



Tech Info Library

System 6.0.x, 7.x: How They Handle 4MB SIMMs (9/95)

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TOPIC -----

If a SIMM bank is filled with 4MB modules (giving 16MB), will 8MB be used by System Software 6.0.x, or will the system not know what to do with these SIMMs? We are concerned that these SIMMs will bomb the system.

DISCUSSION -----

System software 6.0.x is a 24-bit operating system. When a Macintosh system is running system software 6.0.x, the Macintosh is in 24-bit mode. In 24-bit mode, the Macintosh II family of computers has the address space starting at \$00 0000 through \$7F FFFF (8MB) reserved for system RAM. The SIMM sockets use the entire system RAM address range of \$00 0000 through \$7F FFFF, which equals 8MB of RAM.

As you can see from this, with 24-bit addressing, installing four 4MB SIMMs would give you 8MB of usable RAM. The memory configuration under "About This Macintosh..." (About the Finder with System 6) will report 16MB installed, but 8MB is usable with the remainder being assigned to the system software. The extra memory assigned to the system software is unusable. In the case of the Macintosh LC, 2MB RAM is on the logic board. If you install two 4MB SIMMs, the Finder will report that 10MB of RAM installed. 8MB of RAM is usable.

With System 7, you have the option of turning on 32-bit addressing in 32-bit clean ROM computers, with the exception of the AV and Power Macintosh models which operate in 32-Bit mode at all times. (MODE32 installed on computers running System 7 versions prior to 7.1 or the 32-Bit System Enabler installed on computers running 7.1 will enable 32-bit operation). This allows addressing above 8MB in those computers that physically support more than 8MB of RAM.

A/UX is also a 32-bit operating system that can address above 8 megabytes of RAM. A/UX supports up to 256MB of physical RAM.

In 32-bit mode, the Macintosh II family of computers (which includes the Macintosh SE/30) has the address space starting at \$0000 0000 through \$3FFF FFFF (1 gigabyte) reserved for system RAM. NuBus RAM cards may use address \$0000 0000 through \$3FFF FFFF to add system RAM. The SIMM sockets use address \$0000 0000 through \$07FF FFFF, which equals 128MB of RAM.

Here's a list of the current Macintosh systems and the maximum physical memory

that the SIMM sockets support:

Begin_Table

Macintosh System	Maximum Physical RAM
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Non 32-Bit clean systems

Macintosh Plus	4MB
Macintosh SE	4MB
Macintosh SE/30	128MB + #
Macintosh II	32MB * ##
Macintosh IIX	32MB * #
Macintosh IICx	128MB + #
Macintosh Portable	9MB #
Macintosh Portable (backlit)	8MB

32-Bit Clean systems

Macintosh Classic	4MB
Macintosh Classic II	10MB
Macintosh Color Classic	10MB
Macintosh LC	10MB
Macintosh LC II	10MB
Macintosh LC III	36MB
Macintosh LC 475	36MB
Macintosh LC 520	12MB
Macintosh LC 550	36MB
Macintosh LC 575	36MB
Macintosh LC 630	36MB
Macintosh IICi	128MB +
Macintosh IISI	65MB +
Macintosh IIFx	128MB +
Macintosh IIvi	20MB
Macintosh IIvx	68MB
Macintosh Quadra 610	68MB
Macintosh Quadra 630	36MB
Macintosh Quadra 650	132MB
Macintosh Quadra 660AV	68MB
Quadra 700	68MB +
Quadra 900	256MB +
Quadra 800	136MB
Quadra 840AV	128MB
Quadra 950	256MB +
Power Macintosh 6100/60	72MB
Power Macintosh 7100/66	136MB
Power Macintosh 8100/80	264MB
Macintosh Performa 200	10MB
Macintosh Performa 400	10MB
Macintosh Performa 405	10MB
Macintosh Performa 410	10MB

Macintosh Performa 430	10MB
Macintosh Performa 450	36MB
Macintosh Performa 460	36MB
Macintosh Performa 466/467	36MB
Macintosh Performa 475	36MB
Macintosh Performa 476	36MB
Macintosh Performa 550	36MB
Macintosh Performa 600	68MB
Macintosh Performa 63X	36MB
PowerBook 100	8MB
PowerBook 140	8MB
PowerBook 145	8MB
PowerBook 160	14MB
PowerBook 165	14MB
PowerBook 165c	14MB
PowerBook 170	8MB
PowerBook 180	14MB
PowerBook 180c	14MB
PowerBook Duo 210	24MB
PowerBook Duo 230	24MB
PowerBook Duo 250	24MB
PowerBook Duo 270c	32MB
PowerBook Duo 280c	40MB

End_Table

Requires the 32-Bit System Enabler with System 7.1 or MODE32 with versions of System 7 earlier than 7.1.

Requires the 32-Bit System Enabler with System 7.1 or MODE32 with versions of System 7 earlier than 7.1, as well as the FDHD upgrade kit and PMMU (The FDHD upgrade has been discontinued).

+ These models are designed to handle 16 megabyte SIMMs but only 4 megabyte SIMMs are officially supported by Apple at this time.

* There are two different reasons that the Macintosh II and the Macintosh IIX can't support the higher density SIMMs. First, the Macintosh II ROM startup code doesn't know about 4MB SIMMs and won't start up.

Second, the Macintosh IIX ROM does know about 4MB SIMMs, but standard 4MB SIMMs won't work on the Macintosh IIX. This is because JEDEC, the committee overseeing the standardization of new solid-state devices, added an additional built-in test mode to high-density DRAMs. The test mode is invoked by a sequence of electrical signals which was ignored by earlier-generation DRAM. This specification for 4MB SIMMs was changed after the Macintosh IIX was developed. At the time the Macintosh IIX was developed, in theory, 4MB SIMMs should have worked. It wasn't known at the time that the specification would be changed. The result is that the current standard 4MB SIMMs don't work on the Macintosh IIX.

There are special 4 Megabyte SIMMs available that have a PAL chip which will allow their use in the Macintosh II and IIX. You'll need to

contact the SIMM vendor or manufacturer to see if they have these special SIMMs available.

This subject is described in detail in Tech Note #176. Refer to the Developer Tech Answers Library in the Developer Support folder for further information on this Tech Note.

Article Change History:

- 19 Sep 1995 - Revised to show discontinued upgrade.
- 18 Aug 1994 - Revised to include Macintosh 630 family and Duo 280c.
- 15 Mar 1994 - Revised to include recent Macintosh and Performa models, corrected formatting.

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