



# Quad-monitor support via Intel® integrated graphics and a single discrete 2D graphics card on a HP Z220 CMT/SFF workstations

## Overview

Intel's integrated graphics supports concurrent use of a discrete graphics card. This allows HP to offer HP Z220 workstation configurations with a cost effective means of supporting up to 4 displays to customers with entry graphics needs. For customers who need four displays or customers for whom using a second discrete graphics card is not an option, a configuration with a single discrete 2D graphics card and Intel® HD integrated graphics enabled could be a viable solution.

This paper describes how to enable such a configuration on the HP Z220 workstation, as well as some of the limitations that users should be aware of.

## Quad-monitor support combining integrated and discrete graphics on HP Z220: some caveats

Mixing graphics devices from different vendors is only supported with Windows 7 operating systems. This configuration is not supported with Windows Vista, Windows XP or Linux.

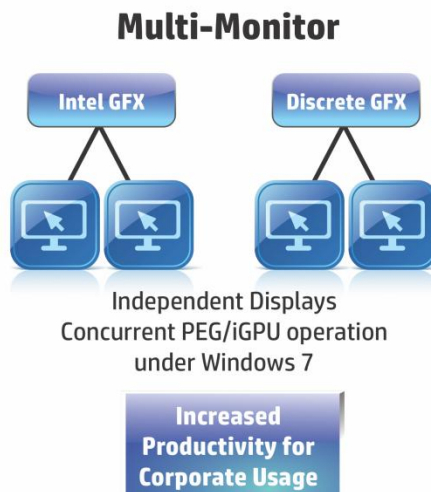
Furthermore, HP is limiting mixed graphics configurations to 2D graphics cards from NVIDIA, namely the NVS300 and the NVS310. Customers who need four 3D accelerated displays should consider the HP Z420 Workstation.

Only a single 2D graphics card should be used in mixed graphics configurations. Intel® integrated graphics is not allowed to be enabled simultaneously with two graphics cards installed on HP Z220 workstation.

These mixed graphics configurations are enabled for customers to use at their own risk and support will be provided on a "best effort" basis. Customers are encouraged to thoroughly evaluate these configurations using their real-world workload before committing to a mixed graphics configuration.

The following issues have been found during HP's Workstation Graphics validation testing.

The default BIOS behavior is for integrated graphics to be disabled when a discrete graphics card is present in the system. The customer will have to go into the BIOS setup menus and manually enable integrated graphics. If the system was ordered with discrete graphics installed, the customer will need to obtain the driver for integrated graphics from [hp.com](http://hp.com), and install it manually.



## HP recommends Windows.

The graphics control panels from Intel®, AMD and NVIDIA are all limited to the displays from that graphics vendor and only the Windows 7 control panel can communicate with all of the displays. Vendor specific value add features such as NView and Hydravision won't work on the displays attached to integrated graphics and could have side effects when used in mixed graphics configurations.

Intel® HD graphics have different levels of 3D support (DX10 or DX11 / OpenGL 3.1) from the NVIDIA and AMD graphics cards (DX11 / OpenGL 4.0). Customers who need 3D graphics acceleration should avoid mixed graphics configurations.

HP recommends that the discrete graphics card host the primary display.

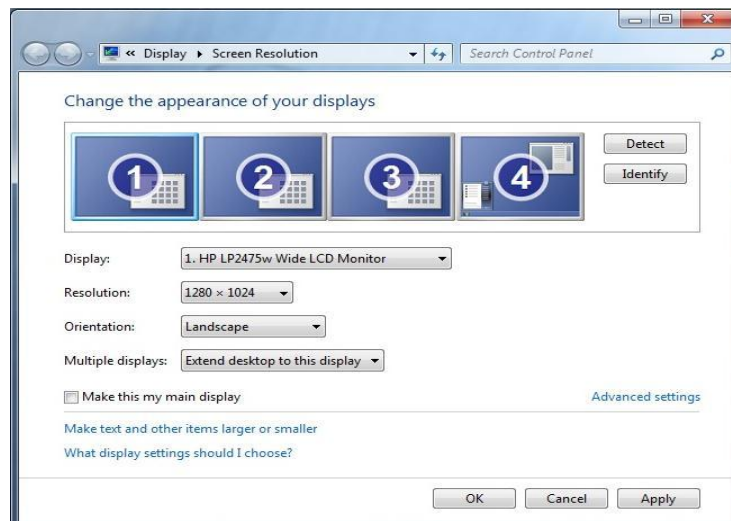
## Mixed Graphics Setup

1. Make sure the system is running Windows 7 Professional 64-bit.<sup>1</sup>
2. Make sure that the processor used in the system is a model with Intel® integrated graphics.  
NOTE: Intel® integrated graphics is not available with Intel® Xeon® E3-12x0 v2 processors family. (Replace the “x” with appropriate number depending on the processor SKU)
3. Make sure the 2D Graphics card is installed in the correct slot. (PCIe x16, HP Z220 CMT is slot2, and HP Z220 SFF workstation is slot3)
4. Boot to SBIOS F10 setup menu -> Advanced -> Device Options, set “Integrated Video” setting to “enable”.
  - “Enable” means enabling iGFX with add-in graphics card installed. The factory shipped default setting is “Disable” in HP Z220 SBIOS.
  - The power up splash screen will be displayed on the discrete graphics card, even with integrated graphics enabled.
5. Install Intel® HD Graphics driver and restart system:
  - Download Intel® HD Graphics 2000/2500/4000/P4000 driver from [hp.com](http://hp.com), and install it.
  - Install the driver for the discrete graphics card, if not already installed.
6. Enabled all attached monitors using the Windows 7 Display Control Panel.
  - Select the Display control panel then Screen Resolution -> Make this my main display to designate one of the displays hosted by the discrete graphics card as the primary display.

## Mixed Graphics Usage:

In the OS display property page, you have the choice to make the monitors displayed by the following methods.

- Extended mode: All displays can have independent screens in extended mode, this means there is a “main display” and the rest are extensions of that screen.
- Clone mode: Only the displays attached on the same graphics adapter can have identical screens in clone mode. The displays across different graphics adapter must be displayed in extended mode.
- Rotation: Every single display can be rotated independently.



HP recommends Windows.

## Conclusion

The mixed integrated and discrete graphics configuration described above may be a cost effective solution to support four displays on HP Z220 workstation. Customers will need to evaluate and enable this feature for themselves, and should be aware of the level of support and risks involved in using mixed graphics.

HP and our graphics vendors fully support dual add-in graphics card configurations (dual-NVS 300 or dual-NVS 310) and HP recommends these configurations for users wanting quad display support. Using identical cards eliminates the complexities of two different graphics vendors and capabilities.

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### Additional resources

[hp.com/go/whitepapers](http://hp.com/go/whitepapers)

[hp.com/support/Z220SFF\\_manuals](http://hp.com/support/Z220SFF_manuals)

[hp.com/support/Z220CMT\\_manuals](http://hp.com/support/Z220CMT_manuals)

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