Display Card 8•24 GC: Questions and Answers (11/94)

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TOPIC ---

Here are some questions and answers about the Macintosh Display Card 8•24 GC.

DISCUSSION ---

Q) The card supports NuBus master and slave block transfer modes. I was under the impression that not all Macintosh models support block transfer mode.

  a) Does this imply that there are third-party video cards that DO support block transfer? If yes, do you know the manufacturers' names?

  b) Will the Display Card 8•24 GC run even faster when talking to one of these video cards (faster than without block transfer, but still not as fast as the on-board video)?

A) The Macintosh IIfx does support slave block transfer mode; the other Macintosh models do not have this support. The Display Card 8•24 GC block transfer function is primarily for use between NuBus cards with block transfer abilities.

  a) We currently do not know of any third-party cards that support block transfer. Beside the Display Card 8•24 GC, the only video card we know of that supports block transfer is the Display Card 8•24 in its 8-bit mode.
  b) The Display Card 8•24 GC would accelerate a second card that has block transfer to a greater degree than it would accelerate a second card that does not have block transfer. The second card (with block transfer) would not run as fast as the Display Card 8•24 GC performing all operations itself. (We assume that "on-board video" means the video on the Display Card 8•24 GC as opposed to logic board video, like on the Macintosh IIci.)

Q) It seems that the use of off-screen bitmap algorithms actually slow down the Display Card 8•24 GC.

  a) Is this true?

  b) How does adding DRAM to the card boost off-screen performance?

c) Do I need to rework my graphics code to use it?

A)

a) We are unsure what you are asking -- slow down the Display Card 8•24 GC compared to what? If this is in reference to moving off-screen bitmaps across NuBus compared to using the local DRAM for off-screen bitmaps, the answer is yes, moving bitmaps across NuBus is slower than using the local DRAM.

b) When DRAM is installed on the card, it is automatically used for off-screen bitmaps.

c) Since the off-screen bitmaps automatically and transparently use the DRAM, there is no need to change an application's code to take advantage of this function.

Q) More generally, do you have any information that outlines all the factors that determine the ultimate speed of any graphic operation? For example:

a) Speed of the CPU running QuickDraw routines relative to AM29000 speed. (How much faster is the AM29000 QuickDraw than the regular Macintosh version?)

b) On-screen versus off-screen algorithms.

c) On-board video versus third-party video cards.

d) Effect of various NuBus byte lane width specifications when transferring data from one board to another.

e) 1-bit versus 8-bit or more graphics.

A)

a) This depends on the action being taken; a straight line from point A to point B will not benefit to the degree that a complex polygon would. The AM29000 performance is from 5 times to 30 times faster than unaccelerated performance.

b) The creation of the on-screen image and off-screen image will be equal. Since only QuickDraw variables and small data structures are moved across NuBus, there is an improvement in this image creation compared to standard video cards. However, the biggest benefit is when the previously created off-screen image is moved onscreen.

c) We are not sure what is being asked. We do not have specifications for third party-cards. (We hope this is the information being requested.) Typical reads and writes from the Macintosh to display cards are performed in 1000 and 500 nanoseconds, respectively. (This is what we believe you are requesting for the standard video cards.) The Display Card 8•24 GC and writes to its frame buffer (off-screen bitmaps in DRAM) at a rate of 66 reads 60 132 nanoseconds. (This is what we believe you are requesting for the on-board video

specifications.)

d) We have not been able to locate an answer for the byte lanes issue. We will do our best to provide details on this in a later response.

e) The following applies during image movement from Macintosh memory across NuBus to standard video cards or during image movement from Display Card 8•24 GC frame buffer to Display Card 8•24 GC display:

When moving 24-bit images, you are moving 4 times as much data than moving 8-bit images and 24 times as much data than moving 1-bit images. When moving 8-bit images, you are moving 8 times as much data than moving 1-bit images.

The movement of image data from Macintosh memory to the Display Card 8•24 GC is different because only variables and small portions of data structures are being moved across NuBus--not large, deep bitmap images. There is a small increase in the amount of data sent as you move from 1-bit to 8-bit to 24-bit; however, 8-bit and 24-bit are very close. The bitmaps grow dramatically; the variables and data structures remain relatively flat.

Q) When does the Display Card 8•24 GC accelerate third-party cards?

A) The Display Card 8•24 GC accelerates other video cards via its pseudo-block transfer. This is similar to block transfer in that it claims the bus for a 16 NuBus data word transaction, but different in that it must send an address word for each data word that it sends. The extra transfer activity makes pseudo-block transfer slower than block transfer, but it is still an improvement over normal NuBus access times.

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