×			
Displays			EDID Emulation					
< 🍝 Emulate								
Create and configure EDID I	mulation connection	15						🗸 Save
EDID emulation ma Eyefinity. Any exist	effect any existing ng EDID emulation	g AMD Eyefinity configurations settings for the selected conne	that include emula ections will be lost.	ated displays. To minimi	ze this impact, co	nfigure EDID emulatio	n before configurir	ng AMD
Source From File	~	Source File C:/Users/7thSense Design Ltc	i/Desktop/					
Destination GPU 0 - AMD Radeon(TM) Ve	ga 11 Grap	Destination Connection Connection 2 (DisplayPort)		4	<b>3</b>	2	4	
Destination Connection Pro Connection: Display Port, La	erties nes: 4, Bit Rate: 5.4		>					
🔒 🎮 Gami	ng	▶ Video	Connect	Displa	ау	🖅 System	••• Adv	anced

# Gaming

For UHD or higher, there is just one setting here. Click 'Gaming' and in Global Settings, switch on 'Triple Buffer':

AMDZ RADEON SETTINGS ? 🖈 _ 🗆 ?										
<      Global Settings										
Global Graphics					lonitoring					
Configure graphics settings. Custom s	settings configured in profiles override set	tings on the Global Graphics page				more	🛱 Reset			
Anti-aliasing Mode	Anti-aliasing Method 🗸 🗸	Morphological Filtering Off	Anisotropic Use applica	: Filtering Mode ation settings		Texture Filtering Quality Standard	~			
Surface Format Optimization	Wait for Vertical Refresh Off, unless application specifi	OpenGL Triple Buffering On	Shader Cad AMD optim	he ized		Tessellation Mode AMD optimized	~			
Chill Off										
A Gaming	► Video	© Connect	Display	OF SI	ystem	••• Advar	nced			

# **Eyefinity Display Grouping**

Having more than one connection now adds the 'Eyefinity' button.

The AMD driver for Pico currently only supports a single horizontal row of displays. [October 2019]

Click 'Eyefinity' and then on 'Quick Setup' to arrange the displays.

AMD	RADEON SET	TINGS				?	) ☆ _ □ ×
Quick S	Setup is complete. Display gr	oup has been created					more
Discard	ı ۵	Arrange Displays	r 📮 Try Advanc	ed Setup 🥕			
e <u></u>							
A	🙉 Gaming	► Video	©⊜ Connect	Display	Eyefinity	🕼 System	••• Advanced

Click a display to identify the actual output that is lit up blue:



The final display needs no identification.

Close Radeon Settings and restart the Pico.

72
# **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**

4 8 G S Delta Media Server

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

## EDID Emulation (Spoofing)

EDID (Extended Display Identification Data):

- 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 ٠ displays when drawing to them
- maintains the required arrangement on working displays if one (or more) display fails: •



- 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:

MIDIA Control Panel					
File Edit Desktop Workstation Help					
3 Back - 🕲 🐔					
Select a Task	View System Tenelogy				
B-30 Settings	view system ropology				
Adjust mage seconds with preview Manage 3D settings	This page shows the displays and graphics cards correct	stad within this postern.			
Set PhysiX Configuration					
-Change resolution	C. Funned al C. Dafrach				
-Adjust desitop colour settings	- cipano as				
-Wew HDCP status	System topology	Status Settings			
Set Up Digital Audio	System	Mo of			
-Adjust desizability size and position -Set up multiple displays	Veriation	20 Application controlled			
E-Stereoscopic 3D	20 Shure	V Approximation controlled			
-Set up stereoscopic 3D -View rating for cames	E Boudeo Sone	COSC CO			
	Eamelock 0	PR Notwood			
-Adjust video colour settings	Francisck 1	P Not used			
- Willation	External over sizeal	Not nesent			
I-New system topology	Framelock sync pulse	A Not present			
Charles Mosaic	Sync settings	Synchronise Displays	More		
Manage GPU Utilisation	Quadro M6000 (1 of 2)				
-Synchronise displays	DVI	Not connected ECIII2 (Monitor)			
	DVI	EDI2 (Nonitor), Multi-Displey Cloning (Disabled)			
	DisplayPort (3)	Not connected EOD (Monitor), <u>Multi-Display-Cloning</u> (Disabled)			
	DisplayPort (2)	Not connected EDD (Monitor), <u>Multi-Display Cloning</u> (Disabled)			
	DisplayPort (1)	Not connected <u>EDD</u> (Monitor), <u>Multi-Display Cloning</u> (Disabled)			
	SLI Mode	Disabled			
	Usage Mode	WDDM			
	Total memory	20180 M8			
	Memory free	12115 M8	( More		
	Idek Iyama PLE2208HDD				
	Display state	Not synced			·
	Resolution, refresh rate, colour de	1920 × 1080 pixels, 60.000 Hz, 32 bpp			
System 27 of hacon	1.4	Horizontal (2200) Vertical (2225)			
			And the second se		
				/ Nen	se
(3) E				🛛 🔺 🛎 🕅 🐼	1055 07/08/2017

#### **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,  $4 \times DP + 1 \times DVI$  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**, and that the adapter types are the same for all. It is not possible to spoof outputs with mixed resolutions or mixed adapter types.

MVIDIA Control Panel				
File Edit Desktop Workstation Help				
🔾 Back 🔹 💭 🔣				
Select a Task	View System Topology		<u>.</u>	
	in the system reports,			
-Manage 30 settings -Set Physic Configuration	This page shows the displays and graphics cards connected	I within this system.		
Display				
-Adjust desitop colour settings	💠 Expand al 🕐 Befresh			
-Rotate display -Vew HDCP status	System to Manage LUID			
-Set Up Digital Audo	Export Lood Unload			
Set up multiple displays	Ve EDID File:			
Set up stereoscopic 30Set up stereoscopi	34	Browse		
-Wew rating for games	Select Connector to Force EDID:			
-Adjust video colour settings	Connector Display Stat	us Wdeo signal Comments* *		
Adjust video image settings     Workstation	DisplayPort (1) Not	Connected DVI-D Connected VGA (Analogue)		
- New system topology Set up Missar	DisplayPort (2) Not	Connected VGA (Analogue)		
-Change ECC state	DisplayPort (3) Not DisplayPort (4) Not	Connected VGA (Analogue) Connected VGA (Analogue)	More     More	
-Manage GPU Utilisation -Synchronise displays	G Quadro M6000(2)			
	DisplayPort (1) Not	Connected VGA (Analogue)		
	DisplayPort (2) Not	Connected VGA (Analogue) Connected VGA (Analogue)		
	DVI Idek Isyam Mon	tor DisplayPort (Dig		
	<ul> <li>I have read the warning messages and warning messages.</li> </ul>	eant to load EDID on selected monitors		
		Lood EDID Cancel		
		EDE (Monitor), <u>Multi-Display Cloning</u> (Disabled)		
	SLIMode	Disabled		
	Total memory	20180 MB		
	Memory free	12115 MB	W More	
	🗈 🌉 ldek Syama PLE2208HDD			
	Display state	Not synced		
Status Information	Resolution, refresh rate, colour de	1920 × 1080 pixels, 60,000 Hz, 32 bpp Mexicantel (2000)   Vestical (8125)		-th
				Cente
				JULIA
🚯 🔗				📕 🚢 😢 🏷 🧐 🌓 10.56

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.

# Emulating, Grouping, Synchronising Displays

NVIDIA Control Panel				
File Edit Desktop Workstation Help				
G Back • G 🕥	1000			
Select a rask ⊡-30 Settings	View System Topolog	ВХ	<u>î</u>	
-Adjust image settings with preview -Manage 3D settings	This page shows the displays and graphics cards	is connected within this system.		
-Set Physik Configuration			1	
Change resolution Adjust desitop colour settings	Espandial C Befresh			
-Rotate display - Vew HDCP status	System to Manage EDAD			
-Set Up Digital Audio -Adjust desitop size and position	D Export Load Uniced			
Set up multiple displays ::-Stereoscopic 30	V EDID file: Critikensi/2thGense Design Ltd/Des	rsitcol/7th 192 Browste	E	
Set up stereoscopic 3D Vew rating for games	Select Connector to force EDID:	ELVINE.		
-Adjust video colour settings	Connector Display	Status Wdeo signal Comments* *		
Adjust video image settings	Quadro M6000(1)	Not Converted (MS-D) The FDID indicates time		
-Mew system topology -Set up Mosaic	ViplayPort (1)	Not Connected DisplayPort (Dig		
Change ECC state Manage GPU Ublisation	DeplayPort (2)	Not Connected DisplayPort (Dig Not Connected DisplayPort (Dig	(W) More	
-Synchronise displays	DisplayPort (4)	Not Connected DisplayPort (Dig		
	DisplayPort (1)	Not Connected DisplayPort (Dig		
	DisplayPort (2)     DisplayPort (3)	Not Connected DisplayPort (Dig Not Connected DisplayPort (Dig		
	• 2713			
	<ul> <li>Trave reacide waring lies</li> </ul>	sages and want to load LULU on selected monitors		
		Load EDD Cancel		
		EDD (Monitor), Multi-Display Cloning (Disabled)		
	SU Mode	Disabled		
	Usage Mode	WDDM		
	Total memory Memory free	20180 MB 12115 MB	(₩) More	
	😑 🌉 Idek Ilyama PLE2208HDD			
	Display state	Not synced 1920 x 1000 civels (0.000 ktr. 32 hop		
System Information		Horizontal (2200) Vertical (1125)		
				a seuse
(3) S				🔟 🚢 💌 🏷 🖏 👀 👘 10.58 07.08/2017
MIDIA Control Panel				
NVIDIA Control Panel File Edit Desktop Workstation Help				
NVDIA Control Panel File Edit Desktop Workstation Help				
WXDXA Control Panel           File         Edit Desktop Workstation Help           Operative         Operative           Static and task         Operative           Static and task         Operative	View System Topolog	8 <b>y</b>		
WDDA Control Panel     For Edit Desitory Workstation Help     @ Incl @      @ Solar - @      @     Solar a Incl     @ 30 Samp     Advance saftroge saft preview     Monae Nampo saftroge saft preview     Monae Nampo saftroge saft preview     Monae Nampo saftroge saft preview	View System Topolog	3y		
MXDDA Control Favel     Fee Eds: Dealtop Workstation Help     @ Incl = @     @ Software	View System Topolog	<b>BY</b> convected within this gatem.		
MDDA Control Fanel File Eds: Decision Workstation Help Control File Table File File File File File File File Fi	This page shows the display and graphics cards	<b>EX</b> I connected within the system.		
MDDA Centrol Fand Fire Eds Destrop Workstation Help Control - Con	View System Topolog This page shore the display and publics cards	<b>Sy</b> Seture Settings		
MODUL Control Panel     Fre Edit Desized Workstation Help     Seter a Take.     Softman     Softm	View System Topolog This pape shows the display and gaphes cards System topology System of the start of the s	By connected within the system.		
MODA Control Panel     Fre Eat: Desition Workstation Help     Sete a Table.     Solaria and a set of the	View System Topolog This page shows the displays and graphics code topology System topology System Driver vension Vertical proc	BY scorrected within this system. Settus: Settings Settus: Settings 20.5.5 20.5.5 20.5.5 20.5.5		
MDDA Control Favel     Fer East Desitory Workstation Help     Tor East Desitory Workstation Help     Tor Point     Tor Poin	View System Topolog This page shows the displays and graphics costs Capanel Control Control Control System topology System Deservencion Verical type JD Server	Sy corrected within this paten. Status Settings WARA W The Application scottability The Application scottability		
MDDA Control Favel     Fre Eat: Destrop     Weak 1 Intel     Destrop	View System Topolog Thi sogn shore the display and gueshese cade Departed a	Status Settings Satus Settings Satus Settings Satual S		
MODUL Control Panel     Fre Ealt Destroy Workstation Help     Sete a take.     Sete a	View System Topolog This pape shows the display and packets cards System topology System Verical ypes 20 Stores 20	By connected within the system.		
MUDUA Control Panel     Fire East: Desition: Webge     Solution: Webge     Solution:      Solution:     Solut	View System Topolog This page shows the display and gapies cach transpare shows the display and gapies cach transpare shows System topology System Diver vension Vertical you 30 Stores Famelock 1 External you signal External you signal	Structure Settings  Status Settings  Status Settings  Status Settings  Status Settings  Net work		
MODA Control Famel     Fre Eat: Desition Workstation Help     Set a Table     Softman	View System Topolog This page shows the display and paghics code topology System topology System Driver vension Vertical proc 30 Stores Parentock 0 Frantock 0 Frant	Setus Settings Sets Settings Sets Settings Sets Settings Sets Settings Sets Settings Sets Sets Settings Sets Sets Sets Sets Sets Sets Sets Sets		
MODA Control Favel     For East Desized     Torial East Desized     Torial East Desized     Torial     Torial East Desized     Torial	View System Topolog This sign shows the display and guesties can Depend al Organization System Deprese Vertical spine Vertical spine Vertical spine Sorree Conservation Vertical spine Parametersk 1 Exervation Farametersk 1 Ex	Status Settings Settings Settings Settings Settings Settings Settings Settings Settings Not word Not	€ More	
MODUL Control Panel     Free East Desized Workstation Help     Control     Sector 1 failure     Control     Sector 2 failure     Control     Cont	View System Topolog This page shows the digstay and packets call System topology System Verical yee, 20 Stree Familoid 0 Familoid 0 External yee signal External yee sig	By s connected within the system Status Settings Status Settings Status Settings Status Status Not word Not word Not present Sectionation Controlled Controlled Sectionation Not connected Not connect	C Mare	
MUDIA Control Panel Frie East Desized Workstation Help Frie East Desized Workstation Help Frie East Desized Workstation Help Frie East Panel Frie East Panel Frie East Panel Frie Control Panel Frie Frie Control Panel Frie Frie Frie Panel Frie Frie	View System Topolog This pape shows the display and packets cach view of the display and packets cach vie	Status Settings  Return Settings  Return Settings  Return Settings  Return Settings  Return Settings  Net used  Net present  Settings  Net used  Net present  Settings  Net connected PhyloColo (; of 6)  Connected Phy	€ Mos	
MODA Control Famel     Fre East Desizery Workstation Help     Fre East Desizery Workstation Help     Sete at Table     Software    Applied mays stimp and preview    Applied mays stimp a	View System Topolog This page shows the display and gaphes calls Capanish Control of Control System topology System topol	Set overeide within this system.  Set over a set ings Set over a set of the system.  Set over a set of the system	€ More	
MODUL Control Panel     For Earls Destroy Workstation Help     Control     Sector 1 take     Sect	View System Topolog This span shows the display and gachete cash System topology System Derive variain Verical spine Source Sou	Stormestad with the potent  Satus Settings  26.85		
MODUL Control Panel     Fre Earl Desized Workstation Help     Control     Contro     Control     Contro     Control     Control     Control     C	View System Topolog Tris page shows the digate and packets can Use a page shows the digate and packets can Use a page of the system System	Status Settings Status Settings Status Settings Status St		
MUDIA Control Panel Fre Eat Desizes Workstation Help Select a Takin- - Select a Takin-	View System Topolog This pape shows the display and packets calls System topology System topology System topology System topology System topology System topology Diver venticit Diver venticit System topology System Diver venticit System topology System topology S	Status Settings  Return Settings  Retur		
MUDA Control Famel Fire East: Desized Workstation Help Select a Takin: 	View System Topolog This ages shows the disfays and graphics costs System topology System Doner varials Verical grap: Stores Paraeliski B Betweening one signal Paraeliski B Visia Visia Visia Visia Visia	By:     Settings       Settur:     Settings       201.8     Not used       201.8     Not present       201.8     Settings       201.8 <td>€ More</td> <td></td>	€ More	
MUDIA Control Panel Ter Edit Destroy Workstation Help Control Panel P	View System Topolog This span shows the disalign and gueshese cash System Topology System System System Sorres	Sy ke convected with the system.  Sector Sectors  Sector Sectors  Sector Sectors  Sector Sectors  Sector Sectors  Sect		
MULTIA Control Panel Ter Edit Destang Workstation Help Control Panel Sector 1 take: - Sector 2 tak	View System Topolog Tris page shows the digate and packets seek Use and the digate and packets seek Used and the digate and packets seek System System Dispers	By  to connected within the system.   Status Settings:  Status Settings:  Status Settings:  Status Settings:  Status Settings:  Status Not used Not used Not veset: Not used Not preset:		
MUDA Consul Panel Fre East Desized Workstation Help Fre East Desized Panel Fre East Desized P	View System Topolog The pape shows the digiting and packets call The pape shows the digiting and packets call The pape shows the digiting and packets call The particular shows System resides Particular shows Determined Particular shows D	Sy       convected within the system      convected within the system      Status      S		
MUDA Control Famil For East Desized Workstation Help Control Family Workstation Help Sector 1 Take - Adjust ways stars gradient - Adjust ways gra	View System Topolog The sign rises the disfuer and profile costs United in the state of the signed of the signed System topology System System Signed System Signed	Stormender within this system.  Serious Settings  Mod. M  Settings  Mod. M  Mod. Settings  Mod. Settings  Mod. Settings  Not used  Not used  Not used  Not present  Sectional Rolations  Sectional Rolation  Sectional Rolation  Sectional Rolation  Sectional Rol	Mor	
MODUL Control Panel     Tre Last Control Panel     Tre Last Control Panel     Tre Last Control Panel     Sector 1 task.	View System Topolog The sear show the disday and guebra cash Compared all Compared and System Topology System Sys	Sy       sourcestant white the system      Sector Sectors      Sector Sectors      Sector Sectors      Sector Sectors		
MULTIA Control Panel Ter Edit Destang Workstation Help Control Panel Sector 1 take. Sector	View System Topolog Tri page itori the dislay and packet call Use page itori the dislay and packet call Use and the dislay and packet call Use and the dislay and packet call System System Decision Paradol 3 Estemal one signal Estemal one signal Estemal one signal Estemal one signal Estemal one signal System Use Call one signal Vida Vida Vida	By  a convected within the system  b convected within the system  b convected the provided of the system  b convected the prevent  conve		- <b>7th</b>
MULTIA Control Panel For Early Designed Workstation Help Sector 3 Take Oragon and Social Socia	View System Topolog Tris pape shows the digate and packets call Used and the digate and packets call Used and the digate and packets call System Descensions	Sy       to connected within the system      Status:     Setus:		
MUDA Control Panel Free East Desized Workstation Help Free East Desized Panel	View System Topolog Transformer System topology System Sys	Status Settings  Return Settings  Retur		zth
MODUL Control Panel     Tre Last Control Panel     Tre Last Control Panel     Tre Last Control Panel     Sector 1 task.	View System Topolog The sear the disdue and packet call the sear the disdue and packet call the sear the disdue and packet call the search of the search of the search the search of the search o	SV is converted within this gutan. Sector Sector		the transference of the tra
MODIA Control Panel     Free Carlson Workstation Help     Control     Sector 1 status     Sector 1 st	View System Topolog Tris sogn shows the display and package and System Topolog System System Parabola 1 Edensi op ei pala Spres Sores Sores Sores Sore stimal Sprestimality (Sores) Sore stimal Sprestimality (Sores) Sore stimal Sprestimality (Sores) Sore stimal Sprestimality (Sores) Sore stimal Sprestimality (Sores) Sore stimal Sore s	By to concerted within the system. Status Settings Status Settings Status Settings Status Settings Status Settings Status Settings Status Settings Status Settings Not concerted high preset Status Status Not concerted high preset Status Settings Concerted high preset Concerted high		t
MUDIA Control Parel Tes Edia: Desizea Workstation Help Sector 3 failure - Control Parel - Control Parel	View System Topolog Tra page shows the display and packate call Use page shows the display and packate call Use and the display and packate call System Display	BY to convention while the system:		<text></text>

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*.

## 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  $3 \times 1$  group, whilst a group of 8 monitors (as in this example) may use a  $2 \times 4$  group. An NVIDIA 'matrix' is designated as rows × columns (the opposite of AMD systems, which would call the arrangement below  $4 \times 2$ ).



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.

# Emulating, Grouping, Synchronising Displays



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.

# Emulating, Grouping, Synchronising Displays

NVIDIA Contro	NVIDIA Mosaic set up				- • •	
File Edit Desk	Mosaic Displays		Topology: 2 × 4			
Back	Mosaic Displays  1. Select topology  2. Select displays  3.	errange displays 4. Adjust over	Topology: 2 x 4			ss image. E Identify Disple
⊖-Video	Topology:					
Adjust vide						And the first state of the first state of the
<ul> <li>Woristation</li> <li>View system</li> <li>Set up Mos</li> </ul>	8	6	4	2		
Change EC Manage GP Synchronise	1,3	1,1	0,3	0,1		
	7	5	3	1		
		1,0	0,2	0,0		
	Total Resolution 600 x 2100 pixels			Apply	Cancel	
				Back Next	Finish	
O System Inform						• •
<b>()</b>				A 4	. 🔤 🔈 🍋 📆 🕯	) 11:48 07/08/2017

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.

	5	4	2
1,3	1,0	0,3	0,1
7	6	3	1
1,2	1,1	0,2	0,0 Zsense

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.

## 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.

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.

NVIDIA Control Panel File Edit Desktop Workstation Help			
Back • So Strings -Adjust image settings with preview -Manage 3D settings - Adjust image settings with preview - Manage 3D settings - Display - Change resolution - Adjust desktop colour settings - Rotate display - View HDCP status - Set up multiple displays - Set up multiple displays - Set up stereoscopic 3D - Set up stereoscopic 3D - Set up stereoscopic 3D - Adjust video colour settings - Adjust video image settings - Adjust video image settings - Morkstation - View system topology - Set up Mosaic - Change CFC state - Manage GPU Utilisation - Synchronise displays	Synchronise Display You can synchronise frame rendering acros synchronise one or many systems to a hous       	Server Settings Edit the properties of the frame synchronisation pulses generated by the timing server. Server refresh rate: 60.00 Hz The synchronisation pulses are based on: The server refresh rate (Internal timing) An external house sync signal Sync frequency: 60.00 Hz Sync signal detection: composite The signal detection: composite The signal detection: composite The signal detection: signal Sync requency: 60.00 Hz Sync signal detection: composite The signal detection: composite The signal sectors Both edges Falling edges Falling edges Some settings have been automatically updated to match the noming house sync signal. CK Cancel	E Apply
System Information		Apply	Cancel

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:

View System Topology					
This page shows the displays and graphics cards connected	ed within this system.				
← Expand all					
Mosaic Displays					
System topology	Status Settings				
🖂 🛐 Mosaic Displays					
Configuration	2 x 2 Topology				
Resolution, refresh rate	3840 × 2400 pixels, 60.00 Hz				
Display Sync State	Quadro Sync II Server				
Timing	The display is locked to the house sync signal				
OS Screen Identifier	2				
Displays and Graphics Cards					
System topology S	Status Settings				
□ System					
Driver version	377.48				
Vertical sync	3D Application controlled				
3D Stereo	Disabled				
🖃 . 🧱 Quadro Sync II (server)					
Framelock 0	0ut Out				
Framelock 1	0ut Out				
External sync signal	Present (In use)				
Framelock sync pulse	V Present				
Sync settings	Synchronise Displays				
🖃 💻 Quadro P6000					
	Not connected				

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.

## **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 <u>contact 7thSense</u> <u>support</u>.

Using UltraVNC from a control PC, access each server remotely and open the NVIDIA Control Panel (as here  $\frac{73}{73}$ ).

- 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 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:
  - o '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.

#### 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'.

#### 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 copypaste 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.

# **Emulating and Grouping Matrox C680 Displays**

Right Click on the Matrox desktop icon and open the driver displays homepage. This is the front end of the driver – information about the driver can be found in 'About'.



- Open Multi-Display Setup for EDID spoofing and grouping.
- After making any EDID or Group changes, a dialog will ask if you wish to keep these settings. A 60-90 second timer should appear in the active viewpoint.

## Emulating

EDID Setup and Grouping can be found inside Multi-Display Setup. EDID Setup can be found in EDID Management and requires *all* the outputs to be connected.

Matrox PowerDesk		_	
Home 💿 Multi-Display Setup			
Windows display	Main display: Display 1 O Output settings for: Display 1 Monitor model: Recommended resolution: Connector type:	٢	
1+ Matrox output in clone mode	<u>R</u> otation:	None	
	R <u>e</u> solution:	1920 × 1080	۲
Legend (Click to collapse) ⊾	Co <u>l</u> or palette:	32-bit color	
	Refresh ra <u>t</u> e:	60 Hz	
6	Apply settings to all output     Basic configuration     Favorites	s	~
	Audio settings		$\sim$
	O Mode management		
	EDID management		
	Identify displays and output	ts	
🕕 Note: To change your multi-display setup, right-click your displays and	ОК	🞯 Cancel	
outputs or drag them to the work area.	○ Apply	Pelp 🕞	
Use this page to configure the multiple outputs of your Matrox product	5.		
			matrox

C680 graphics cards require a .dat file for the EDID. These can be exported from the display and saved to file. This option is available inside *View and export EDID > Export EDID to file...* 



- Once the EDID has been exported, 'Emulate EDID from file...'. You can either individually emulate each connected output, Select all, or Ctrl+left-click the selection of outputs you want to emulate.
- Apply and OK to confirm the emulation.

You can emulate outputs that are not physically connected to the card when using 'Emulate EDID from file'.

### Unspoof

Under the same *Multi Display Setup > EDID Management*, select all and click 'Disable EDID emulation', then Apply and OK.

### Multi Display Setup

In Multi Display Setup you can view and change the Display Resolution, Bit colour and Refresh Rate. Any changes made need you to click 'Apply' before entering EDID Management or Stretch Mode.

Matrox PowerDesk			– 🗆 🗙
Home 🚭 Multi-Display Setup			
Windows display	Main display: Display 1 Output settings for: Displa Monitor model: Recommended resolution: Connector type:	<b>9</b> ay 1 <b>9</b>	^
Matery output in close mode	Botation:	None	0
mation output in clone mode	Resolution:	1920 x 1080	0
▲Legend (Click to collapse) ▲	Color palette:	32-bit color	0
	Refresh rate:	<u>60 Hz</u>	0
1	Apply settings to all of     Apply settings to all of     Basic configurati     O Use independent mo     Favorites	25 Hz Interlaced 29 Hz Interlaced 30 Hz Interlaced 50 Hz 59 Hz 60 Hz	
	Audio settings		~
Unused outputs	EDID management		
2 3 4 5 6	O Identify displays and ou	tputs	U
Note: To change your multi-display setup, right-click your displays	Оок	O Cancel	
and outputs or drag them to the work area.		C Help	
Use this page to configure the multiple outputs of your Matrox product	ls.		
			matrox

### Grouping

Once emulated you can group your displays. Click the 'Basic Configurations' tab and select 'Use Stretch Mode'. This will offer the available configurations according to the number of outputs connected. If you have all 6 outputs emulated, you will be given all the available configurations between 1 output and 6:

Auth-Display Setup			-
8	1 Statched 1 + 2		î
	1 (Institued 2 x 1		1
8	(Desking)+3		
	1 Doubled 4x1		
<b>H</b>	1 South South 2 + 2		
	13belded 1x4		
	13mided1x1		
	13methad1x3		
TITLE	1 Descent of		
===	13betchard 1+2		
	10eded2x3		
	13extbol1xd		
n-to-ratically co-	rligare your malti-display dealtray, chasse the multi-display setup you want to use	2	1
	00	6 OC+	of .

- Select the group you need, Click 'OK' and then 'Apply' to create the Group. Click 'OK' again to return to the driver Home interface.
- Restart the system after making any graphics changes.

## Ungrouping

To ungroup, go to *Multi Display Setup > Basic Configurations* and click 'Use Independent Mode'. Select 1, or the number of connected outputs, from the options. Click 'OK' and 'Apply'.

1 Independent (single)	î
2 Independent	
3 Independent	
4 Independent	
5 Independent	
6 Independent	

Video Walls

# Video Walls

Whilst not presenting issues of warp and blend, video walls have their own complexities. Dimensions can be very precise, from display panel specifications and physical measurement. The arrangement logic, however, can sometimes feel confusing, especially with rotated and multi-channel walls, or where additional display controllers are used.

- Video Walls: Bezel Compensation<sup>95</sup>
- Portrait-Grouped Video Walls<sup>97</sup>
- Multi-channel Video Walls<sup>107</sup>
- > <u>Non-rectangular video walls</u><sup>(112)</sup>
- Mixed-Pitch LED Displays<sup>(15)</sup>
- Datapath Fx4 Display Controller<sup>(119)</sup>

# **Video Walls: Bezel Compensation**

Until seamless direct-LED video walls completely take over, even ultra-slim bezels remain part of the display calculation. Effectively we need to stretch the resolution of the total display so that the image includes the width of all, and only, the *adjoining* bezels.



The specification of a display panel will provide the pixel resolution and the bezel width.

Example: 1920 ×1080 HD display with very small bezels:

- 0.75 mm pixel pitch
- left/right bezel width 5 mm/3 mm
- top/bottom bezels 5 mm/3 mm (these may not be the same as left/right in all displays)

Width of adjoining bezels =  $0.75 \times (5+3) = 6$  px

In the above group of 3 × 3 of these displays, the total display resolution (canvas) is:

Width:  $(3 \times 1920) + (2 \times 6) = 5772$ Height:  $(3 \times 1080) + (2 \times 6) = 3252$ 

It can also be worth physical measurement, since additional millimetres can accumulate depending on the physical mounting and become noticeable in alignment of diagonals.

This is the available size for the media. If you carve it, do so proportionate to the whole display.

If the display is large enough to require multiple channels, make sure the channel matrix in Delta is underlapped to the bezel measurement, since the adjoining *outer* bezels of each channel now need to be taken into account.

# **Portrait-Grouped Video Walls**

Whilst in theory panel display groups/desktops can be rotated in Windows, experience shows that it is more reliable to rotate the show in Delta. Here are two examples of wall displays employing portraitoriented panels, requiring rotation.

### Example 1: 3 × 2 portrait panels, single channel

A group of six, 1920 × 1080 px display panels, is installed in portrait orientation, overall dimension 3240 × 3840:



When grouped for the graphics output card, they will be grouped as if in normal landscape orientation. The simplest approach in Delta is to make canvas agree with the group, the channel agree with the rotation (physical reality), and to locate the media to agree with this. The canvas agrees with the graphics card display group:



The **channel** agrees with the physical rotation:



## Video Walls

The **media** is in the correct physical orientation for the display and therefore agrees with the channel, not the canvas, so we give it a corrected location in the layout. This is easiest by positioning the centre of the media in the centre of the canvas:

Resource Editor : 3x2portrait-3240x3840	×
General Timeline File(s)       Screen Location       Animation       Keying       Colour         Image Mapping Mode :       Flat       ✓         Full Screen         ✓         Maintain Aspect         ✓         Image Mapping Mode :       Image Mapping       ✓         Maintain Aspect         ✓       1620       ✓         Image Mapping Mode :       Image Mapping       ✓       1620       ✓         Mirror H       Image Mapping       Image Mapping       ✓       1620       ✓       Pixels         Image Mapping Mode :       Image Mapping       Image Mapping       Image Mapping       ✓       Pixels         Image Mapping Mode :       Image Mapping       Image Mapping       ✓       Pixels       ✓         Image Mapping Mode :       Image Mapping       Image Mapping       ✓       Pixels       ✓         Image Mapping Mode :       Image Mapping       Image Mapping       Image Mapping       ✓       Pixels         Image Mapping Mode :       Image Mapping       Image Mapping       ✓       Pixels       Nitrol         Image Mapping Mode :       Image Mapping       Image Mapping       Image Mapping       Image Mapping       Pixels       Nitrol       Pixels       Nitrol	Original Image Size 3240 Pixels 3840 Pixels Aspect 0.84 : 1 Canvas Size 3840 Pixels 3240 Pixels 3240 Pixels Aspect 1.19 : 1
	OK Cancel Apply

This appears in the layout is if it were mismatched:



## Video Walls

But the display (and preview) shows that this is correct:



Note that the playback window represents the canvas, so will be rotated.

## Example 2: 5 × 1 portrait panels, single channel

A group of five,  $1920 \times 1080$  px display panels, is installed in portrait orientation, overall dimension  $5400 \times 1920$ :



The graphics card grouping will stack these in landscape orientation, so we match the **canvas**:



The **channel** agrees with the physical rotation:



## Video Walls

The **media** is in the correct physical orientation for the display and therefore agrees with the channel, not the canvas, so we give it a corrected location in the layout. This is easiest by positioning the centre of the media in the centre of the canvas:

Resource Editor : 5x1-portait wall-imag	je	×
General Timeline File(s)       Screen Location         Image Mapping Mode :       Flat         Full Screen	Animation Keying Colour         Image: Size         X       960         Pixels         Y       2700         Pixels         Pixels         Height       1920         Pixels         Roll       0.00         Degrees         Coordinates relate to Centre	
	OK Cancel Apply	

This appears in the **layout** is if it were mismatched:

▲ 7thSense - GUI - Timeline 1 - c:\shows\5x1-portrait-wall.xml*         Eile       Eile       Display       Servers       View       Encrypted Movies       Wizards       Configure         □       □       □       □       □       □       □       □       □       □	- D	× <u>H</u> elp
Layers     Layout     Switches     Preview     Group     64     ✓       Warp     Blends     Colour     Splines     Display     Sequences     Server     L: Delta3507     ✓	My name 1 7THSENSE	E ver
Resources Timeline   Image Description Start   1 5x1-portait wall-image     Layer 1   Centre: X 960 Y 2700   W 5400 H 1920   Frames 0 - 100	cted In Scope Enabled	
Image: Note - a Geometry, Spline or Transform Animator on the same layer can override the location       Refresh     Image: RESET	in v	
LTC       00 : 00 : 00 :: 00          • • • • • • • • • • • • • • •	:::00 00:00:16::00 00:00:20 >	€ Q

But the display (and Preview) shows that this is correct:



Note that the playback window represents the canvas, so will be rotated.

# **Multi-channel Video Walls**

Larger video walls may require multiple channels, and even splitting channels with a display controller, such as the Datapath Fx4, to feed more display units. Managing rotation and placement of displays grouped by each graphics card can take a little thought. Here is a worked example of a 6 × 2 display installed in portrait orientation, fed by three channels from Delta.



In DeltaGUI, the **canvas** matches the overall display, in an underlapped (for bezel compensation) 3 × 1 matrix array:

▲ 7thSense - GUI - Timeline 1 - Defau File Edit Display Servers View Er D 😂   🖬 🖾 🐹 V W	ult* ncrypted Movies <u>W</u> izards	<u>C</u> onfigure ₹   <b>Ⅲ ID</b>		Au	idio 🗾	– □ × <u>H</u> elp			
Layers Layout Switches Warp Blends Colour	Splines Display	Preview Group Sequences Server	64 V	My	name 1 🗸	<b>7THSENSE</b> Delta MediaServer			
FLATPLANE MODE	MESH MODE	OUTPUT CHANNELS	PREVIEW SETUP		Testpatterns	Grid Off ~ Size 25			
OUTPUT VIEWPORT									
Channel 2 Active Canvas Size (pixels) Width 6480 Height 3840 Display Mode		Viewpor	Output Car 6480 by 3840 1 Viewport 2	ivas :   pixels   Viewport 3					
Matrix V 3 V X 1 V						(RESET)			

The three **channels** are rotated to match the graphics card grouping for portrait-oriented displays, so that they run left to right:
▲ 7thSense - GUI - Timeline 1 - Defa <u>F</u> ile <u>E</u> dit <u>D</u> isplay <u>S</u> ervers <u>V</u> iew B		e		− □ × <u>H</u> elp
🗅 🚔 🛛 🔚 📽 🖾 V W	/ 🧮 🚟 🏦 I   🛞 R   🏢 ID		Audio	Video
Layers Layout Switches Warp Blends Colour	Preview Splines Display Sequence	r Group <mark>64 ∨</mark> es Server L:Delta3507	My name 1	7THSENSE Delta MediaServer
FLATPLANE MODE	Mesh Mode O	UTPUT CHANNELS PREVIEW SETUP		Grid Off ~ Size 25
CHANNEL		MATRIX MODE : CHA	NNEL LOCATION	
Channel 2 Active Canvas Size (pixels) Width 6480 Height 3840 Channel Location X 0 Y 2160 Width 3840 Height 2160 Rotation 270 Defaults Wizard Beams Name Chan_2		Canva 6480 by 384 Channel 1 Channel 2 : 3840 by 21 pixels Channel 3	S : 0 pixels	
				( RESEL
Main < 1 2 3 4	5 6 7 R Þ Auto <	1 2 3 4 5 6 7	R 🖻 Display Beams S	Snap Off 30.000 fps

Here media carved into the three channels is given individual locations for these rotated channels:

🛦 7thSense - GUI - Timeline 1 - Default*	_	ΟX
<u>File Edit D</u> isplay <u>S</u> ervers <u>V</u> iew Encrypted Movies <u>W</u> izards <u>C</u> onfigure		<u>H</u> elp
D 🖆   🖬 🖾 🕅 V W 📕 🖬 业 I   券 R   ▦ ID Audio	Video -	
Layers Layout Switches Preview Group 64 ~ My name 1 ~	7THS	ENSE
Warp Blends Colour Splines Display Sequences Server L: Delta3507	Delta Me	ediaServer
Resources Timeline Configure Filters: Selected In Scope	Enabled	I 🔽
Layer       Image Description       Start         1       6x2-portrait-wall-ch1       0         2       6x2-portrait-wall-ch2       2         3       6x2-portrait-wall-ch3       0    Frames 0 - 100          •       6x2-portrait-wall-ch2       •         •       6x2-portrait-wall-ch2       •         •       6x2-portrait-wall-ch3       0             •       6x2-portrait-wall-ch3       •             •       6x2-portrait-wall-ch3       •             •       6x2-portrait-wall-ch3       •              •       6x2-portrait-wall-ch3       •                 •       6x2-portrait-wall-ch3       •           •     6x2-portrait-wall-ch3           •     •     6x2-portrait-wall-ch3           •	W 2160 H	
Note - a Geometry, Spline or Transform Animator on the same layer can override the location		~
		>
LTC       00 : 00 : 00 :: 00 ·: 00 ·· 10 ·· 00 ··	0 00:0	
Main ⊲ 1 2 3 4 5 6 7 R ⊳ Auto ⊲ 1 2 3 4 5 6 7 R ⊳ Display Beams Sn:	ap Off	30.000 fps

Here the **location** of the media for channel 2 has been set:

Resource Editor : 6x2-portrait-wall-ch2	×
General Timeline File(s)       Screen Location       Animation       Keying       Colour         Image Mapping Mode :       Flat       Image Mapping       Im	Original Image Size 2160 Pixels 3840 Pixels Aspect 0.56:1 Canvas Size 6480 Pixels 3840 Pixels Aspect 1.69:1
	OK Cancel Apply

The display is now correct:



This example is small enough for a single piece of uncarved media, but this principle of arrangement holds for any array using many more displays. Note also that this is the correct approach for very long walls exceeding the 16384 px width limit.

## Non-rectangular video walls

For effect, video walls can be any shape or arrangement, to be more eye-catching and interesting, and carrying a single disaggregated image, or multiple but co-ordinated images. Graphics card drivers are good at grouping rectangular arrays, and rectangular media is efficient. For everything else, there are options.

Let's take an irregular array of 8 panels that needs to be able to show a contiguous image. Except for the extreme-right panel, we would not be wasting much of a rectangular media frame:



Delta software offers <u>composition mode</u>, whereby elements of the source media are placed individually into display areas. This allows for very efficient media delivery by compacting just the visible areas during the graphic design, into a rectangular frame that minimises unused pixels.

In this case, the solution could be to take the displayed areas only, and compact them into a rectangular frame, a saving of 60 per cent:



Delta will take each element, rotate where required, and place them in the total canvas area:



There are many solutions, and a simple alternative in this case may be simply to extract the outlying area as a separate media resource and cut the right-hand quarter off the original.

Display controllers (see below, the <u>Datapath Fx4</u><sup>(119)</sup>, for example) can also produce a similar result, placing parts of a rectangular image into the distributed video space. The visual result is exactly the same.

## **Mixed-Pitch LED Displays**

Sometimes it may be necessary to span media across LED display panels with different pixel pitch. The panels may have the same physical dimensions, but be required to play the same media, perhaps adjacent to each other. Consider this two-display example, where the processors for each display can receive the same resolution, the displays are the same physical dimension, but one has almost double the pixel-pitch of the other:



By using DeltaServer in <u>composition mode</u> (a Delta licence option), the output channels can be manually placed on the output raster. Each LED processor receives only the relevant part of the media, on a desktop resolution in DeltaGUI that matches that of the processors.

### **Display Canvas**

In DeltaGUI, *Display > Canvas*, set the canvas size to the overall resolution of both display processors. For this example, let's suppose each is 800 × 800, so the overall canvas size is 1600 × 800:

🛕 7thSense - GUI - Timeline 1 - Default.xml*			– 🗆 X
File Edit Display Servers View Encrypted	Movies <u>Wizards</u> <u>Configure</u>	A	<u>H</u> elp
	I ∐ I   * R   ⊞ ID	Audio	Video
Layers Layout Switches	Preview Group 64 V	My name <mark>1 v</mark> -	7THSENSE
warp Biends Colour Splines	Display Sequences Server L: Delta3507	De	<b>elta</b> MediaServer
FLATPLANE MODE DOME MODE MESH	H MODE OUTPUT CHANNELS PREVIEW SETUP	Output Setup Testpatterns	Grid Off  V Size 25
CHANNEL	COMPOSITION MODE : CH	ANNEL LOCATION	
Channel 1	Canvas : 1600 by 800 p Channel 1 Channel 1 : 800 by 800 pixels	ixels mei 2	
		P. Display Rasma Saar	
Main < 1 2 3 4 5 6	7 R ▷ Auto < 1 2 3 4 5 6 7	R 🖻 Display Beams Snap 🤇	Uπ 30.000 fps

### **Timeline Media**

Then suppose we place media on the Timeline with a dimension of 1920 × 1280. The left half of this media on channel 1 (with the higher pixel-pitch, unscaled) will therefore be 960 wide, full height.

### **Output Channel Viewport Settings**

Since we are in composition mode, when we go to Output Channels, we can set the overall output frame, and the viewport for each channel. First, create a frame bigger than the output resolution to create working space, and position each channel's viewport. This will also allow us to offset the viewport if the displays prefer not to run from X,Y of 0,0. Compare the viewport settings of each channel (Channel 2 inset illustration):



**Channel 1 viewport** location has been offset in X and Y by 32 px (let's say this is a requirement of this LED display panel). Its width is the first (horizontal) half of the media (960), and it is full height (1280).

**Channel 2** is positioned (viewport location X at 1020 px) clear of channel 1, and is vertically offset by 20 px (again let's suppose this is a different requirement for this panel). It displays the right side of the media (960 × 1280) but scaled down by the pitch ratio of 1.5 between the two displays (to 640 × 853).

In the playback window, this will appear 'wrong' but on the LED displays, their different pixel-pitch will look correct.



A worked example in Delta version 2.4 can be seen here. (In Delta 2.5, viewports are shown using the *Output Channels* icon in *Display*.)



View online at <u>http://portal.7thsense.one/user-guides/MC264-display-configuration/index.html?</u> gdc\_mixed-pitch\_led\_displays.html

## Datapath Fx4 Display Controller

The Datapath Fx4 will take one GPU output and split it to control a group of up to 4 displays. Units can be daisy-chained (looped) and synced. In this basic setup guide we look at how configuration works, but the creative possibilities are much wider.



Each output monitor can take its input from any region of the input image as all of the required cropping, scaling, rotation and frame-rate conversion is handled by the Datapath Fx4 hardware. These regions can overlap to allow any output to replicate another or can be configured to support any creative splice of the source material. This allows the support of many non-rectangular screen arrangements with uneven gaps, and any mix of monitor orientations.

The fundamental limit for the FX4 is 616 MP/s (Mega pixels per second). 3840 × 2400@60 Hz does, for example, fall under that limit and would work using the DP input. However, there is also a limit on the maximum output geometry size from any one the outputs, and this is 2048 × 2048.

The FX4 only supports 8-bit operation, with the exception of the SDI version which supports 12-bit outputting when using the DP inputs.

#### **Features**

- Creative configurations
- Up to UHD input, 4 × HD 1080p outputs
- Rotates, crops, scales, mirrors and bezel corrects
- Dual HDMI 1.4 and single DisplayPort 1.2 inputs for 4K 60 fps source capture
- HDCP support on all inputs and outputs
- Stand-alone operation: non-volatile configuration can adapt to changes in inputs by automatically adjusting all scale factors
- Power down configuration save facility, power up instantly with no re-setup required

For more details, there is a Datapath Fx4 Quick Start, and a full Guide available. This contains additional information on looping multiple units, recommended maximum cable lengths, and troubleshooting.

## **Conceptual Overview**

The Datapath Fx4 is configured and the final display laid out, using the Wall Designer application. This can be used over IP, or with the software on a PC connected by USB to the Fx4. Principally, the Wall Designer software is providing configuration and visualisation. The result is stored in the Fx4, and can be saved in a config file (extension .wdl). It is very simple to use.

Do not use the Wall Designer app on the server, because you can easily lose the controls you need by sending them out of view.

### How Wall Designer and Fx4s views the world

You can take a single piece of media through a single channel in Delta and split it across multiple display panels with one or several Fx4 units daisy-chained together. Rather like Delta composition mode viewports, the resolution of the whole canvas is split across all connected displays (Datapath promotes Wall Designer as a designer tool for constructing panel arrays that are not in a classic matrix). The software shows each panel as a window onto the whole media. These 'capture regions' are virtual panels and can be dragged around, flipped and rotated and positioned by measure as you wish, to match a physical wall construction. Where the virtual panel lies on the media background, that area of the media is what the panel will display (illustration below). Daisy-chained (looped) Fx4 units are viewed as connected units in Wall Designer to handle more than four panels at once.



### **Matrix Video Walls**

Large high-resolution displays will need to pass through multiple Delta channels. Each GPU head can then address one or more Fx4 units, but only daisy-chained *per head*. Fx4 units from multiple heads can be genlocked, but each channel's Fx4 must be configured separately. However, if the Fx4s are addressing identical layouts (as in a regular matrix), the same configuration for the first can be replicated on the other units. In this way very large video walls can be fed easily to at least four times as many panels as channels available to Delta.

Ch1	Ch1	Ch2	Ch2	Ch3	Ch3	Ch4	Ch4
Fx4 #1	Fx4 #1	Fx4 #2	Fx4 #2	Fx4 #3	Fx4 #3	Fx4 #4	Fx4 #4
1	2	1	2	1	2	1	2
Ch1	Ch1	Ch2	Ch2	Ch3	Ch3	Ch4	Ch4
Fx4 #1	Fx4 #1	Fx4 #2	Fx4 #2	Fx4 #3	Fx4 #3	Fx4 #4	Fx4 #4
3	4	3	4	3	4	3	4

Example: a matrix of 16 1920 × 1080 panels, giving 8640 × 3840 overall

Each of four GPU heads is connected individually to four separate Fx4 units, each Fx4 feeding four displays mounted in portrait.

The Wall Designer is used to configure the first group of four on the first Fx4, and handles the panel orientation and bezel correction. The configuration can be saved and then applied to each of the other units. To handle the bezel correction *between* channels, use DeltaGUI.

If required, each Fx4 can be assigned a static IP and thereafter be addressed remotely, or its server addressed by VNC.

Alternative possibilities for driving this display:

- two GPU heads each from two servers (using carved media)
- one GPU head with four daisy-chained (looped) Fx4 units (loses resolution)

## Wall Designer and DeltaGUI

The Wall Designer app will handle the internal bezels of a group of display panels, so that each Fx4 receives input from one Delta channel. Where multiple Fx4 units are fed from separate Delta channels, the bezel around the outside of each Fx4 group must be accounted for. This is done in the channel setup in Delta by underlapping the media channel by the width of the adjacent outer bezels.

An alternative, though perhaps more involved method, is to set the panels up as if they had no bezels, and use Delta in composition mode to place viewports precisely in the panels and account for the bezels there.

## Connections

There are three models distinguished by their output connectors: DP, HDMI and SDI. This is the DisplayPort model:



For UHD bandwidth, you must use DisplayPort 1.2 cables.

Take the required GPU output from the Delta server to the DisplayPort in.

The adjacent **loop** out port enables a second unit to receive the same server output and split to up to a further four displays. Example: a 4K output from one server GPU can be split across up to four displays, or more, but this is still an overall 4K group display.

Connect up to four monitors (typically a matrix is sequenced in rows 1 and 2 above 3 and 4).

Connect the **USB** B port to a PC with Wall Designer installed.

The **LAN** option allows the IP of the Fx4 to be addressed over a network, using the passwordprotected browser version of the Wall Designer. (The out-of-the-box dynamic IP can be seen via Wall Designer on a USB-connected PC, in the Status menu.) A static IP can be assigned to each Fx4 once it has been configured. Multiple Fx4 units only require one LAN input, as the second Ethernet port is for looping.

The **Sync** accepts Tri-level or Black burst syncs for genlocking the Fx4 to external devices. It is not required for basic display setup.

## Wall Designer: Monitors

Make sure the Delta server graphics display is properly set up in Windows and the GPU driver and with the right EDID.

The Wall Designer app enables you to quickly configure your displays, saving the configuration to the Fx4 unit. The app can be downloaded from <u>https://www.datapath.co.uk/datapath-current-downloads/display-controller-downloads/software-display-controller</u>. Select 'Wall Designer'.



Install the app on the PC connected to the Fx4. Open Wall Designer:

## Toolbar (right)

Note the **?** icon on the right for additional help. Production-level installation may only be for making sure the unit works, so fewer settings need be made than for a final wall installation.

File icons: New, Open an existing config file, and Save a config file.

**Print** gives a drawing of the panel layout with measurements and a table of panel models and placements.

**Drawing:** note the tools for showing measurements and units, and for snap-alignments, when dragging panels into position on the grid.

### **Menu: Monitors**

untitled*.wdl	- Wall Design	er			
Wall	Desid	aner			
MONITO		DUTE	DEVICE		STATUS
		FUIS	DEVICE		TATUS
	Monitor Se	election			
LG	✓ 55V	M5B	~		
	Add Mor				
	Rotation Angle				
Add Mo	nitors to Wall	Clear Se	lection		
	Monitor Pro	operties			
Manufactu	rer	LG			
Resolution	19	20	1080		
Refresh Rat	te	60 Hz			
Display Are	a 1209.	.6 mm 6	80.4 mm		
Bezel Top Bezel Botto		0.9 mm			
Bezel Left		0.9 mm			
Bezel Right		0.9 mm			
	Save De	tails			
	Delete D	etails			
	New De	tails			
	Settin	igs			
Background	I Image	None Locke	d V		
Monitor Sp	acing 💽	- 0	mm		
-				<u> </u>	

#### Selection

- Select the brand of monitor and the model, from the drop-down menus. These selections will turn blue in the lists to indicate they are the current selection. All monitors must be of the same model, resolution, dimensions etc.
- Click on the grid and drag out the required arrangement (or click required grid squares). This example shows 2 × 2.
- For portrait-mounted panels, set the rotation angle before adding them to the wall.
- Click 'Add Monitors to Wall'.
- Clear Selection clears 'monitors to add'. To remove a monitor from the wall, right click the panel on the wall and select 'Remove Monitor'.

Note that to add another monitor, first 'Clear Selection' otherwise all previously added monitors will be added again.

#### Properties

Details from the Datapath database should be correct by default, but check and change if necessary. Errors may reflect a wrong EDID on the server.

**Resolution** and **Bezels**: these are derived from the database of monitor models, but can be adjusted here.

Save details: accept any changes made to Properties.

**Undo Changes**: resets to previous values. Reads **Restore Defaults** (database values) after saving.

**Background** settings are cosmetic and not necessary for setup. Their principal function is so that you can imagine a display wall in situ (e.g. an airport lounge, reception area, photo or design image of your own ...). There is an example of this in <u>Conceptual Overview</u><sup>(120)</sup>.

**Monitor spacing/projector overlap**: if known and required, apply these settings before adding monitors to the wall.



The added monitors will look something like this:

Here one monitor has been selected (just click and it will go green, showing the origin point), and the right-click menu shows rotation and layer, and allows removal from the wall. The measurement tool has been applied: click this tool once for overall dimensions, again for panel dimensions. Units can be mm or in, using the 'toggle units' tool.

Once selected, a panel can be dragged within the input area (not beyond), or given an X /Y origin by measure. The mouse wheel zooms the wall, and any selected background image can be selected and scaled behind the group by dragging.

## Wall Designer: Inputs

Select the Inputs menu to address the entire input canvas area that is being being taken and split from the Delta server GPU head.





#### Inputs

Create and name a new input, e.g. reference the server and GPU head (channel). Click 'Create'.

You will only need one input to the Fx4. If you make any size adjustments to any panels, you can use 'Refit' to fit the panels into the media, or 'Tile' to fit all the media into the panels.

'Replicate' will place the source image into each channel.

#### Sample Source

This is just an image to use in Wall Designer for setup. The Datapath Logo default may be good enough for setting up. Other defaults are listed, or use your own source with exactly the resolution and dimensions you need.

Note the Flip and Rotation options are for the whole panel group.

#### **Input Source Resolution**

This is the resolution of the input from the Delta server GPU head (channel).

#### **Capture Regions**

This section addresses which part of the source media is displayed on each panel and the group as a whole. To manipulate any panel, click 'Adjust Capture Regions' and select the required panel.

It should not be necessary to use this for an initial configuration, but does apply to actual installations. Here you set the origin for the placement of the input canvas on the arrangement of monitors, the overall dimensions, and can flip or rotate individual panels (see illustration below):



Close the capture regions when you have finished.

Your media should now be exactly where it should be, with channel edge alignment set in Delta, and bezel compensation managed within the channel by Wall Designer. We now need to connect these virtual panels to a real Datapath device.

## Wall Designer: Devices

When you select the Devices menu, you will see the input device and the numbered panels:

antitled".wdl - Wall Designer	- 0 ×
Wall Designer	TAPATH
Auto-Configure Devices Mar Andro Son Mar Mar Martin Son Martin Martin Son Martin Physical Level or Devices Martin	

- Make sure 'Auto arrange' and 'Auto apply' are both checked.
- Click on the Fx4 button.

The panels will go black and return configured, and Wall Designer will show the schematic:



Any element can be clicked to show its properties, and/or dragged: selected items go green. You can reassign outputs to panels by dragging the wires. This avoids the need to swap plugs and ports to correct physical arrangements.

Click on the Fx4 unit itself to see or change its Network Settings:



You can now set a static IP address for using the remote browser Wall Designer app to log into the Fx4 unit. Apply (and note) a password. This will be required at the Fx4 IP Control Panel when you try to connect to the IP of the Fx4.

Input-looped devices will show in this schematic with their connected displays.

## Wall Designer: Status

The Wall Designer Status menu can be used to examine any USB-connected Fx4, as listed on the left.

rout2.wdl - Wall Designer													- 0
Vall Desig	ner								The				DATAPAT
MONITORS INPU	UTS DEVICE	S STATUS				S have			~~			and the second	ENGELLENCE BY DESIGN
Devices			Fx4 - 175C40F00	01551									^
Fad <b>1</b> Fad - 175040F001551 Fad-501	-		Serial Number Firmware Version Flash Version Hardware Revision Output Scaling For Text Disable Outputs When No Signal	175C40F001551 v2.4.2 v16 c No No		IP Address MAC Address Subnet Mask Gateway DHCP Enabled	30 00 29 30 80	0.100.100.105 055:DA:40:20:16 05.255.255.0 0.100.100.1 0				47°C rerige Temperature (ॡ)	
Hx4			Active Input		Display P	ort							
x4			Preferred Input		Display P	ort							
s.s	-		HDMI 1			HDMI 2				Display Port		9	X <sup>0</sup>
			Current Timing		-	Current Timi	ng.		-	Current Timing			-
			No Signal			No Signal				4096 x 2160p @	60.088Hz		
			Preferred Timing			Preferred Tin	sing		•	Preferred Timing			•
			HDCP Status		-	HDCP Status			-	HDCP Status			-
			Unencrypted			Unencrypter	1			Unencrypted			
			HDCP Enabled		••••	HDCP Enabl	ed			HDCP Enabled			•
										Max Link Rate			•
			Output 1	€ Out	put 2	P	Output 3	в	Output		Ø	Loop Output	
			Current Timing	- Currer	nt Timing	-	Current Timing	-	Current Tim	ing	-	Current Timing	-
			1920 x 1080p @ 60.000Hz [SMPTI	1920	× 1080p @ 60.000Hz [5	MPT[]	1920 × 1080p @ 60.00	OH2 [SMPT[]	1920 × 108	0p @ 60.000Hz [SMPT]	<b>u</b>	No Signal	
			Preferred Timing	+ Prefer	red Timing	•	Preferred Timing	•	Preferred To	ming	+	Preferred Timing	•
			Default Timing	* Defau	It Timing	•	Default Timing	•	Default Tim	ing .	•	HDCP Status	
		Upgrade Firms	vare Upgrade Flash Reset Devi									<u> </u>	Osen Webzener
			( detterne ) [ satterne								_		

The Status Panel provides a detailed summary of the device including details of Flash and Firmware versions, IP Address (if connected via a network), serial number and average temperature of the device etc. The Status Panel also displays the input and output properties. A detailed view of each property can be viewed by clicking on each drop-down menu.

**Projection Alignment** 

## **Projection Alignment**

Alignment for any kind of projection surface can either be done manually or by using auto-align tools. The process of alignment produces geometric data that warps the regular media to project correctly. Geometrically simple setups with smaller numbers of projectors do not require auto-alignment systems to achieve this warp data, but with large numbers of projectors, dome theatres and projection mapping, this becomes a very time-consuming task, that will only require repeating with any theatre adjustment, including lamp changes.

In both cases, geometrically accurate patterns are projected onto the display surface and observed, either by eye or camera. The warp data for each channel (projector) is held in Delta Geometry resources and applied to the background / display layer (i.e. to apply to the whole canvas and all visual media resources. Adjustments are made until the projected geometric patterns are correctly aligned. In the case of auto-alignment tools, the process may also include auto-blending and colour correcting overlapped media regions.

The geometry file can be saved separately as an .xdl file and then merged with any show on this display.

#### General notes for manual alignment of flat or curved screens

- The media design must match the aspect ratio of the display surface, not the additive dimensions of all channels, which overlap by around 20 per cent.
- Using a laser line will help provide a true horizontal and true vertical visual reference .
- The grid pattern projected consists of true squares. Physical measurement of diagonals will confirm aspect ratio.
- Work progressively with two adjacent channels, left to right.
- Adjust channels towards each other, not all one towards the next.
- Get everything almost right first, then go back and improve.
- With each channel, start with simple geometry (the four corners) before adding grid points to finesse your warp.

#### Guides

- Flat-screen manual alignment setup and process
- ➢ Dome Mode auto-alignment using Scalable Display Technologies Display Manager™
- > <u>Projection mapping (Mesh Mode)</u> using .obj geometry definition files and Delta 3D calibration

Working in 10-bit Colour Depth

## Working in 10-bit Colour Depth

10-bit operation is switched on from a Registry Key and also the graphics driver needs to be in 10-bit mode, with the EDID connected allowing a 10-bit signal.

**Note**: 10-bit operation is not enabled in *DeltaGUI* > *Display* > *Output Setup*.

#### Make sure the server is licensed for 10-bit (Without this the server won't render 10-bit)

- VNC to the server.
- Take the server out of Fullscreen mode and from the DeltaServer control window, click *About* > *About Server*. Make sure 'Dual Head High Bit Depth' is in the drop-down list, and select it:



#### Change the Registry key if required

- Close the DeltaServer application (be sure to save anything that is open in DeltaGUI before you do this).
- Click Windows Start, type 'regedit' to open the Registry and find the following key:

HKEY\_LOCAL\_MACHINE\SOFTWARE\7thSense\Delta\Graphics 'DesktopTargetBitDepth'.

If this reads 8, double click the name and change the value to 10:

Registry Editor						_		×		
<u>F</u> ile <u>E</u> dit <u>V</u> iew F <u>a</u> vorites <u>H</u> elp										
Computer\HKEY_LOCAL_MACHINE\SOFTWARE\7thSense\Delta\Graphics										
V SOFTWARE	^	Name			Туре	Data		^		
TthSense		ab (Defa	ult)		REG_SZ	(value)	not set)			
6EU-000		ab 3DCal	OldMaths		REG_SZ	0				
Delta		ab Active	StereoBlueLine		REG_SZ	0				
Anaglyph		ab Advar	ncedViewportMode		REG_SZ	0				
Capture		ab Allow	SourceWarpOnMesh		REG_SZ	1				
ComParts		ab Block	RenderOnMovieScrub		REG_SZ	0				
ConfigurationDefaults		ab Canva	asSmallerThanDesktop		REG_SZ	0				
Connections		ab Create	elmageWithTextWhenBad		REG SZ	1				
Graphics		ab Deskt	opTargetBitDepth		REG SZ	8				
Hardware		ab Disab	PRO		REG SZ		_			
Installed		ab Doub	Edit String			×				
> ResourceDefaults		ab Enabl	-							
ResourcePaths		ab FarCli	Value <u>n</u> ame:							
- SDI		ab FiFoD	Desktop Target Bit Depth							
> System		ab FiFoM	Value data:					~		
DFM	$\mathbf{v}$	<	10					>		
			10							
					ОК	Cancel				

#### Check that 10-bit graphics support is enabled: AMD

• Right click anywhere on the desktop of the Server and open AMD Advanced control panel. On the left hand side select AMD FirePro Settings. At the bottom is a checkbox called 'Enable 10-bit pixel formal support'. Make sure this is checked:

	FirePro Advanced Settings	Preferences
> Presets 🧳	AMD FirePro <sup>™</sup> Settings	?
<ul> <li>&gt; AMD FirePro™</li> <li>AMD FirePro™ Settings EDID Emulation</li> <li>&gt; Desktop Management</li> <li>&gt; Desktop Color</li> <li>&gt; AMD Eyefinity™</li> <li>&gt; MU Eyefinity™</li> <li>&gt; Group</li> <li>&gt; My Digital Flat- Panels</li> <li>&gt; Properties (Digital Flat- Panel)</li> <li>&gt; Display Color (Digital Flat-Panel)</li> </ul>	Configure settings for your AMD FirePro <sup>™</sup> graphics card. Quad Buffer Stereo □ Enable Quad Buffer Stereo Active Sync (Sync signal enabled) This option is used in conjunction with active stereo display devices like stereo shutter glass eyewear.	
Scaling Options (Digital Flat-Panel) HDTV Support (Digital Flat-Panel) Custom Resolutions (Digital Flat-Panel)	Enable 10-bit pixel format support	

• Now select 'Properties (Digital Flat-Panel)' on the left menu to check that the graphics EDID is also set to 10-bit. This will give you the EDID information and show at what bit depth the graphics card is drawing.

Standard Display Resolutions

# **Standard Display Resolutions**

These are the most common display formats for reference, with pixel dimensions and ratios:

8K UHD (4320p) 7680 × 4320 16:9		
4K UHD (2160p) 3840 × 2160 16:9		
WUXGA 1920 × 1200 16:10		
HD (1080p) 1920 × 1080 16:9	01:6	
	080 1	
	48 × 1	
	2K 20	

Format	referred to as	pixel dimensions	ratio
HD	1080p	1920 × 1080	16:9
WUXGA		1920 × 1200	16:10
2К		2048 × 1080	19:10
4K UHD	2160p	3840 × 2160	16:9
8K UHD	4320p	7680 × 4320	16:9

**Document Information** 

## **Document Information**

Date	Document edition	Software version	Revision Details	Author/Editor
December 2017	1	N/A	New release	Andie Davidson
July 2018	2	N/A	Updated with AMD Radeon Pro, Windows 10, Dual AMD setup	Andie Davidson
August 2018	3	N/A	Video wall worked examples and graphic output splitting	Andie Davidson
February 2019	4	N/A	Rearrangement, addition of Projection Alignment	Andie Davidson
October 2019	5	N/A	Pico AMD Radeon added	Andie Davidson
February 2020	6	N/A	Matrox C680 added	Andie Davidson
July 2020	7	N/A	Revised server terminology	Andie Davidson
December 2021	8	N/A	Later version of AMD Radeon Pro settings	Andie Davidson

#### Windows Registry Settings

This document is supplied for informational purposes only. Any modification to Windows Registry values that are not exposed via the DeltaServer or DeltaGUI application interfaces – or otherwise advised by 7thSense personnel – may result in performance degradation and/or complete instability of the products. Any attempt to engage 7thSense for support in troubleshooting may result in the reversal of all Registry settings to the factory default or last known good 7thSense-approved configuration. The customer assumes all risk when manually editing any Windows Registry values on any 7thSense product.

## Index

## 1

10-bit colour depth 136

## A

AMD Display Configuration 7 AMD FirePro 15 CrossFire desktops (dual GPU) 26 display matrix 19 display matrix (dual GPU) 26 display synchronization 34 EDID emulation 9 EDID emulation (dual GPU) 15 Eyefinity 19 Eyefinity (dual GPU) 26 genlocking 34 grouping 19 grouping (dual GPU) 26 scaling 19 settings 8 spoofing 9 synchronize (synchronise) displays 34 AMD FirePro displays 8 AMD Radeon Pro 18.Q2.1 38 display matrix 44 display synchronization 50 EDID emulation 40 genlocking 50 grouping 44 settings 39 synchronize (synchronise) displays 50 AMD Radeon Pro 21.Q1.2 54 display matrix 61 display synchronization 63 EDID emulation 56 genlocking 63 grouping 61 synchronize (synchronise) displays 63 auto-align 134

## С

capture regions 120, 125 connections 128

## D

Datapath Fx4 connections 122 Datapath Fx4 display controller 119 DeltaGUI 120 devices 128 display formats and sizes 140 display matrix 77 display synchronization (nVIDIA) 80 document information 142 dynamic IP 130

## E

EDID emulation 73

### G

genlocking synchronise displays (nVIDIA) 80

## Н

high bit depth colour 136

inputs capture regions 125 resolution 125 sample media 125

## L

LAN 122 LED displays mixed pixel-pitch 115

### Μ

matrix walls 120 Matrox C680 GPU EDID emulation 87 install 87 multi-display configuration 87 multi-display setup 87 spoof and group 87 monitors layer 123 remove 123 rotate 123

### Ν

network settings 128 NVIDIA

## Index

#### NVIDIA

control panel 73 emulating and grouping displays 6 grouping 77 mosaic 77 system topology 73 NVIDIA displays reconfigure displays 82

### Ρ

Pico AMD Radeon arrange displays 68 EDID emulation 68 triple buffer 68 projector alignment 134

## R

resolution 120

## S

spoofing (nVIDIA) 73 static IP 128 status of Fx4 devices 130 Sync 122 synchronize (synchronise) displays (nVIDIA) 80

## U

USB 122

## V

video wall setup 94 video walls bezel compensation 95 non-rectangular displays 112 portrait and multichannel 107 portrait panels (worked examples) 97 splitting graphic outputs 119 virtual wall in Wall Designer 120
E: info@7thsense.one W: 7thsense.one

7thSense Design Ltd

2 The Courtyard, Shoreham Road Upper Beeding Steyning West Sussex BN44 3TN UK 7thSense LLC

4207 Vineland Rd Suite M1 Orlando, FL 32811 USA

T: +44 (0) 1903 812299

T: +1 407 505 5200