



# NVIDIA Mosaic Technology

DU-05620-001\_v01 | December 10, 2010

## User's Guide



# TABLE OF CONTENTS

<b>1 About NVIDIA Mosaic</b> .....	<b>1</b>
About This Document .....	2
System Requirements .....	2
Limitations.....	2
<b>2 Using NVIDIA Mosaic Technology</b> .....	<b>4</b>
Connect Your Displays .....	5
Configure Your Driver Settings .....	6
Configure Display Settings.....	6
Enable V-Sync.....	6
Set up Mosaic Mode .....	7
Troubleshooting .....	9
Display position does not match the diagrams in Appendix A .....	9
Only 800x600 resolution is available.....	9
Issue .....	9
Resolution.....	9
Mosaic options are missing from the Set Up Mosaic page .....	10
Issue .....	10
Resolution.....	10

# 01 ABOUT NVIDIA MOSAIC

NVIDIA® Mosaic Technology takes multiple displays and Quadro or NVS GPUs and presents them as a single logical GPU to the operating system.

In this way, using multiple-display hardware acceleration, Mosaic technology lets you use multiple displays to create a larger, virtual canvas with minimal performance impact on 2D or 3D applications.

Each display defines a unique uniform region within a larger virtual canvas.

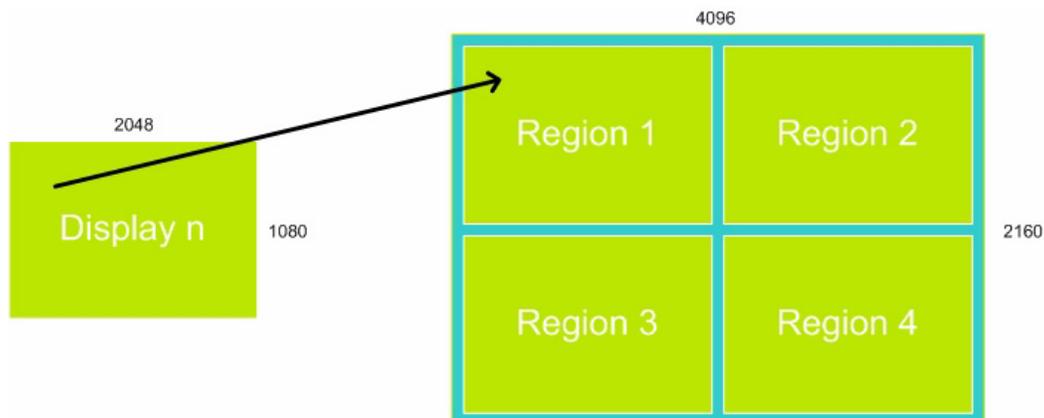


Figure 1.1 Mosaic Regions



**Note:** Unlike SLI Mosaic, NVIDIA Mosaic does not offer the synchronized multi-GPU output required for stereoscopic or multi-projector installations.

## About This Document

This document explains the Mosaic settings and how to connect your displays for optimum performance.

## System Requirements

► The following Quadro and NVS products are supported:



**Note:** If more than one GPU is installed and intended to be used for Mosaic, they must be identical. For example, two Quadro NVS 295 cards can be used in a Mosaic configuration, but not one Quadro FX 380 and one Quadro FX 580.

- NVS 300
  - Quadro NVS 290, 295, 420, 450
  - Quadro FX 380 LP, FX 380, FX 580, FX 1800, FX 3800, FX 4800
  - Quadro 600, 2000, 4000
  - Quadro 5000, 6000 (non-SLI Mosaic enabled configurations)
  - Quadro FX 5800 (non-SLI Mosaic enabled configurations)
  - Quadro Plex D2 (non-SLI Mosaic enabled configurations)
  - Quadro Plex 7000 (non-SLI Mosaic enabled configurations)
- The following operating systems are supported:
- Microsoft Windows 7
- NVIDIA Quadro Professional Driver Release 265 or newer.

## Limitations

► Maximum Resolution

The maximum resolution depends on the Quadro product used.

- **Quadro 5000/6000, Quadro Plex 7000**

These GPUs have a maximum desktop limitation of 16,384 x 16,384 pixels. For proper operation, do not configure display settings that will total greater than 16,384 pixels in either the horizontal or vertical direction. For example, a 1 x 4 array consisting of panels of 6400 x 1600 pixel output each would have a total pixel output dimension of 25,600 x 1600. This would exceed the 16,384 limitation in the horizontal direction.

- **Quadro FX 5800, Quadro Plex D2, all others**

These GPUs have a maximum desktop limitation of 8192 x 8192 pixels. For proper operation, do not configure display settings that will total greater than 8192 pixels in either the horizontal or vertical direction. For example, a 1 x 4 array consisting of panels of 2560 x 1600 pixel output each would have a total pixel output dimension of 10240 x 1600. This would exceed the 8192 limitation in the horizontal direction.

The total pixel output for a configuration is the total horizontal pixels by total vertical pixels. *Total size* on the *Set Up Mosaic* page calculates the total pixel dimension for you. The total pixels displayed is a combination of the Display configuration, resolution setting, and edge overlap settings.

▶ **Minimum Resolution**

Mosaic also requires that individual displays use a resolution greater than 800 x 600 pixel output. If a display in your configuration is set to one of the smaller pixel output resolutions (e.g., 640 x 480 or 800 x 600), the system will revert to single display mode.

▶ **Matching Displays**

All displays must be the same type and use the same type of connection (for example, all DVI-to-DVI or all DVI-to-VGA). Mixed display use is not supported.

▶ **Maximum Number of Displays**

- Up to 8 displays, depending on the product and configuration

## 02 USING NVIDIA MOSAIC TECHNOLOGY

This chapter describes how to set up your displays and configure the NVIDIA software for NVIDIA Mosaic.

This chapter explains the three basic stages for setting up SLI Mosaic mode, and also includes a troubleshooting section:

- ▶ [Connect Your Displays](#)
- ▶ [Configure Your Driver Settings](#)
- ▶ [Set up Mosaic Mode](#)
- ▶ [Troubleshooting](#)

### About the NVIDIA Control Panel

- See the *NVIDIA Control Panel Quick Start Guide* for an overview of the interface.
- Mosaic settings are found on the *Set up Mosaic* page in your NVIDIA Control Panel. When Mosaic is enabled, the Microsoft Windows Display Properties panel will show multiple displays but you will not be able to interact with them. Instead, use the settings on the *Set up Mosaic* page to adjust the display resolution and refresh rate.

## Connect Your Displays

Connect all the displays that you intend to use in Mosaic to the Quadro boards. See [“Display Connections” on page 18](#) for the proper connectors to use, based on your solution and display configuration.

- ▶ All displays connected must be part of the Mosaic configuration. For example, the 2x2 configuration cannot be set with only 3 displays connected.
- ▶ Additional displays that are not part of the desired Mosaic configuration should not be connected, as this may result in unpredictable behavior.
- ▶ Mosaic mode cannot be enabled when only one display is connected.
- ▶ All displays must be the same type and use the same type of connection (for example, all DVI-to-DVI or all DVI-to-VGA).
- ▶ The visual characteristics of displays vary by manufacturer and model from the same manufacturer. NVIDIA recommends using the same make and model for all displays.

## Configure Your Driver Settings

There are several settings that you should configure before enabling Mosaic mode.

- ▶ [Configure Display Settings](#)
- ▶ [Enable V-Sync](#)

### Configure Display Settings

Before you enable Mosaic, only one display is lit. The display settings that you set on this display will be applied to all the displays after enabling Mosaic.

- 1 Open the NVIDIA Control Panel by right-clicking the desktop and then clicking **NVIDIA Control Panel** from the context menu.
- 2 Configure your display settings before enabling Mosaic.

Display settings may include but are not limited to:

- Desktop color settings
- Flat panel scaling
- Video and TV settings

### Enable V-Sync

- 1 From the **Manage 3D Settings** Global presets pull-down menu, select **Base profile**.
- 2 From the Settings list box, select **Vertical sync** and change its value to **Force on**, then click **Apply**.
- 3 From the Global presets pull-down menu, select **3D App - Default Global Settings** (the driver's default profile) or use the application profile that matches the application you are using, then click **Apply**.

## Set up Mosaic Mode

- 1 From the *Select a Task* navigation pane, under *Workstation*, click **Setup Mosaic** to open the associated page.

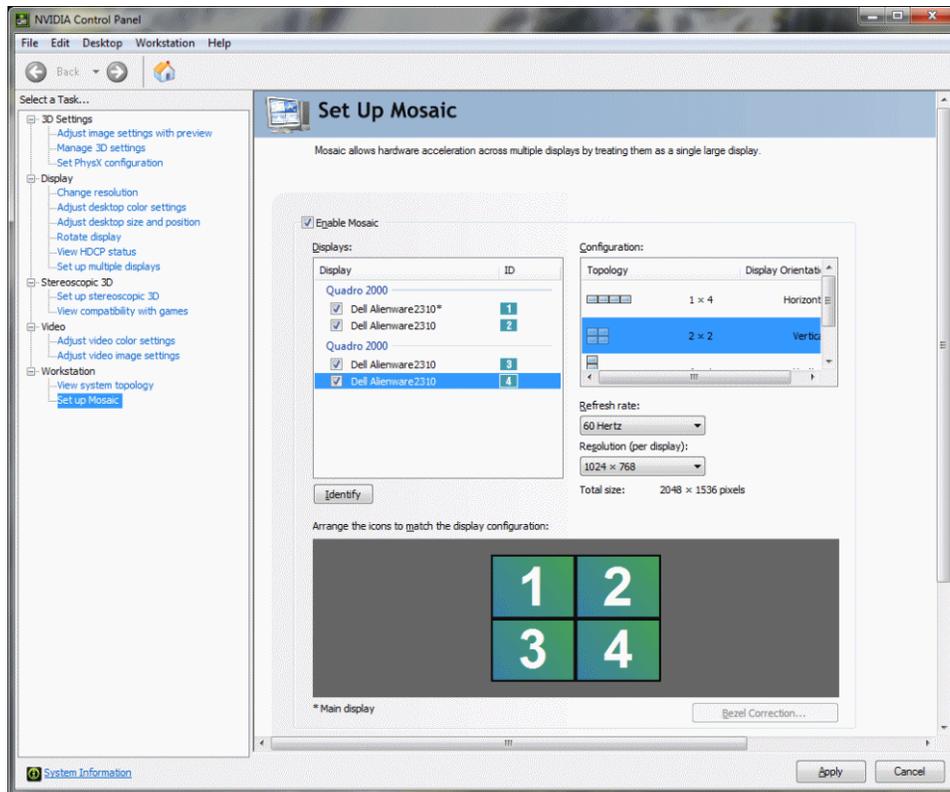


Figure 2.1 NVIDIA Control Panel Set Up Mosaic Page

- 2 Click the **Enable Mosaic** check box to enable Mosaic settings.
- 3 Under *Displays*, click the check boxes for the displays that you want to use for Mosaic. Click **Identify** and the corresponding number appears on your displays to help you determine which displays you want to check.
- 4 Under *Configuration*, select the topology and display orientation you want to use. The selection must match the number of displays you selected in the previous step.
- 5 Set the resolution per display. Click the **Resolution (per display)** list arrow and then select the resolution to which you want each display set. Make sure your settings fall within the following limits:
  - Maximum total resolution (horizontal or vertical): 8192 for older Quadro products, 16,384 for newer Quadro products. See [“Maximum Resolution”](#) on page 2.
  - Minimum individual resolution: 800x600
- 6 Set the refresh rate.

Click the **Refresh rate** list arrow and then select the refresh rate you want applied to all displays.



**Note:** The refresh rate list box contains the refresh rates that are available for the resolution selected. The Set up Mosaic page shows a limited number of refresh rates. For VGA displays, you may not see a refresh rate that you know is supported. If a refresh rate supported by your display is not listed, you can set it by locating and then setting it using the Windows Display Properties page. Alternatively, you can define a custom mode using the NVIDIA Control Panel->Change resolution page and then the refresh rate should appear on the Set up Mosaic page.

- 7 Click and drag the icons at the bottom of the page to match your display configuration.
- 8 Click **Bezel Correction** and then adjust the Horizontal and/or Vertical edge gap as needed to accommodate bezeled displays.
- 9 Click **Apply** to save your changes.

## Troubleshooting

- ▶ Display position does not match the diagrams in Appendix A
- ▶ Only 800x600 resolution is available
- ▶ Mosaic options are missing from the Set Up Mosaic page

### Display position does not match the diagrams in Appendix A

Due to differences in system BIOS configurations with respect to the GPU, the display positioning on your system may not match the arrangement given in Appendix A.

If this is the case,

- ▶ Use the “Verify Display” diagrams to determine the correct connections for your system, and then reconnect the displays accordingly.
- ▶ If you are using a configuration that does not use all of the display connections on the Quadro Plex unit and not all of your displays are lit, then connect displays to all of the connector outputs to determine which outputs are being used.

### Only 800x600 resolution is available

#### Issue

On the Set up Mosaic page, only 800x600 is listed under **Resolutions (per display)**.

#### Resolution

Verify the following and make the necessary corrections:

- ▶ All displays are the same type—all VGA or all DVI—and that they have the same EDID information and capabilities.
- ▶ All the displays are connected to the connector locations as indicated in Appendix A.

## Mosaic options are missing from the Set Up Mosaic page

### Issue

Some sections are missing from the *Set Up Mosaic* page.

### Resolution

- 1 With the system turned on and the NVIDIA Control Panel opened, disconnect (hot-unplug) all displays except for the primary boot display.
- 2 In the NVIDIA Control Panel, select **Set up Mosaic** to open the associated page.
  - All appropriate display configurations should appear in the **Display setup** list.
  - Only 800x600 resolution is available.
- 3 Click the **Display setup** list arrow and then select the topology you wish to configure.

The topology should be activated but only the first display will be visible. If VNC is available, the full topology can be viewed from a remote machine.

- 4 Connect (hot plug) the remaining displays until all are visible.

The displays may not appear in the proper topology order. This can be corrected later.

- 5 Enable Mosaic, verify the display configuration, and make corrections as needed as described in [“Set up Mosaic Mode” on page 7](#).

## Notice

ALL NVIDIA SOFTWARE, DESIGN SPECIFICATIONS, REFERENCE BOARDS, FILES, DRAWINGS, DIAGNOSTICS, LISTS, AND OTHER DOCUMENTS (TOGETHER AND SEPARATELY, "MATERIALS") ARE BEING PROVIDED "AS IS." NVIDIA MAKES NO WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE MATERIALS, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE.

Information furnished is believed to be accurate and reliable. However, NVIDIA Corporation assumes no responsibility for the consequences of use of such information or for any infringement of patents or other rights of third parties that may result from its use. No license is granted by implication of otherwise under any patent rights of NVIDIA Corporation. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all other information previously supplied. NVIDIA Corporation products are not authorized as critical components in life support devices or systems without express written approval of NVIDIA Corporation.

## HDMI

HDMI, the HDMI logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

## Macrovision Compliance Statement

NVIDIA Products that are Macrovision enabled can only be sold or distributed to buyers with a valid and existing authorization from Macrovision to purchase and incorporate the device into buyer's products.

Macrovision copy protection technology is protected by U.S. patent numbers 5,583,936; 6,516,132; 6,836,549; and 7,050,698 and other intellectual property rights. The use of Macrovision's copy protection technology in the device must be authorized by Macrovision and is intended for home and other limited pay-per-view uses only, unless otherwise authorized in writing by Macrovision. Reverse engineering or disassembly is prohibited.

## OpenCL

OpenCL is a trademark of Apple Inc. used under license to the Khronos Group Inc.

## Trademarks

NVIDIA and the NVIDIA logo are trademarks or registered trademarks of NVIDIA Corporation in the United States and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

## Copyright

© 2009, 2010 NVIDIA Corporation. All rights reserved.