Macintosh Computers: DMA Support

Which Macintosh models support Direct Memory Addressing (DMA)? From what I can tell Power Macintosh computers support it, some Macintosh Quadras may, and the Macintosh IIfx does to a limited degree. Am I right?

This article has been archived and is no longer updated by Apple.

Direct Memory Access (DMA, also called Direct Memory Addressing) is used extensively in computer systems design to help improve performance. It allows systems to transfer large amounts of data into the computer's memory, without burdening the main microprocessor.

For example, the premise behind SCSI (Small Computer System Interface) DMA is that files can be retrieved from a SCSI hard drive and loaded into memory by a SCSI DMA controller. While the DMA controller is loading files in the background, the main processor (for example: a 68030, 68040, or PowerPC processor) can continue to work on other tasks.

DMA has been used in several Macintosh products, without specifically being called out. There are several interface areas in which Apple has chosen to use DMA techniques to improve performance. These are Apple Desktop Bus (ADB), Ethernet, Floppy drive access, SCSI, serial communications, sound input, sound output, and some other I/O operations.

Standard Implementations
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The following is a summary of some Macintosh systems' DMA capabilities:

Apple Desktop Bus (ADB)

Apple has used ADB DMA in the following systems:

* Macintosh IIfx
* Quadra 900
* Quadra 950

Ethernet

Apple has used DMA to improve the performance of Quadra and Power Macintosh systems with built-in Ethernet ports. If a NuBus Ethernet board is used, then the system's built-in DMA capabilities are not used. The following systems use Ethernet DMA:

* Centris and Quadra systems with built-in Ethernet
* Performa 611x series
* Power Macintosh 6100, 7100, and 8100 series
* Workgroup Server 6150, 8150, 9150 series

Floppy

Some systems use DMA to improve performance when accessing files on a floppy drive. Systems which use DMA for the floppy disk drive controller include:

* Macintosh IIfx
* Centris and Quadra 660AV
* Quadra 840AV
* Quadra 900
* Quadra 950
* Performa 611x series
* Power Macintosh 6100, 7100, and 8100 series
* Workgroup Server 6150, 8150, 9150 series

SCSI

Apple has used DMA to improve SCSI performance in some systems. The following systems have SCSI DMA capability:

* Macintosh IIfx (only with A/UX 2.0 or later)
* Centris and Quadra 660AV
* Quadra 840AV
* Performa 611x series
* Power Macintosh 6100, 7100, and 8100 series

* Apple Workgroup Server 95
* Workgroup Server 6150, 8150, 9150 series

Serial

Several Macintosh systems have DMA support for serial communications. DMA is also used with GeoPort communications on appropriate systems. Systems which use DMA with the serial communications controller include:

* Macintosh IIfx
* Centris and Quadra 660AV
* Quadra 840AV
* Quadra 900
* Quadra 950
* Performa 611x series
* Power Macintosh 6100, 7100, and 8100 series
* Workgroup Server 6150, 8150, 9150 series

Sound

With the introduction of the Centris and Quadra AV systems, Apple started using DMA for sound input and output. This improves the performance and allows greater performance when recording and playing back sound. Systems which use DMA for sound input and output include:

* Centris and Quadra 660AV
* Quadra 840AV
* Performa 611x series
* Power Macintosh 6100, 7100, and 8100 series
* Workgroup Server 6150, 8150, 9150 series

Special Cases
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DMA is also used in the following special cases:

Macintosh SE PC Floppy Drive

The Macintosh SE PC 5.25" Floppy Disk Controller Card uses DMA to transfer PC file data from the 5.25" floppy drive directly to the memory of a Macintosh SE.

DOS Compatibility Card

The Macintosh DOS Compatibility Card uses one 32-bit DMA channel. DMA for shared memory support is provided through Macintosh system software.
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