Tech Info Library

NuBus Speed Benchmarks (1/96)

```
Revised:        1/10/96
Security:       Everyone
```

NuBus Speed Benchmarks (1/96)

===

Article Created: 11 May 1990
Article Reviewed/Updated: 10 January 1996

TOPIC ---

I need NuBus specifications for speed, bandwidth, throughput, and
relationship to processor speed.

DISCUSSION ---

The following specifications are not TRUE benchmarks, but can be used as a
primer to understand the variables influencing the "relative" throughput
of NuBus.

Though the NuBus speed is designed to be processor- and architecture-
independent, it varies depending on the NuBus card and Macintosh used. We
don't have specific benchmarks, but in general, the NuBus "throughput"
ranges from around 7MB to 37MB per second depending on the Macintosh,
NuBus card, and application used. Generally, increases in NuBus
throughput are influenced more by the NuBus card's design and function
than by the use of a "faster" CPU.

NuBus throughput is faster on a Macintosh IIsi, Macintosh IIci, Macintosh
IIfx, or the Macintosh Quadra computers, because the processor clock rate
is faster than the 16MHz for other Macintosh II computers. These Macintosh
computers, therefore, are faster at bus arbitration on the processor side,
and the processor responds faster to NuBus accesses. For example, the
increase in speed with the Macintosh IIci is approximately 20 to 30
percent when going out to NuBus or coming back.

The typical time required to go from the processor bus to the NuBus card
is about 700ns, as is the time in reverse: going from the NuBus card back
to the processor. The time remains constant whether moving 1 or 4 bytes
of data. (These times are representative of the Macintosh II using the
Macintosh II Video Card.)

Other cards, such as the Macintosh 1-Bit Video Card, support what we call
"dump and run." A Macintosh II has a transfer rate of about 20MB using
this card because each 4-byte write-only takes only 200ns, and the data
goes right into video RAM on each cycle. This card immediately
acknowledges each cycle on a write, whereas the Macintosh II Video Card
could take more than one cycle for the data to move into RAM.

Cards that support the NuBus burst mode could achieve transfer rates of
up to 37.5MB when going from NuBus card to NuBus card, which is the case
with some graphics accelerator cards to video cards. With these cards,
the first access takes 200ns, and each subsequent access up to 16 takes
only 100ns.

Because of the overhead processing video, any performance increase over
one of the other Macintosh II computers is negated when using a Macintosh
IIci or Macintosh IIsi with the internal video in 8-bit mode. Setting the
internal video to 1-bit, or having a NuBus video card, will ensure maximum
NuBus performance in these systems.

Note: For information about Macintosh computers based on the 68040 or PowerPC
microprocessors, see these related articles in the Tech Info Library:

"Power Macintosh and NuBus Q&A"
"68040 CPU Architecture: NuBus Transfer Modes and Performance"

Article Change History:
10 Jan 1996 - Added reference to related articles.

Support Information Services

Tech Info Library Article Number:5514