Using the NVIDIA Display Mode Selector Tool

User Guide

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Using the NVIDIA Display Mode Selector Tool

Introduction

Some NVIDIA® server and workstation GPU PCIe boards offer the ability to change the configuration of the physical display ports such as enabling or disabling them. The default GPU display port configuration for each board is intended to align with most use cases. Changing the configuration of the physical display ports, such as enabling or disabling them, should **only** be performed if a particular use case absolutely requires it since this alters its fundamental behavior in the system. If modified incorrectly or used on an incompatible system, this can cause the GPU PCIe board and system to be permanently unusable.

The following table provides a full list of all the GPU PCIe boards that support the enabling and disabling of physical display ports.

Table 1. GPU PCIe Boards That Support the Enabling and Disabling of Physical Displays

GPU PCIe Board	Default Display Mode
NVIDIA RTX A6000	Physical Display Ports Enabled with 256MB BAR1
NVIDIA A40	Physical Display Ports Disabled with 64GB BAR1

With the NVIDIA Display Mode Selector Tool, a software utility, physical display ports can be enabled or disabled. Additionally, the NVIDIA Display Mode Selector Tool can be used to switch GPU PCIe boards to any of the following modes:

- **Physical Display Ports Enabled with 256MB BAR1**: This mode is used for standard workstation deployments that contain physically attached displays.
- **Physical Display Ports Enabled with 8GB BAR1**: This mode is used for specific use cases such as broadcast, virtual production, and location-based entertainment deployments, which require physical display ports as well as the support of additional performance optimizations through an 8 BAR1 such as the NVIDIA Rivermax software.
- **Physical Display Ports Disabled**: This mode is used for running NVIDIA virtual GPU (vGPU) software or compute use cases where no physically attached displays are required.

Supported Drivers

When enabling and disabling physical display ports, it is important to use the correct NVIDIA driver software stack. The following table indicates which graphics driver should be used with each display mode:

Table 2. Drivers That Support the Enabling and Disabling of Physical Display Ports

	NVIDIA vGPU Driver	NVIDIA RTX Enterprise Driver	NVIDIA Data Center Driver
Physical Display Ports Enabled with 256MB or 8GB BAR1	Not Supported	Supported	Supported
Physical Display Ports Disabled	Supported	Not Supported	Supported

The supported drivers can be downloaded using the following URLs:

- NVIDIA vGPU Software: nvid.nvidia.com/dashboard
- NVIDIA RTX Enterprise Driver: www.nvidia.com/drivers
- NVIDIA Data Center Driver: www.nvidia.com/drivers

Supported NVIDIA vGPU Software Editions

The NVIDIA vGPU Driver, which is referenced in the table above, refers to these supported NVIDIA vGPU software editions:

- NVIDIA RTX Virtual Workstation (vWS)
- NVIDIA Virtual PC (vPC) or Virtual Applications (vApps)
- NVIDIA Virtual Compute Server (vCS)

Software Availability

The NVIDIA Display Mode Selector Tool software package is available on the NVIDIA Developer Hub at https://developer.nvidia.com/displaymodeselector.

The End User License Agreement (EULA) must be accepted prior to downloading the NVIDIA Display Mode Selector Tool software package, which is attached in the software package and also available for review on the NVIDIA Developer Hub.

System Requirements

Please adhere to the following system requirements:

- The NVIDIA Display Mode Selector Tool is compatible with the following operating systems:
  - Windows® version 10 64-bit RS5 or later
  - Linux 64-bit
- To run the NVIDIA Display Mode Selector Tool on these operating systems, administrator privileges are required.
- The NVIDIA Display Mode Selector Tool should only be used on NVIDIA vGPU certified systems. A list of all NVIDIA vGPU certified systems is available at https://www.nvidia.com/en-us/data-center/resources/vgpu-certified-servers/.

WARNING: Using the NVIDIA Display Mode Selector Tool on systems that have not passed vGPU software certification can cause the GPU PCIe board and system to be permanently unusable.

Using the NVIDIA Display Mode Selector Tool to Enable or Disable Physical Display Ports

When enabling or disabling physical display ports, the syntax may include the following:

displaymodeselector --gpumode <mode_name> [-i *num*]

mode-name: physical_display_enabled_256MB_bar1

physical_display_enabled_8GB_bar1

physical_display_disabled

num: (Optional) GPU index

Note: If omitted, all switchable GPU PCIe boards will be switched.

With the NVIDIA Display Mode Selector Tool, display modes can be set for a specific GPU PCIe board or multiple GPU PCIe boards.

To enable or disable physical display ports using the NVIDIA Display Mode Selector Tool:

1. Run the following command to obtain a list of available display modes:

```
.\displaymodeselector.exe --gpumode
```

A warning message appears.

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Windows\system32> cd C:\Users\NVIDIA\Desktop\
PS C:\Users\NVIDIA\Desktop> .\displaymodeselector.exe --gpumode

NVIDIA Display Mode Selector Utility (Version 1.49.0)
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WARNING: This operation updates the firmware on the board and could make
         the device unusable if your host system lacks the necessary support.

Are you sure you want to continue?
Press 'y' to confirm (any other key to abort):
```

2. Press the `Y` key to continue.

   A list of available display modes appears.

```
WARNING: This operation updates the firmware on the board and could make
         the device unusable if your host system lacks the necessary support.

Are you sure you want to continue?
Press 'y' to confirm (any other key to abort):
y
Select a number:
<0> physical_display_enabled_256MB_bar1
<1> physical_display_disabled
<2> physical_display_enabled_8GB_bar1

Select a number (ESC to quit):
0
Specifed GPU Mode "physical_display_enabled_256MB_bar1"


Update GPU Mode of all adapters to "physical_display_enabled_256MB_bar1"?
Press 'y' to confirm or 'n' to choose adapters or any other key to abort:
```

3. Enter the corresponding number for the appropriate display mode and then press the `Enter` key.
4. Do one of the following:
   a). To apply the selected display mode to all GPU PCIe boards, press the `Y` key.
   b). To apply the display mode to an individual GPU PCIe board, press the `N` key and enter the corresponding number for the desired GPU PCIe board.
5. Reboot the system once the display mode has been applied to the desired GPU PCIe boards.
6. After rebooting the system, the physical display ports will be enabled or disabled for each corresponding GPU PCIe board depending upon the display mode that was selected.
7. If running Windows, additional steps must be performed as outlined in the next section.

Changing the Windows Driver from TCC Mode to WDDM Mode

Since the GPU PCIe board may be set to either TCC mode (compute only/graphics off) or WDDM mode (graphics on), enabling or disabling physical display ports for systems that are running Windows involves a few additional steps.

When a GPU PCIe board has physical display ports enabled and the Windows GPU driver mode is set to TCC mode, a picture may appear from the physical display port. However, it is not a GPU-accelerated graphics display and there is no NVIDIA graphics driver associated with it. For the physical display port to output a GPU-accelerated NVIDIA display, the Windows GPU driver needs to be running in WDDM mode.

The following table indicates the default Windows driver mode for the corresponding GPU PCIe board:

Table 3. Supported GPU PCIe Boards and Their Default Windows Driver Mode

GPU PCIe Board	Default Windows Driver Mode
NVIDIA RTX A6000	WDDM Mode (Graphics On)
NVIDIA A40	TCC Mode (Compute Only/Graphics Off)

After enabling physical display ports for a particular GPU PCIe board on Windows, ensuring that the GPU driver is set to WDDM mode is the next step.

If the GPU driver is not set to WDDM mode, use the nvidia-smi.exe utility and do the following:

1. Open a Command window with administrative privileges enabled.
2. Ensure that the path directory within the Command window is pointing to the folder that contains the nvidia-smi.exe file.

   This is usually the “C:\Program Files\NVIDIA Corporation\NVSMI" folder when a non-DCH driver is installed. Otherwise, it is the “C:\Windows\System32” folder when a DCH driver is installed.
3. Run the following command to set the Windows driver to WDDM mode:

   ```
   .\nvidia-smi.exe -fdm 0
   ```

   All GPUs will be set to WDDM mode. To set a specific GPU to WDDM mode, refer to the nvidia-smi documentation. To change the Windows driver mode from WDDM to TCC, run the following command:

   ```
   .\nvidia-smi.exe -fdm 1
   ```

4. Reboot the system.

   After rebooting the system, the GPU PCIe boards that have physical display ports attached and enabled will appear as separate displays on the Windows Desktop. If a new driver is installed on the NVIDIA A40 GPU PCIe board, it will automatically revert to TCC mode by default.

Note: After disabling GPU PCIe boards with physical display ports, it is not usually necessary to set the driver mode to TCC mode since the displays are disabled for the NVIDIA vGPU Driver and NVIDIA Data Center Driver and will perform as expected.

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