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## PowerBook Video Mirroring: Issues and Workarounds (5/96)

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TOPIC -----

This article describes all of the known issues with the video mirroring mode on PowerBook computer systems. Where possible, known workarounds have been provided.

DISCUSSION -----

What Is Video Mirroring And How Does It Work?

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Video mirroring is a feature provided on Macintosh PowerBook computers (it can also be used on some desktop Macintosh systems). If your PowerBook computer has an external monitor attached, you can use it to show the same images displayed on your built-in screen. This feature can be useful when you are making a presentation.

When an external monitor is connected to the PowerBook computer, video mirroring is by default "off" and the system is in normal "dual-screen" mode. To activate video mirroring, use the Video Mirroring Control Strip module or go to the PowerBook Display control panel.

When the PowerBook is in video mirroring mode, everything displayed on the primary device (usually the internal display) is then drawn again on the external device using the CopyBits routine (from the QuickDraw toolbox). The CopyBits routine copies a bitmap image from one region to another. If the two display devices are at different bit depths, then the image may have to be scaled down or dithered during the CopyBits process.

Video Mirroring Issues And Workarounds

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### QuickTime Movies Are Slow And "Jerky"

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When the PowerBook computer is in video mirroring mode, one video controller is having to draw everything twice. Because of this, QuickTime movies will not play back at the same frame rate as they will in a normal video mode.

To optimize QuickTime playback performance in video mirroring mode,

- set the color bit depth to 256 colors on both monitors
- keep the movie window size as small as possible
- turn off virtual memory

### Issues With Presentation Applications

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Slide presentation applications, such as Powerpoint and Persuasion, that make use of "fade and dissolve" type transitions may perform more slowly when in video mirroring mode. The same issues that cause QuickTime movie playback to be slow (see above) will also cause complex transition effects in slide presentation programs to be slow. With complex transitions, the amount of information for CopyBits to process increases dramatically, potentially causing a performance decrease. Simpler transition effects will cause less of a burden on the system.

Optimum performance can be achieved by using some of the following suggestions in the creation and delivery of the presentations:

- keep color settings to the minimum bit depth actually needed
- set both monitors to the same bit depth
- reduce use of animation transition effects to a minimum
- minimize use of complicated graphics
- minimize number of individual graphics per slide
- turn off virtual memory during presentations
- disable extensions that are not required during the presentation

### Graphics Anomalies May Occur On A Mirrored Display

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It is up to the application software to deal with multiple displays correctly. Some third-party software applications assume that displays can't overlap, and therefore don't make appropriate changes to all of the devices listed in the device list provided by toolbox routines such as GetDeviceList and GetNextDevice. This can result in screen regions getting updated on one display but not on the other when in video mirroring mode.

Although there is no Apple workaround for this type of problem (the third-party developer should address this in their software), you can usually choose which display will have the anomalies by making a particular display the "main" monitor. To do this, drag the menu bar onto the desired monitor icon in the Monitors control panel before activating video-mirroring mode. You may also need to drag the Happy Mac icon onto the desired monitor. To see the Happy Mac icon, hold down the Option key while the Monitors control panel is open. The anomalies will usually show up on the monitor that is NOT the "main" monitor. Also, setting both monitors to the same bit depth will reduce the chances of this happening.

Some applications, especially games, will draw directly to the screen instead of using Apple's QuickDraw routines to draw as normal. Drawing directly to the screen can be advantageous because it allows for faster speed and more direct control of timing. However, video mirroring mode exclusively uses QuickDraw routines to draw screen images twice. If a program is using non-QuickDraw routines to draw graphics, those graphics will appear corrupted on the device that is NOT selected as the "main" device in the Monitors control panel (discussed above) when video mirroring is active.

Most games will provide an option to turn QuickDraw graphics on or off instead of forcing the user to use non-QuickDraw graphics. Look in the Preferences section of the game for this setting.

#### Mouse Tracks with PowerBook 5300 & 190 Series

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On PowerBook 5300 and 190 series computers, when in video mirroring mode, Mouse Tracks will only work on the internal PowerBook display. This is a current limitation of the PowerBook 5300 and 190 series computers. When in "dual-screen" mode, the cursor may leave cursor trails on the external monitor when Mouse Tracks is on. Until this is fixed, we recommend that you leave Mouse Tracks off when an external monitor is connected.

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