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PowerBook: Liquid Crystal Display Refresh Rates (11/95)

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TOPIC -----

What are the refresh rates for the displays in the Macintosh PowerBook 5300, 2300, and 190 series computers (both Active and passive matrix, color and grayscale)? How does this compare to the display on my desktop system?

DISCUSSION -----

This article provides general information on display refresh rates used in Macintosh PowerBook computers. However, it is difficult to compare Cathode Ray Tubes (CRTs), used with desktop Macintosh computers, to passive and active matrix Liquid Crystal Displays (LCDs), used in PowerBook computers, because it is an entirely different technology. To complicate things further, the two types of LCDs use two totally different technologies to create the image on the screen.

Active Matrix

Active matrix displays, also called Thin-Film Transistor (TFT), have transistors that are individually addressed and charged. The amount of time that it takes for the charge to diminish is somewhere around 20 milliseconds (ms). We currently use a refresh rate of 62Hz on all (color and grayscale) TFT displays which means that each row of pixels gets refreshed every 16ms.

Passive Matrix

Passive matrix displays, also called Film SuperTwisted Nematic (FSTN), are even better in that aspect. Once their pixels receive a charge, the time it takes for the pixel to lose its charge can be measured in seconds. In fact, the fastest time that the computer can turn a pixel off is over 60ms. The passive matrix screens use a refresh rate of 73Hz for grayscale passive matrix (MFSTN) displays and 79Hz for color passive matrix (CFSTN) displays, each row of pixels is refreshed every 12ms.

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