Built-In and NuBus Ethernet Maximum Transfer Rate (3/96)

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TOPIC -----

What is the maximum data transfer rate possible with the built-in Ethernet port in comparison to NuBus Ethernet cards?

DISCUSSION -----

According to IEEE 802.3 Ethernet specification, Ethernet's maximum data transfer rate is 10 Mbits per second. The Apple EtherTalk card, Apple Ethernet NB card, and on-board computer Ethernet provide physical and link-level access to data communications networks meeting IEEE 802.3 and 802.2 Logical Link Control (LLC) type 1 standards.

In real life, Ethernet transfer rates from 4 to 10 Mbits per second vary depending on a number of factors, such as:

- The load of the internet network
- The network configuration
- The Ethernet buffer size on the card or board
- The type of Macintosh
- The software running
  - Version of AppleTalk
  - Operating System
  - MacTCP
  - MTU (Maximum Transmission Unit

Regarding the differences between on-board Ethernet and the Ethernet NB card, on-board Ethernet is about 15% to 20% faster than Ethernet NB card. This is because built-in Ethernet uses Direct Memory Access (DMA), it doesn't rely on NuBus data transfers, and the chip is operating at the faster system bus clock rate. Built-in Ethernet interface utilizes a 32-bit data path. The following systems use Ethernet DMA:

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

The Quadra's on-board Ethernet is implemented using the National DP83932 SONIC

Ethernet controller chip. This device includes an IEEE 802.3 encoder/decoder (ENDEC), media access control (MAC) unit, separate 32-byte send and receive FIFOs, and DMA controller in one device. SONIC is housed in a 132-pin PQFP package. A small ROM provides the Ethernet global address (which provides a unique 48-bit identity for each Quadra built). The SONIC controller includes DMA capability. It will request the bus and transfer data between its internal registers and main memory.

The Curio integrated circuit (IC) controls the Ethernet functions on Power Macintosh computers. The Curio IC is a multipurpose custom IC that contains a Media Access Controller for Ethernet (MACE), a SCSI controller, and a Serial Communications Controller (SCC). The Curio IC supports DMA transfers between its I/O ports and the computer’s main memory.

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