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## Macintosh Quadra 950: Video Support

Revised: 8/24/92  
Security: Everyone

Macintosh Quadra 950: Video Support

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### Article Change History

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- 8/24/92 - CORRECTED
- To give proper bit depth on all Apple displays
- RETITLED
- To make the contents of the article more clear

### TOPIC -----

This article describes the Macintosh Quadra 950 video support, including a definition of convolution. Here is what the Quadra 950 gets with Apple monitors:

### DISCUSSION -----

Quadra 950	12 Mono	12 RGB	13 RGB	16 RGB	15 Port	21 Mono	21 RGB
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1 meg VRAM	8	24	16	16	8	8	8
2 megs VRAM	8	24	24	24	8	8	16

The VRAM slots on the Quadra 950 are located under the power supply, and are therefore difficult to access. It comes standard with 1 MB of VRAM. All four slots must be populated with 256K SIMMs when upgrading the Quadra 950 from 1MB VRAM to 2MB.

Because the Quadra 950 uses 80ns VRAM SIMMs, the frame buffer controller (DAFB) could be reprogrammed to remove one or more wait states from the VRAM access time, thus increasing the video speed 20%. Due to the increased speed of the processor, the total video speed improvement should reach 30%. The Quadra 950 comes standard with 1MB VRAM, which can be

expanded to 2MB using 80ns 256K VRAM.

The built-in frame buffer also supports several non-Apple monitors (VGA and Super VGA-800 x 600) and broadcast standards such as NTSC and PAL for interlaced displays. Convolution is included as an option for NTSC and PAL to reduce the flicker when using interlaced monitors. When connecting to an NTSC or PAL device, the ID pins on the cable indicate whether convolution is turned on. A special video adapter box is needed in order to connect the Quadra 950 to a television. Third parties such as Truevision, RasterOps, and Computer Friends provide the conversion of the RGB signal to a composite signal for NTSC and PAL. Because the video chip on the main logic board provides NTSC and PAL timing, the solution for a television display is significantly lower in cost than on other computers. In 24-bit mode, convolution isn't an option, but it is in black and white mode.

To locate a vendor's address and phone numbers, use the vendor name as a search string.

#### Definition of Convolution

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The Macintosh Display Card 8•24, introduced in 1990, addressed the problem of screen flicker by implementing a new way of pixel averaging called Convolution. Convolution runs every pixel through a formula that averages the pixel with its individual neighboring pixels above and below, and its part of the function of the CLUT/DAC chip on Display Card 8•24.

Convolution causes a blurring effect between scan lines so that a horizontal line includes at least a portion of the scan lines above and below its own scan line. A portion of the horizontal line remains visible during display of both the odd and even fields, so flicker is avoided. The convolution formula follows a 1:2:1 ratio, where the current pixel value is given twice the weight of its neighbors above and below.

Convolution is automatically turned on where appropriate. If the on-board video on the Quadra 950 is driving an interlace display in 24-bit mode, convolution is disabled. If the card is driving an interlace display in 8-bit mode, or a lesser pixel depth, convolution is enabled.

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