

For Macintosh and
Power Macintosh

CONNECTIX



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**Double
Your RAM
with Just
One Click**



**RAM
DOUBLER**

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RAM DOUBLER

*Double Your RAM
with Just One Click*

CONNECTIX

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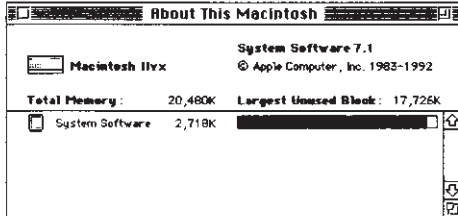
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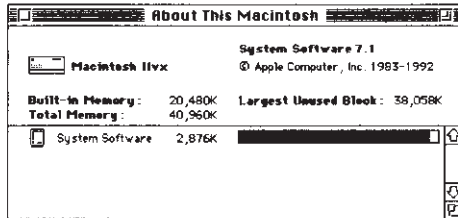
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WELCOME TO RAM DOUBLER

RAM Doubler™ is a system software extension that doubles the amount of built-in memory in your Mac. It's just that easy. With twice as much memory to open applications, you'll be rid of that "Out of Memory" message forever.



Before RAM Doubler



After RAM Doubler



The RAM Doubler Extension

SYSTEM REQUIREMENTS

RAM Doubler works on all 68030, 68040 and PowerPC Macintosh models currently being produced and most older Macintoshes that use these processors.

To run RAM Doubler, you must have the following:

- A Macintosh equipped with a 68030, 68040 or PowerPC processor. Examples include all PowerMac, Centris and Quadra models, all PowerBooks and Duos except for the Model 100, all models in the Macintosh II family except the original (see below), and all Performas.
- System 6.05 or later.
- 4 MBs of physical RAM memory required, 8 MBs recommended.
- A hard disk is required if you have less than 8 MBs of RAM.

RAM Doubler cannot be used on a few older Macs because they use the 68000 or 68020 microprocessor: PowerBook 100, Mac 128, Mac 512, Mac Plus, SE, original Classic and original LC (see below for an exception). Machines that originally had a 68000 CPU and were later upgraded with a 68030 accelerator will not work with RAM Doubler. (They should use Connectix Compact Virtual to extend memory.)

RAM Doubler can work on the original Macintosh LC if it has a Daystar, Diimo, or Dove accelerator installed.

RAM Doubler can work on the original Mac II, which uses the 68020 microprocessor, if a 68030 or 68040 accelerator is installed. You may use a 68851 PMMU chip instead of an accelerator.

For further information see the section "Compatibility Issues" at the end of this manual.

INSTALLING RAM DOUBLER

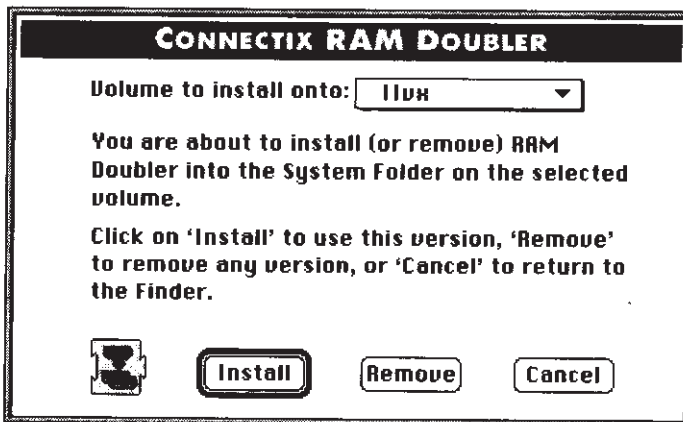
TO INSTALL RAM DOUBLER

- ❖ **NOTE:** If you are using 24-bit addressing on your Macintosh (or aren't sure what kind of memory addressing you're using), open the Memory Control Panel and select 32-bit addressing. Restart your Macintosh and check to make sure your favorite applications still work. If you have problems, you'll have to use 24-bit addressing, which limits the maximum memory you can use to 14 MBs. If everything works fine, proceed with the RAM Doubler installation. If you're not sure what 32-bit addressing is, check the "Living with RAM Doubler" (specifically, statement #5) or the "Frequently Asked Questions" section of this manual (specifically, the question "Why isn't my memory doubling?").
1. Turn on your Macintosh and insert the RAM Doubler floppy disk.

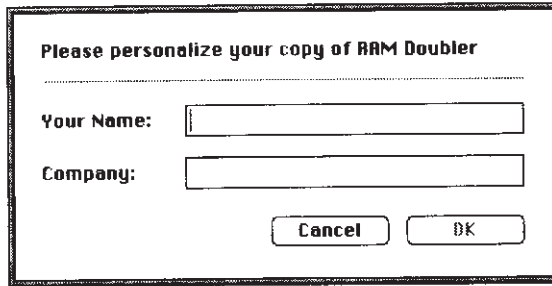


RAM Doubler Installer

2. Double-click the RAM Doubler installer icon to begin the installation process.

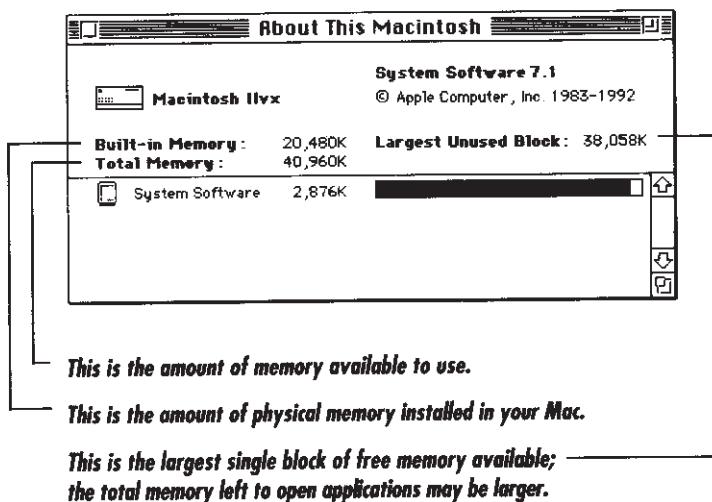


3. Use the pop-up menu to tell the installer on which disk volume you want to install RAM Doubler. The logical choice is usually the one selected, since it is the disk you started from.
4. Click the Install button.



5. Fill in the personalization dialog box that appears. Click the OK button.
6. When you see a message saying that installation was successful, click OK to return to the Finder.
7. Restart your Macintosh.
8. Be sure to look at the RAM Doubler Read Me file on the RAM Doubler installer disk for any last minute information about the product that isn't in this manual.

To confirm that your Mac's memory is doubled, choose About This Macintosh from the Apple menu when you are in the Finder. Built-in Memory is the actual amount of physical RAM installed in your Mac. Total Memory is the amount of memory actually available to use. If your memory is not fully doubled, refer to the "Frequently Asked Questions" section at the end of this manual.



TO REMOVE RAM DOUBLER

1. Double-click the RAM Doubler installer icon on the RAM Doubler floppy disk.
2. Use the pop-up box to tell the installer on which disk you want to remove RAM Doubler.
3. Click the Remove button.
4. Restart your Macintosh.

TO TEMPORARILY DISABLE RAM DOUBLER

To temporarily disable RAM Doubler, restart your Mac and

1. Hold down the Tilde (~) or Escape key to disable just RAM Doubler.

Or,

1. Hold down the Shift key to temporarily disable all extensions.

TROUBLESHOOTING CONFLICTS WITH RAM DOUBLER

If you suspect a problem with your configuration related to RAM Doubler, try the following simple test:

Restart your Macintosh while holding down the Tilde key (~). This disables RAM Doubler temporarily while leaving the rest of your system intact.

If the problem disappears with RAM Doubler disabled, consult the ReadMe file on your RAM Doubler disk for additional configuration information, or call Connectix Technical Support for more help.

If the problem persists with RAM Doubler temporarily disabled, the problem is not with RAM Doubler and you should try removing other extensions to isolate which is causing the problem.

WHAT IS RAM DOUBLER?

Connectix RAM Doubler is a system extension that always exactly doubles Macintosh RAM. It is a software-only product that requires no adjustment or user intervention after the original one minute installation process.

Using RAM Doubler, a Macintosh with 4 MB of RAM works exactly like a Macintosh with 8 MB, an 8 MB Macintosh works like one with 16 MB, and so on. RAM Doubler is fully compatible with the complete range of Macintosh application software.

HOW RAM DOUBLER WORKS

RAM Doubler uses three techniques to double RAM:

- Reallocating unused application memory
- Compression of least-recently used memory
- Swapping memory to hard disk

These techniques are used in that order to maximize memory performance.

RAM Doubler starts by reallocating memory an application has reserved but is not currently utilizing. Unused application memory is indicated by the "white bar" space in the About this Macintosh memory display. Most of the time, making unused application memory available to the System is sufficient to double the amount of application memory that can be used. If this is the case, the other two techniques are not used. Reallocation results in extra memory that is just as fast as the physical memory in your machine, which means there is virtually no performance penalty imparted by reallocating memory.

If more memory is needed, RAM Doubler locates memory blocks the Macintosh has used but probably will not need again. Typical examples would be software used to start up the computer, or to open an application. Normally this memory is unavailable to other applications. RAM Doubler compresses infrequently used memory blocks using proprietary data compression techniques. By compressing these memory blocks, additional RAM is freed up for other applications. Compression results in a slight performance penalty (2-5%), but is still fast, since everything is done without having to access the hard disk.

Reclaiming unused memory and compressing the data in infrequently used memory will almost always be able to produce full RAM doubling. However, situations exist that require additional work by RAM Doubler:

- If the data in memory is already compressed, RAM Doubler's compression techniques generally are unable to additionally compress memory.
- The time necessary to compress memory may adversely affect performance, as is occasionally the case with Macintoshes having less than 8 MBs of physical RAM.

In these situations, RAM Doubler swaps some of the compressed contents of memory out to disk, using patented techniques originally developed for Connectix's earlier memory management product, Virtual. Swapping memory to disk is usually the slowest method of adding memory to your system, although it is still quite fast. On machines with very little physical memory, swapping can sometimes be faster than compression.

RAM Doubler is optimized for memory access performance. It uses highly specialized code to pick the method of doubling that slows down the Macintosh the least. Most Macintosh users see no difference in system performance using RAM Doubler.

LIVING WITH RAM DOUBLER

1. You must start with at least 4 MB of physical RAM. At the other end of the spectrum, RAM Doubler can not fully double the memory of a Macintosh with more than 128 MB of physical RAM. RAM Doubler only extends memory to 256 MB.
2. You need an MMU (Memory Management Unit)—which is built into the 68030, 68040 and PowerPC processors, but optional for 68020-based machines. Because RAM Doubler uses the MMU, you can't use RAM Doubler simultaneously with either Connectix Virtual or System 7 VM. For 68000-based machines that have an accelerator or ROM that is incompatible with RAM Doubler, Connectix recommends using Compact Virtual to increase memory capacity.
3. When using RAM Doubler, do not use Get Info to increase the memory allocation of your applications unless you experience "Not Enough Memory" or "Out of Memory" errors within those applications. If you allocate a memory partition larger than physical RAM available, be aware that some applications—in particular Adobe PhotoShop—are created in such a way that you may see a decrease in performance. Moreover, this degradation is more visible the less memory you have (for example, it is worst on a 4 MB machine, the minimum RAM Doubler configuration).
4. Performance using RAM Doubler is generally not noticeably different from real RAM. The two major exceptions are:
 - If you put all your doubled memory to work on a single, huge application.
 - If you have a 4 MB Macintosh and fully load the 8 MBs RAM Doubler creates.

In these situations slowdowns beyond the normal 2-5% may be seen.

5. Most users work in 32-bit addressing. However, if you use 24-bit mode you are subject to some memory addressing limitations inherent in Apple's design, though less than you would have if you simply installed more RAM (one case where RAM Doubler is superior to physical RAM!) Normally in 24-bit mode you can only use 8 MB of RAM, even if more is installed. With RAM Doubler you double RAM up to 15 MB minus the number of NuBus cards installed in your Mac. If you have more than 5 MB now and want to use RAM Doubler in 24-bit mode, call Connectix at

800/950-5880 and we'll help you figure out what your upper limit is going to be (it's usually 12 to 14 MB). In 32-bit mode all these issues disappear, so use 32-bit addressing if you can.

❖ NOTE: If your memory control panel lacks a 32-bit addressing section one of three cases apply:

1. It is a 68000-based Macintosh that needs to use Compact Virtual to extend memory.
 2. It is a Mac II, IIfx, IIfx or SE/30 which needs to use Connectix MODE32 to run 32-bit system addressing.
 3. It is a very new Macintosh which can only work in 32-bit system addressing.
6. RAM Doubler does not double RAM disk memory, since that is removed from the System before RAM Doubler starts to work. In particular, if you use Apple's RAM Disk, the memory for the RAM Disk is allocated by the Macintosh ROM and is thus unavailable for doubling. The formula for figuring out how much memory you'll have for applications is:

Application Memory Size = (Physical RAM Size - RAM Disk Size) * 2

Therefore, an 8 MB Macintosh with a 4 MB Apple RAM Disk will only have 8 MB of available RAM for applications, not 12. Also, to protect against performance loss, the amount of your physical RAM, minus the size of your RAM Disk, should never be less than 4 MB. Note that Connectix Maxima 3.0 doubles the capacity of RAM disks, so you can get a larger RAM disk by using it instead of Apple's. In the same example as above using Maxima instead of Apple's RAM disk you would have 8 MB of RAM and an 8 MB RAM disk (that is, the RAM disk would double in capacity).

FREQUENTLY ASKED QUESTIONS

- Q.** Does RAM Doubler REALLY give me the functional equivalent of doubling my physical RAM?
- A.** Yes! RAM Doubler always exactly doubles your application memory. If you have 4 MBs of physical RAM, RAM Doubler will provide you exactly 8 MBs of application memory; 8 becomes 16, and so on. RAM Doubler is not like disk drive compression utilities, which often only provide a 50-80% increase. The Mac will look (in About This Macintosh) and act (in compatibility, performance and capacity) like a Mac that has more RAM.
- Q.** Can I use RAM Doubler with Virtual? Are they compatible? Is Virtual still useful?
- A.** RAM Doubler and Virtual are mutually exclusive since both demand control of the MMU. For most Macs, Virtual is made obsolete by RAM Doubler—you get equal or better performance without decreasing your disk drive space. If you have a really fast hard drive and a slow CPU (16MHz '030) there are cases where Virtual can be faster, but not much. Connectix doesn't recommend RAM Doubler to owners of a Mac IIcx or earlier who are already using Virtual, unless you are pinched for hard drive space. For current Macintosh models, or older Macs not already using Virtual, we'd generally recommend RAM Doubler.
- Finally, Connectix continues to publish and support Virtual because it's more flexible than RAM Doubler. For example, you can more than double your RAM if you wish.
- Q:** Why did my hard disk space decrease?
- A:** RAM Doubler occasionally and temporarily uses hard disk space to improve your Mac's performance. This is common if your Mac has less than 8 MB of RAM. When you shutdown or restart your computer, any disk space RAM Doubler is using will be freed up.
- Q.** How big is the disk file that is used to "swap" info?
- A.** The swap file size varies depending on how full real RAM gets and how well the data contained there compresses; it's rarely more than a few hundred kilobytes. (For Macs with 8 MBs of physical RAM or more it's almost never used.)

Q. As I fill my RAM with programs, things slow down. Is this normal?

A. The more you fill your RAM, the more it will slow down, though by using the minimal swap file RAM Doubler generally minimizes any slow down. Remember, too, that the size of memory partitions for applications and the document size have effects on performance. For example, giving Word a minimum size partition to work in and then working on a really large document will slow performance, since Word will have to spool pieces of the document to the hard disk. Such slow downs have nothing to do with RAM Doubler. Check the manuals for the applications you use to make sure you're assigning them the optimal amounts of memory to work with.

Q. What about updates?

A. We release updates to RAM Doubler on three BBS's: AppleLink: Connectix, AOL: Connectix, and CompuServe: MAC A Vendor Forum (GO MACAVEN). Updates are also available directly from Connectix for a \$9.95 shipping and handling charge (plus California Sales Tax, if applicable) if you don't have access to one of the on-line services.

Q: How can I test to see if my Mac and applications can use RAM Doubler?

A: You can test by trying your Mac and applications with System 7 Virtual Memory because both use the MMU in similar ways. If it won't work with VM, it may be impossible to get to work with RAM Doubler, though we've found a few creative workarounds already.

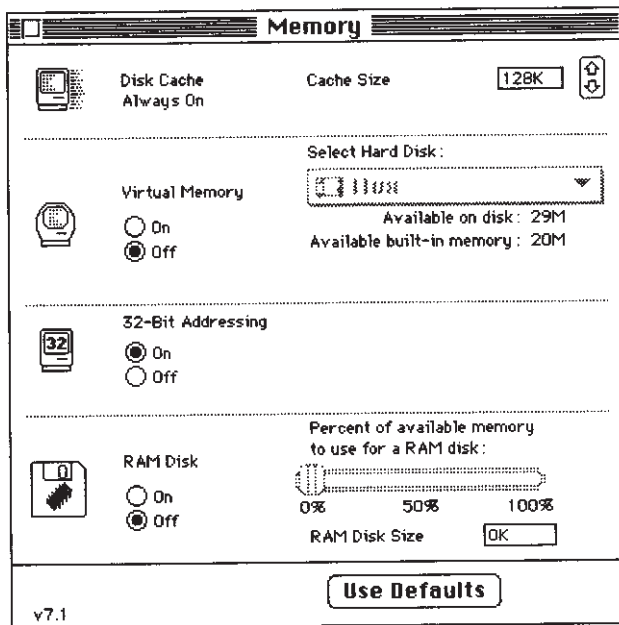
Q. Why isn't my memory doubling?

A: RAM Doubler may not double your memory if your Mac is using 24-bit addressing and you have more than 4 MB of physical RAM. Due to limitations Apple imposed on older Macs, 24-bit addressing can only manage a total of 16 MB of memory, of which some is used up by hardware (serial ports, floppy drive, ROMs, and video, network or other NuBus cards).

You can still fully double your RAM. Simply switch to System 7's built-in 32-bit addressing.

To use RAM Doubler with 32-bit addressing:

1. Choose Control Panels from the Apple menu and open the Memory control panel.



Memory control panel

2. Click the On button under 32-bit addressing.
3. Restart your Macintosh.
 - ❖ **NOTE:** Not all applications, system extensions, and hard disk drivers are compatible with 32-bit addressing. Check with the manufacturer if you have problems using a particular product with 32-bit addressing.
 - ☛ **TIP:** If you have trouble restarting your Mac with 32-bit addressing on, restart your Mac and hold down the Shift key to disable your extensions. To find the offending software, remove all third party software from the System Folder and Control Panels and Extensions folders. Then, place one extension into the System Folder and restart. Repeat this process and eventually you should find the extension that is not compatible with 32-bit addressing. You should contact the manufacturer for a compatible version.

Q: Why do I still get the “Out of Memory” or “Not Enough Memory” message?

A: This can be caused by two distinct problems, memory allocation and fragmented memory.

Memory Allocation: While your Mac may have more memory, your programs may not have enough memory set aside. If you frequently run out of memory in a particular application, you may want to increase the amount of memory the program uses. To do this, adjust the program’s memory size. Select the application; choose Get Info from the File menu; specify the amount of memory the application uses in the box labeled “Current size” or “Preferred size.” (System 7.1 also adds a “Minimum size”—Refer to your Macintosh User’s Guide for more details.)

Fragmented memory: Like disk space, memory becomes fragmented. The system software’s memory management is not able to relocate entire applications to unify free space in memory. This often happens when you open and close applications repeatedly. After enough time, the memory space is broken down into increasingly smaller pieces. You can sometimes recover more space by closing two programs that appear next to each other in the About This Macintosh window, but at some point it is usually best to restart, clearing the memory fragmentation problem.

Q: Why are the numbers in the About This Macintosh window not what I expect?

A: Apple wrote the About This Macintosh window in a very specific way, which sometimes confuses users who don’t know how it performs calculations.

Largest Unused Block: The system software reports the value of the largest contiguous block of memory and not the sum of the fragmented free memory space. Memory space is shared by your software and hardware. Memory space can be fragmented because hardware addresses for the ROMs and for add-on cards are scattered within it (24-bit mode, only—this doesn’t happen with 32-bit addressing). If you frequently have trouble opening applications because your largest unused block is much smaller than the amount of unused RAM, it is probably a good idea to turn on 32-bit addressing.

Total Memory: When using more than 8 MB of memory with 24-bit addressing, the system software sometimes reports the sum of the memory available for applications and that used by add-on cards, even if that memory is not available to applications. The general solution is to turn on 32-bit addressing. However, if you have a Mac with more than one NuBus slot, you can eliminate this confusion through proper alignment of your NuBus cards. On a Mac II, IIx, IIcx, IIfx, Quadra 700, put the cards in adjacent slots as far away from the power supply as possible. On a Mac IIfx, IIvx, Centris 650, Quadra 650, 800, 900 and 950, put cards in adjacent slots nearest the power supply.

Q: Now that I have more memory should I increase the memory allocations of all my applications?

A: No, the manufacturer's suggested memory allocation size is usually optimal. Unless you are experiencing difficulties (see Out of Memory question above) with a particular application, it is usually best to leave the allocation at the default size.

Q: Can I use RAM Doubler with products that double my hard drive space?

A: RAM Doubler works with all file-level compression utilities, such as AutoDoubler, Now Compress and Stuffit. RAM Doubler is also compatible with Stacker, but not other driver-level disk compression products.

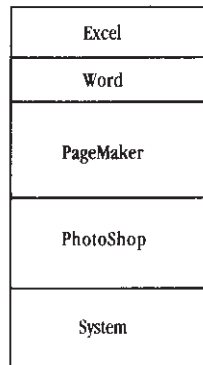
Q: Will RAM Doubler make my Mac run hotter or void my Apple warranty?

A: No to both questions. RAM Doubler does its magic entirely in software and does not alter your hardware in any fashion.

Q: I have 16 MBs of memory after installing RAM Doubler. I opened Excel, Word, PageMaker, and PhotoShop. Great! But then I cannot open any window in the Finder. The Finder tells me "Not Enough Memory," so I quit Excel, Word, and PageMaker. Now I have over 11 MBs free, but the Finder still insists it does not have enough memory, what gives?

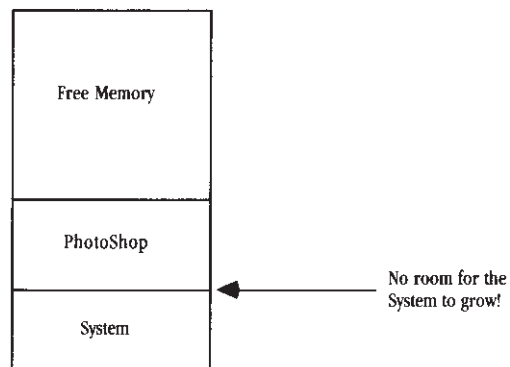
A: You've found one of the anomalies in the Macintosh OS. The same thing happens regardless of whether you have RAM Doubler installed or not. Essentially, Finder is unable to move applications out of the way to free up room for the System heap to grow. Here's how it works:

-
- Let's say you start Excel, Word, PageMaker, and PhotoShop, in that order, and fill up the application memory area. Your memory map will look like this:



There is no free memory at this point.

- Next, you Quit out of Excel, Word, and PageMaker, which leaves the memory map like this:



Notice that the memory that was freed is not adjacent to the System, where Finder needs the memory to be. The System size needs to grow for the Finder to have enough memory to track the new open window. Amazingly, the message that the Finder put up when it ran out of memory might suggest the wrong application to Quit out of (it always suggests the largest application, no matter where it is in memory).

If you get a Finder message saying "Not Enough Memory," either quit all applications, or quit the last application you started.

COMPATIBILITY ISSUES

Connectix' experience with over a hundred thousand Macintosh users tells us that RAM Doubler works on virtually all current systems and configurations. However, there are a few hardware and software combinations which do not work with RAM Doubler. The full details of what does and doesn't work with RAM Doubler are presented in the following sections. Many of the exceptions that cause RAM Doubler not to work are due to older hardware or software: make sure you are using the current versions of products!

HARDWARE COMPATIBILITY

You must have at least 4 MBs of physical RAM to use RAM Doubler.

1. RAM Doubler works on:
 - all Power Macintosh systems
 - all Quadra, Centris, and Performa systems
 - all PowerBooks and Duos except the PowerBook 100 and the original Apple Portable
 - LC II and LC III, but not the original LC (see item 2)
 - SE/30; all Mac II series except the original Mac II (see item 2)
 - Classic II & Color Classic, but not the original Classic (see item 3)
2. RAM Doubler works on two systems only after modification:
 - original Mac II if the user has added a PMMU chip, 68030 or 68040 accelerator (check accelerator list in item 4, however)
 - original LC if the user has added a 68030 or 68040 accelerator (check accelerator list in item 4, however), or has purchased the LC II or III upgrade
3. RAM Doubler will NOT work on any:
 - Mac Plus or earlier, Mac SE, Mac Classic or Mac LC
 - PowerBook 100 or Apple Portable
4. RAM Doubler will NOT work with the following accelerators:
 - any accelerated compact Mac
 - almost any Applied Engineering TransWarp accelerator
 - any TokaMac accelerator or any Mobius accelerator

-
- Radius Rocket when used as the main CPU
 - The basic test is: Will the accelerator work with System 7 Virtual Memory? If it will, it is compatible with RAM Doubler. If not, it may not be compatible. Many boards will fail this test. A few that work are the DayStar, Diimo, and Dove Marathon boards.
5. Other hardware issues:
- A few older video cards are not virtual memory compatible, and may require a ROM update to work.
 - Some drivers, notably early versions of Alysis' eDisk and GCC's disk drivers, allocate memory in a way which prevents RAM Doubler from extending RAM. Contact your hard drive vendor if you receive the alert concerning a driver not in the system heap.
 - Most SCSI-2 boards do not work with RAM Doubler. RAM Doubler does work with the FWB SCSI JackHammer.
 - Connectix does not recommend using RAM Doubler with any SCSI II NuBus cards (other than the JackHammer).
 - All third-party display adapters for PowerBooks are not currently compatible.
 - Products which disable themselves under non-unity memory-mapping environments (like System 7 VM or Connectix Virtual) are not currently supported.

SOFTWARE COMPATIBILITY

1. O/S Compatibility: System 6 and 7 compatible
 - Systems 6.0.5, 6.0.7, 6.0.8, 7.0, 7.0.1, 7.1, 7 Pro, 7.5
2. Hard Drive doublers:
 - File-level compression products—such as Stuffit—will work with RAM Doubler.
 - Stacker is the only driver-level hard drive compression that currently works with RAM Doubler.
 - To use Stacker, make sure it is on the startup drive or is mounted at startup.

3. AV Turbo ROM: incompatible

- The AV Turbo ROM control panel (a shareware utility for Quadra AV Macs) is not compatible with RAM Doubler. If the AV Turbo ROM is on RAM Doubler will not install on startup. The AV Turbo ROM sets a bit to copy ROM into RAM during boot; thus, this situation can occur even if the AV Turbo ROM has been removed (because the bit has been set). The solution in this case is to either reinstall AV Turbo ROM and turn off the copy ROM into RAM feature; or reset the PRAM (hold down the command+option+P+R keys at startup). If you are using a RAM disk, make sure the contents are saved to the hard drive before resetting the PRAM.

4. MacTCP: current version compatible

- MacTCP 2.0.4 is the current version and is compatible with RAM Doubler. Earlier versions of MacTCP, notably version 1.1, may cause an erroneous message “system file may be damaged” during startup, when loading with RAM Doubler. To correct the problem, update to 2.0.4 of MacTCP.

5. AppleTalk: current version compatible

- You must use a version of AppleTalk 58.1.3 or greater—installed by version 1.4.4 or later of the Network Software Installer (from Apple). We have found that most network problems can be resolved by updating the AppleTalk driver to the current version. These include any problematic network, printing, or file sharing behavior. To find the version of AppleTalk, check the Network control panel; if it does not list the version then it needs to be updated. Also, utilities such as Apple’s MacCheck will provide the AppleTalk driver version in their system configuration listing.

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RAM DOUBLER

For Macintosh and
Power Macintosh

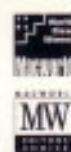
RAM Doubler™ gives you twice the memory without the expense and hassle of adding SIMMs. Installation takes about 15 seconds and one mouse click. It's worry-free right from the start. If you had 4 MBs of RAM, your Macintosh will have 8 MBs of memory available with RAM Doubler. Keep all your applications open—you'll be rid of the "Not Enough Memory" messages forever.

The RAM Doubler Technology

RAM Doubler uses three methods to increase your memory. First, it reclaims unused memory that has been allocated to open applications. Next, RAM Doubler takes memory that is in use but not likely to be used again and compresses it. Finally, if necessary to preserve performance, RAM Doubler will store some compressed information on the hard drive. The result of these three methods is a true doubling of application memory.

What Others Say About RAM Doubler

★★★★ "RAM Doubler may well be the best investment you'll make this year."
MacUser, June 1994



"Our readers pick their favorites...and we wholeheartedly concur with your insightful selection of Connectix Corporation's RAM Doubler as the best new software."
Macworld, September 1994

"...I wish all software worked so seamlessly. This is a way-cool product with no real downside. If you need more Mac memory, buy it... Rating: 10"
Den Crabb, Chicago Sun-Times, Feb. 21, 1994

Connectix provides toll-free technical support and a satisfaction guarantee for all its products.

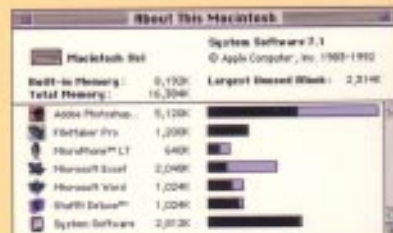
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Package design by Rucker Huggins, Mountain View, CA



Without RAM Doubler, most users hit their system's memory limits when running two or three applications.



With RAM Doubler, double the memory lets you run additional programs and still have plenty of room to do more!

Key Features and Benefits

- Doubles RAM on Macs with as little as 4 MB or as much as 128 MB.
- Fast and easy to use. RAM Doubler's one step installation process takes only a few seconds.
- You'll notice little or no performance impact with RAM Doubler. And there's nothing you have to do to use RAM Doubler—it works automatically every time you start your Mac.
- Works with the full range of Macintosh application and system extension software. Assign up to all your physical memory to a single application.
- Early PowerBook models (such as the 140 and 170) can now have up to 16 MB of memory and newer models can have even more! RAM Doubler does not rely on the physical limits of SIMMs to double application memory.

Requirements

- Macintosh equipped with a 68030, 68040 or PowerPC microprocessor.
- System 6.05 or later; all versions of System 7 including System 7.5.
- 4 MBs of RAM required (hard disk required for machines with 4 to 6 MBs of RAM). 8 MBs of RAM required for System 7.5.
- Not compatible with the Mac Plus, Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac II without a 68851 PMMU or any accelerator that does not work with virtual memory.

United States Patent Number
5,063,499. Other patents pending.

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