

# Using the HP DreamColor LP2480zx Monitor in Apple Mac Systems

The HP LP2480zx Professional Display provides highly accurate color performance, emulating a number of user-selectable output color space standards (such as sRGB, AdobeRGB, etc.) as well as permitting the user to define their own preset color profiles, including selection of the display primaries, white point, luminance, and tone response (“gamma” curve). This product thus meets the needs to color-critical users, working with a wide range of source material. However, on some platforms there may be unique issues resulting from the default color-management functions implemented by those systems.

One of these is the Apple Mac™<sup>1</sup> platforms and the MacOS™ operating system. While the LP2480zx display is definitely usable with Mac systems, and will provide superior color accuracy and high-quality image reproduction to Mac users, there are some unique concerns with the Mac that must be addressed for optimum performance in these systems.

On the MacOS, basic color management functionality is to a large degree provided “automatically,” requiring little action on the part of the user. For most monitors, this results in improved color performance vs. the completely unmanaged situation which is the default behavior on many other systems. However, as the LP2480zx is in essence performing its own “color management” function, interaction between the default CM behavior of the Mac and the LP2480zx can sometimes result in less than optimal results. This paper details the potential areas of concern, and how they can easily be addressed to ensure the best color accuracy when using this monitor on Mac systems.

## Color Management on the Mac and the LP2480zx

Color management under the Mac OS and with common Mac applications is somewhat different than under other systems, and users of the LP2480zx monitor on Mac systems should be aware of the following.

As noted, the setting of the overall system tone response or “gamma” and white point is by default automatically done by the Mac OS for all applications. Adjustment of the color space (i.e., the specific primaries assumed to be in use for a given image), however, is application-specific.

Typically, the MacOS does not perform any color gamut adaptation or correction on untagged image data; it is simply passed unchanged to whatever display is connected, regardless of whether or not a correct profile is installed. “Tagged” images (i.e., those which come with source profile information describing the intended color space) may be corrected to the display space by some applications. Color space manipulation is also not always performed separately in the case of multiple displays. While multiple displays are individually accessible via the System Properties menus in the Mac OS, and separate profiles stored for each, color space correction may be based only on the primary monitor’s characteristics. The correction for the primary monitor will then, in general, be applied to all other displays in the system.

As noted, color space correction is handled on an application-specific basis. For example, Preview (the Mac’s default image viewer) does not perform this function, but Safari (the default web browser) does. Safari does not, however, perform separate corrections for multiple monitors (per the above), and does not correct untagged images.

In general, when using the LP2480zx on any system, whether or not color management is provided there, it will be best to ensure that the LP2480zx is set to the correct color space preset for the images being displayed (e.g., for most computer graphics, web-sourced images, and consumer digital photography, this would be the sRGB preset) and that the appropriate color profile is installed.

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<sup>1</sup> “Apple,” “Mac,” and “MacOS” are trademarks of Apple, Inc..

Especially when using 8 bit/color graphics hardware, the LP2480zx will provide more accurate color management and color space adaptation than can be achieved using the graphics system itself, owing the greater bit depth available within the monitor's own electronics.

## Configuring the LP2480zx's Auto EDID Option

As most monitors can only operate with a single native color profile that describes the default characteristics of the monitor, operating systems assume that the "native" configuration of the monitor is the only possible hardware configuration of that monitor. This can result in incorrect gamut information being reported for the monitor, especially when the user switches from one color space to another.

When a monitor is first connected to a Mac, the OS reads the monitor's EDID (display information data) which describes the capabilities of the monitor including its color gamut, available resolutions, and so on. It then creates a color profile that reflects these monitor settings and capabilities. By default this is only done the first time a monitor is connected to a system. Because the color gamut information can change when the user switches the LP2480zx's color profile it is very easy for the monitor and computer to go "out of sync" with one another and the wrong color gamut to be assumed by the MacOS resulting in inaccurate color representation. Fortunately, the LP2480zx includes an option, Auto EDID Update, which forces the MacOS to re-profile the monitor whenever the monitor color space is changed. We strongly recommend that this option be enabled whenever you connect a DreamColor LP2480zx monitor to a Mac system.

The following steps will cause the monitor's EDID information to be updated whenever a color space is changed, and will cause the host computer to be notified by signaling a Hot Plug Detection.

1. Press any button on the bezel to activate the soft menu display.
2. Press the **Open OSD** button to display the OSD (on screen display).
3. Press the **Next** button until the **Management...** selection is highlighted.
4. Press the **Select/Open** button to enter the Management menu.
5. Press the **Next** button until the **Auto EDID Update** selection is highlighted.
6. Press the **Select/Open** button to enter the Auto EDID Update menu.
7. Press the **Reduce Set** button until the **On** selection is highlighted.
8. Press the **Select/Save** button twice, first to select the option and the second time to save the setting and return to the main menu.

It is critical that you leave the Management menu before exiting the OSD. Otherwise your setting change may not be saved.

9. Press the **Exit OSD** button to exit the OSD.

In addition, Hot Plug Detect Support must be enabled in order for the MacOS to be informed of your change. This option is enabled by default. If you have disabled it or are unsure if it has been disabled, use the following steps to re-enable it.

1. Press any button on the bezel to activate the soft menu display.
2. Press the **Input Select** button to open the Video Input Control menu.
3. Press the **Previous** button until the **Hot Plug Detect Support** selection is highlighted.
4. Press the **Select/Open** button to enter the Hot Plug Detect Support menu.
5. If necessary, press the **Reduce Set** button until the **Enable** selection is highlighted.
6. Press the **Select/Save** button to accept the highlighted choice.
7. Press the **Exit OSD** button to exit the OSD.

## Automatic Color Profile Creation and Gamma/White Point Set-up

By default, the MacOS will automatically read the EDID (file from any monitor connected, and create a “color profile” for that monitor which is then used by color managed applications. However, the defaults for this operation are to also “correct” the display response to a gamma of 1.8 (and a white point of 6500K, or the  $D_{65}$  white) via programming of the graphics hardware look-up tables (LUTs). These values are then also reported in the newly-created profile, regardless of the actual gamma and white point values given in the display’s EDID.

While this default behavior can certainly simplify life for the user, by setting all displays to the same effective response and white point, it may result in poorer accuracy than could otherwise be provided by the LP2480zx. Further, a good deal of images encoded under common industry standards such as sRGB will not appear correct if a gamma setting of 1.8 is used without further color management by the application displaying the image. (In general, most of these standards specify an encoding which assumes a display gamma of greater than 1.8, and so images will appear “washed out” if displayed on a gamma = 1.8 system without further correction.)

Also, as the gamma control provided by the LP2480zx is considerably more accurate than what can be achieved via a typical 8 bit/color graphics system, it is always preferable that tone response/gamma setting be done within the monitor, and that the graphics hardware do nothing to further adjust this (i.e., any LUTs there should be set to a “pass-through” or “linear” mode). This may be achieved via the Mac’s “Systems Preferences” setting, as described below, but will require that the LP2480zx be set to provide the desired “gamma” or tone response. This can be done by selecting one of the color space presets in the On Screen Display of the LP2480zx. If the desired settings are not already available in one of the predefined presets, then the HP Advanced Profiling Solution can be used to create a preset of the customer’s choosing.

If the APS is used, then the APS will install an appropriate profile for the newly calibrated preset. No “pass-through” setup is required as long as the APS-installed profile is used.

If the user changes between presets, then the user will need to manually change the active profile.

## Configuring the Color Profile for Best Performance

*If the default behavior of the Mac system is acceptable as described above, nothing needs to be done by the user. If not, please follow this procedure:*

1. Choose **System Preferences...** from the Apple menu.
2. Select **Displays** in the Hardware group.
3. Select **Color** from the Tab option at the top of the window.
4. Select the **LP2480zx Display Profile** at the top of the list.
5. Press the **Calibrate...** button to open the Display Calibrator Assistant.
6. On the Introduction page, enable the **Expert Mode** checkbox and press the **Continue** button.
7. Click **Continue** through the five **Native Response** pages. You should not modify these options.
8. Enable the **Use native gamma** checkbox on the **Select a target gamma** page and click **Continue**. Note: adjusting the “gamma” value to something other than the factory-programmed presents should be done in the monitor and requires the use of the optional Advanced Profiling Solution accessory.
9. Enable the **Use native white point** checkbox on the **Select a target white point** page and click **Continue**.

10. If multiple users are logged onto this computer, enable the **Allow other users to use this calibration** checkbox on the **Administrator options** page and click **Continue**.
11. Enter a name for the new profile on the next page. The name should include the name of the active LP2480zx color space (ex: LP2480zx – sRGB).
12. Repeat this procedure whenever you switch the monitor's color space.

For more information

<http://www.hp.com/go/monitors>

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<http://h30267.www3.hp.com/country/us/en/dreamcolor>

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