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Apple Ethernet NB Card: Expansion RAM Specifications (4/95)

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TOPIC ---

The Apple Ethernet NB Card, M0417LL/A, has 512KB standard RAM, expandable to 1MB
or 2.5MB with third-party memory expansion modules.

To help you be sure to use the correct third-party RAM, this article provides
specifications for the RAM.

DISCUSSION --

The Apple Ethernet NB card supports 512K of surface-mounted DRAM and four
auxiliary "ZIP" sockets for additional 512K or 2MB of DRAM. The standard 512KB
of surface-mounted DRAM is organized as four 256K x 4 SOJ packages in the bottom
quarter of the 2MB address range ($Fs000000 - $Fs1FFFFF).

A 512K upgrade, implemented with four more 256K x 4 DRAM chips slotted in the
ZIP sockets, would be logically located just above the standard 512KB of DRAM.
This upgrade would provide a total of 1MB of contiguous RAM in the lower half of
the 2MB address range from 000000 to 0FFFFF.

A 2MB upgrade would occupy the entire lower 2MB address range and push the
standard 512K up into the bottom quarter of the upper 2MB address range
beginning at 200000 and ending at 27FFFF (and copied three times up through
3FFFFF).

The entire memory allocation, regardless of the configuration, is accessible to
the 68000 processor, the SONIC Controller, and NuBus. When NuBus is the master,
both the 68000 and the SONIC Controller are denied access to RAM. All RAM
appears as a 16-bit device to the 68000 and the SONIC. The RAM appears as a
full 32-bit wide device, supporting 8-bit, 16-bit, and 32-bit bus reads to the
NuBus interface. NuBus accesses to RAM are performed with two 16-bit accesses
by the MCP Controller and Data Path circuitry to provide the full 32 bits of

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data in one NuBus access. This implementation, transparent to the application, puts the lowest addressed word in the lowest ordered bits (0 -15) and the highest addressed word in the highest ordered bits (16 - 31) of a 32-bit long word. The MMIU (Multi-Master Interface Unit) provides zero wait-state accesses with the 120ns DRAMs, using /CAS before /RAS refreshing.

The DRAM needed for any upgrade to this board must be either 256K x 4 or 1MB x 4 (120ns or faster) AND must be added in increments of 1MB (4-256K ZIP chips) or 2MB (4-1MB ZIP chips) only.

Memory for the card can be difficult to locate. However, if you want to upgrade the RAM, the following information will be helpful:

• Toshiba part No. TC514400AZ (from third-party distributors)

Article Change History:
21 Apr 1995 - Updated memory upgrade information.

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