About SIMMs

Every Mac since the Mac Plus has had sockets or slots to hold memory and to allow for memory expansion. The standard way to add memory is to install SIMMs (Single In–Line Memory Module; a long thin strip of plastic with a single row of RAM chips on it). Some Macs (Portable, PowerBooks, and Classics) use non–standard RAM boards that go into “slots” much like NuBus slots.

Installing RAM is fairly easy. Many leading SIMM vendors include detailed written installation instructions with their RAM, or even a video tape. Often, the hardest part is figuring out how to open up the Mac. If you don’t want to do it yourself, your local dealer will probably do it for a nominal charge.

You should be very careful, however, when installing RAM in the Plus, SE, Classic, Classic II, or SE/30. The built–in video monitor can hold a dangerous electrical charge for quite a while after the power is turned off. SIMM installation on these Macs requires a special tool, (a size T–15 Torx tip screwdriver) and a higher level of experience than on the other systems. You may also have to cut a resistor, or move a jumper (see Reference Guide).

The basic information you need to know about what kind of SIMMs to purchase and where to install them can be described in four simple rules.

The Four SIMM Rules

There are three classes of Macs in terms of memory architecture: Compact, Modular, and Portable. The Compact Macs include the Plus, SE, Classic, and Classic II. The Modular Macs are all the systems with separate monitors, as well as the SE/30. The Portables include the original Portable, the PowerBooks, and the PowerBook Duos.

Each class has its own basic memory architecture. (For a comprehensive system–by–system discussion of RAM configurations, see “Reference Guide”). This architecture usually consists of some RAM soldered onto the motherboard plus several SIMM sockets clustered in one or more “banks”. Knowing about this architecture is important because of the way the banks must be filled.

Rule #1: Each SIMM bank must either be completely full or empty.

Most of the Compacts are built around a standard 4MB capacity. Most Modular Macs are designed for twice this with 2 or more SIMM slots for expansion. Modular Macs following the introduction of the Quadras have some RAM soldered on. The Portables have some RAM soldered on and an expansion slot for adapter cards with more RAM.

Rule # 2: Each SIMM bank must be filled with SIMMs of the same size.

SIMMs come in different sizes. Not long ago there were only two common types: 256K (one quarter megabyte) and 1MB (one megabyte). Today there are 256K, 512K, 1MB, 2MB, 4MB, 8MB, and 16MB SIMMs, and even bigger ones on the way.

You can put different sized SIMMs in different banks, but within each bank mixing is not possible. Putting Rule 1 and 2 together, you can see that a IIcx, using only 256K and 1MB SIMMs can have 1MB (4x256), 2MB (8x256), 4MB (4x1), 5MB (4x256, 4x1), or 8MB (8x1). To go beyond 8MB, you have to confront limits that don't relate just to the SIMM architecture, as described in "Using Large Amounts of Memory".

SIMMs come in different speeds. Some SIMM sizes will not work in all Macs. 512K SIMMs only work in the IIci and IIsi. 2MB SIMMs only work in the LC, LC II, IIsi, IIvx, IIci and Performa 400 and 600. The smallest SIMMs that will work in the Classic II, LC II, IIfx, Quadras and Performa 200 are 1MB. And, 1MB SIMMs made of 2 chips instead of the usual 8 will usually not work on Mac II and IIx.

They are rated according to how fast information can be retrieved from them. This access speed is denoted in "ns" (ns stands for nanosecond, a billionth of a second). Early Compact Macs needed 150ns. Most Modular Macs need 120 or 100ns, but the IIvx, IIfx, IIci and the Quadras demand 80ns. The ns number can be usually be found on the RAM itself: take the last one or two digits after the part number and multiply by 10.

You can use faster SIMMs (lower ns number) than required but they will usually cost more and will not improve performance. The only advantage of buying overrated SIMMs is that they may still be compatible if you upgrade, or if you buy a new Mac. On most Macs (except the IIfx and Quadra 900) you can mix ns numbers even within a bank, but the slowest one is supposed to be to be fast enough for the given type of Mac. In practice, you can often get away with slightly underrated SIMMs. We have frequently used 150ns SIMMs on the Mac II, IIx, IIcx, and SE/30 without a problem. However, we would not recommend trying this on a IIci or IIsi.

Physically, most SIMMs are interchangeable. However, IIfx SIMMs have over twice as many connectors on them, and will only fit in a IIfx (or a LaserWriter II NTX). The 72-pin SIMMs used in Centris and newer modular Macs also differ from the IIfx SIMMs. Plus, you can add these newer SIMMs one at a time.

Portable RAM is completely different–because of the power limitations, special RAM called "Static" or "TSOP" RAM is required. It's expensive. In some cases you may want to choose "pseudo–static" RAM, which consumes more power but costs less. There are two types of Portable RAM and some PowerBook RAM does not work on all PowerBooks. Portable and PowerBook RAM are not interchangeable (see "Reference Guide").

Rule #3: If you only fill one bank with SIMMs, use Bank A.

When you face the front of the two–bank Modular Macs (II, IIx, IIcx, IIci, IIfx), the four

SIMM sockets on the right are Bank A, probably the opposite of what you would guess. On the Mac Plus and the early SE (the one that uses resistors for memory configuration), the two sockets towards the back are Bank A. On the later SE (the one that uses jumpers) and the SE/30, Bank A is towards the front. On the Quadra 900/950, Bank A is the upper left two sockets, and the two sockets below them. The Classic, Classic II, LC, LC II, IIsi, IIvx and Quadra 700 have only one bank.

You can use SIMMs of different sizes in the different banks as long as each bank is of one SIMM type. If you do this, remember:

Rule #4: You should usually put your largest SIMMs in Bank A.
Notice we said usually. If you start working with SIMMs that are bigger than 1MB, things can get more complicated (see “Using Large Amounts of Memory” and “Reference Guide”). In particular, this rule is reversed if you use 4, 8, or 16MB SIMMs and either have a Mac II, Mac IIx, or use on–board video on a IIci. This also applies to 2MB SIMMs on the IIci with on–board video. (2MB SIMMs usually don’t work on the Mac II and IIx.)