

FOR MACINTOSH &
POWER MACINTOSH



Extends Memory -
Even Triples Memory

◆
Memory Savings for
Power Mac Native Applications

◆
Flexible Memory Options

Over
ONE MILLION
Sold!*

RAM DOUBLER™

Run More Applications

2

*Original RAM Doubler

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Connectix RAM Doubler 2

for Macintosh and Power Macintosh

Run More Applications



August 1996
Connectix Corporation

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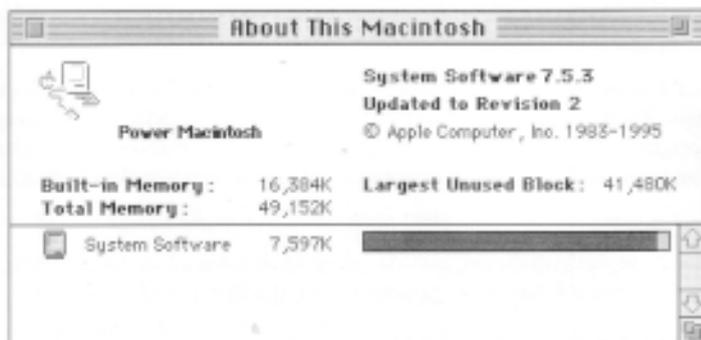
1 INTRODUCTION

Welcome to RAM Doubler 2

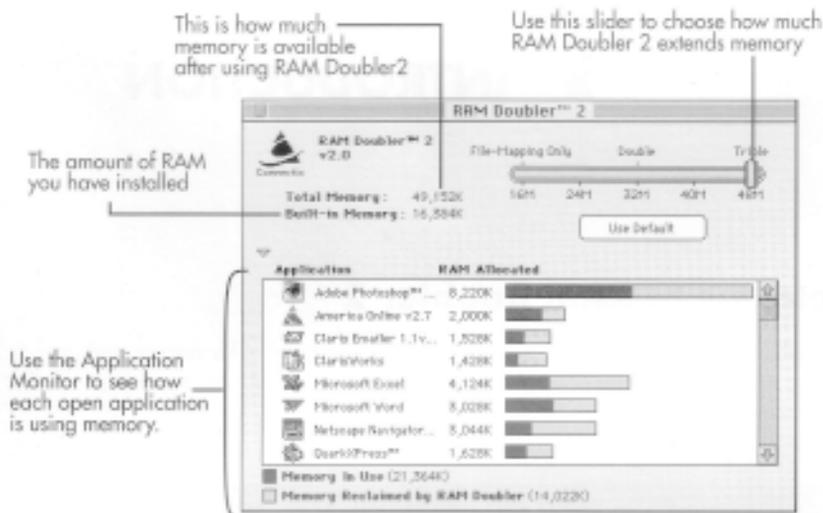
RAM Doubler 2™ is a control panel that extends the amount of memory in your Mac. With flexible memory settings such as triple and double, your memory is extended to automatically run more applications.



Before RAM Doubler 2



After RAM Doubler 2



The RAM Doubler 2 Control Panel

System Requirements

RAM Doubler 2 works on all 68030, 68040 and PowerPC Macintosh models.

To run RAM Doubler 2, you must have the following:

- A Macintosh equipped with a 68030, 68040 or PowerPC processor. Examples include all Power Mac, Performa, Centris and Quadra models, all PowerBooks and Duos except for the Model 100, all models in the Macintosh II family except the original (see the following information).
- System 7 or later.
- 8 MBs of physical RAM memory.

RAM Doubler 2 cannot be used on a few older Macs because they use the 68000 or 68020 microprocessor. These include: PowerBook 100, Mac 128, Mac 512, Mac Plus, SE, original Classic and original LC (see below for an exception). Computers that originally had a 68000 CPU and were later upgraded with a 68030 accelerator will not work with RAM Doubler 2.

RAM Doubler 2 can work on the original Macintosh LC if it has a Daystar or Diimo accelerator installed; or if it has been upgraded to a LCII, LCIII or higher.

RAM Doubler 2 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.

Compatibility Issues

Connectix's experience with Macintosh users tells us that RAM Doubler 2 works on virtually all current systems and configurations. However, there are a few hardware and software combinations which do not work with RAM Doubler 2. The full details of what does and doesn't work with RAM Doubler 2 are presented in the following sections. Many of the exceptions that cause RAM Doubler 2 not to work are because of older hardware or software. Make sure you are using the current versions of products!

Hardware Compatibility

You must have at least 8 MBs of physical RAM to use RAM Doubler 2.

- RAM Doubler 2 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
 - SE/30; all Mac II series except the original Mac II
 - Classic II & Color Classic, but not the original Classic
- RAM Doubler 2 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
- RAM Doubler 2 will NOT work on any:
 - 68000 processor: Mac Plus or earlier, Mac SE, Mac Classic, PowerBook 100, or Apple Portable
 - 68020 processor: original Mac LC
 - RAM Doubler 2 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
 - If the accelerator works with System 7 Virtual Memory, it is compatible with RAM Doubler 2. 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.

■ 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 2 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 2. However, RAM Doubler 2 is compatible with the FWB SCSI JackHammer.
- All third-party display adapter cards for the PowerBook 140, 145, 145B, and 170 are not compatible.
- Products which disable themselves under non-unity memory-mapping environments (like System 7 VM or Connectix Virtual) are not currently supported.

Software Compatibility

■ O/S Compatibility: System 7 or later are compatible

Systems 7.0, 7.0.1, 7.1, 7 Pro, 7.5, 7.5.1, 7.5.2, 7.5.3

■ Hard Drive utilities:

- File-level compression products—such as AutoDoubler, Stuffit, and NowCompress will work with RAM Doubler 2.
- Stacker and eDisk 2.0 are the only driver-level hard drive compression utilities that currently work with RAM Doubler 2. To use Stacker, make sure it is on the start-up drive or is mounted at start-up.

■ AppleTalk: current version compatible

Make sure you have the latest AppleTalk driver, older versions of AppleTalk have compatibility issues under extended memory (virtual memory or RAM Doubler 2). Open the Network control panel to check the version of AppleTalk listed. If there is no version listed or the version listed is less than 58.1.5, then AppleTalk should be updated using Network Software Installer 1.5.1 (or later), available from most Apple software sites online or from an Apple dealer. Note: Open Transport has no known compatibility issues with extended memory.

2 INSTALLATION

Check your Memory Control Panel settings before installing RAM Doubler 2. You should turn off virtual memory, and if possible you should be using 32-bit addressing. For more information about 32-bit addressing, see page 13.

Virtual memory must be turned off for RAM Doubler 2 to load. RAM Doubler 2 and virtual memory are mutually exclusive since both demand control of the Memory Management Unit (MMU). Compared to virtual memory, RAM Doubler 2 provides better performance without decreasing your hard drive space. In addition, just like virtual memory, RAM Doubler 2 provides file-mapping for Power Macs to reduce the memory requirements of PowerPC native applications (see "RAM Doubler 2 and Power Macs" on page 16).

To install RAM Doubler 2:

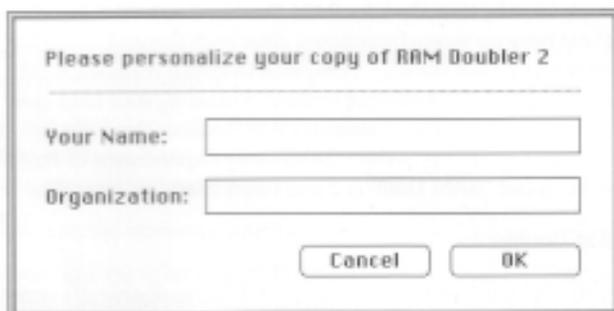
1. Turn on your Macintosh and hold down the Shift key to disable all extensions such as virus protection. Insert the RAM Doubler 2 floppy disk.
2. Double-click the RAM Doubler 2 installer icon to begin the installation process. The installer icon is shown below.



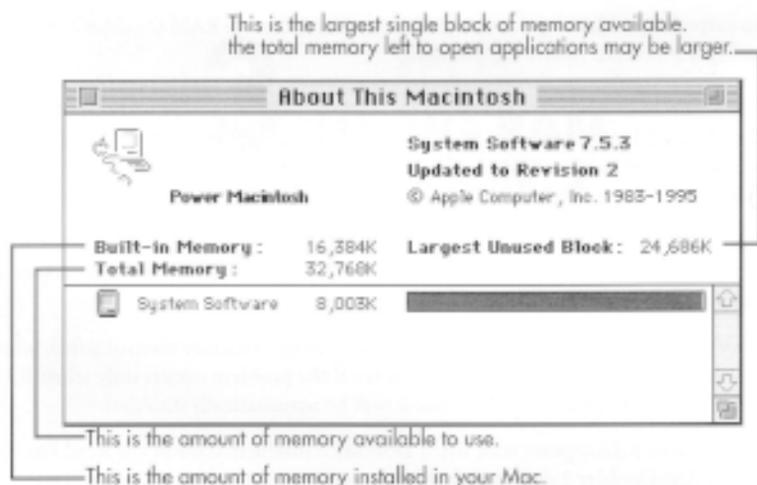
3. The installation dialog will appear as shown on the next page.



4. Use the pop-up menu to tell the installer on which disk volume you want to install RAM Doubler 2. The logical choice is usually the one selected for you, because this is the volume you started from.
5. Click **Install**.
6. Fill in the personalization dialog box as shown. Click **OK**.



7. To register RAM Doubler 2 by modem or fax, complete the electronic registration form and follow the instructions to transmit the registration information to Connectix. If you are unable to transmit the registration electronically, you can send in the postage-paid registration card.
8. When you see a message saying that installation was successful, click **OK** to return to the Finder.
9. Restart your Macintosh.
10. Look at the RAM Doubler 2 *Read Me* file on the RAM Doubler 2 installer disk for the most up-to-date information that isn't in this manual.



To confirm your Mac's memory is doubled (the default setting), choose About This Macintosh from the Apple menu in the Finder. You will see the following items:

- **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" on page 17.

Removing RAM Doubler 2

To remove RAM Doubler 2:

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

Temporarily Disabling RAM Doubler 2

To temporarily disable RAM Doubler 2, restart your Mac and either hold down the Tilde (~) or Escape key to disable just RAM Doubler 2 or hold down the Shift key to temporarily disable all extensions.

Troubleshooting Conflicts with RAM Doubler 2

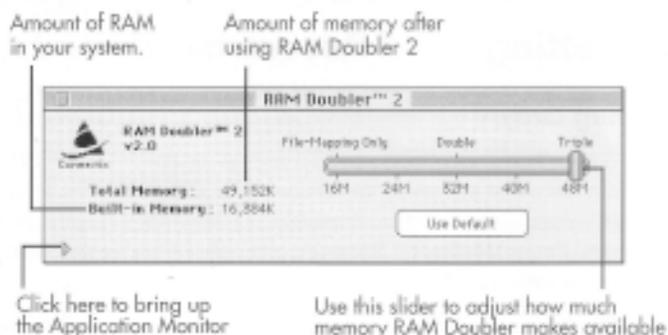
If you suspect a problem is related to RAM Doubler 2, disable RAM Doubler 2 through the following methods to isolate the problem.

- **Disable RAM Doubler 2:** hold down the Tilde (~) or Escape key while booting, which disables RAM Doubler 2, and see if the problem occurs. If the problem continues with RAM Doubler 2 temporarily disabled, the problem is not with RAM Doubler 2. You might try removing other extensions to isolate which one is causing the problem.
- **Disable other extensions:** If you use System 7.5 or later, holding down the Shift+Option keys while booting loads RAM Doubler 2 only and disables all other extensions. See if the problem occurs with RAM Doubler 2 only.
- **Try Virtual Memory:** Turn on virtual memory in the Memory control panel, which is another form of extended memory, and see if the problem occurs only when RAM Doubler 2 is disabled. RAM Doubler 2 will be automatically disabled.
- If the problem disappears with RAM Doubler 2 disabled, consult the Read Me file on your RAM Doubler 2 disk for additional configuration information. Contact Connectix Technical Support for more help (see "Contacting Connectix Support" on page 23) if you are having problems related to RAM Doubler 2.

3

USING RAM DOUBLER 2

Connectix RAM Doubler 2 is a control panel that extends Macintosh memory to run more applications. It is a software-only product that can triple memory, double memory, or provide memory savings for native Power Mac applications. The amount of memory provided is fully adjustable through the RAM Doubler 2 control panel, shown below.



The RAM Doubler 2 Control Panel

Using the RAM Doubler 2 Control Panel

The RAM Doubler 2 control panel allows you to adjust the amount of total memory available for applications, monitor the memory use of running applications, and examine how RAM Doubler 2 extends total memory.

The RAM Doubler 2 control panel has two controls: There are five preset settings available, from no additional memory (File-Mapping Only on Power Macs) to Triple memory. The current memory setting is displayed in Total Memory. By holding down the Option key while dragging the slide bar, you can select a specific memory setting.

Note: You must restart for your changes to take effect.

Default Settings

The default setting for RAM Doubler 2 is double the amount of built-in memory. For example, a 16 MB configuration has 32 MB of memory available to open applications with RAM Doubler 2 installed. On all Power Mac configurations, RAM Doubler 2 automatically enables File-Mapping (see page 16 for more information) to provide memory savings for all native applications. To configure RAM Doubler 2 to use the default settings, click 'Use Defaults' - you must restart for changes to take effect.

Displays

- **Total Memory** shows the total amount for applications to run. This display reflects the setting on the Memory Setting slide-bar.
- **Built-In Memory** is the amount of physical RAM installed in the Macintosh.
- **Version Number** lists the installed version of RAM Doubler 2 for easy reference.

Memory Settings and Recommendations

File-Mapping Only

File-Mapping (Power Macintosh Only) provides savings for Power Mac Native applications only. Instead of increasing the amount of total memory, this setting uses File-Mapping to reduce the memory requirements of Power Mac native applications (see RAM Doubler, and Power Macs, p.16). RAM Doubler 2 always enables File-Mapping even if you have additional memory allocated.

This setting is ideal for users that run primarily native applications and would like to run additional applications without the overhead of extending memory. If you have less than 16 MB of memory built-in, you may find that there is not enough memory available for all your native applications with File-Mapping Only. If this occurs, simply increase the amount total memory since File-Mapping is always enabled by RAM Doubler 2.

NOTE: File-mapping is not available if you are not using a Power Mac. In that case, the setting at the far left of the bar will be OFF.

Double

This is the default, and provides a balance of additional memory with minimal overhead involved with extending memory.

Triple

This is recommended for users who run numerous applications simultaneously, or for users of several large applications. For example, a 20 MB configuration running Adobe Photoshop may have 12 MB allocated to Photoshop and no additional memory for other applications. With RAM Doubler 2 set to Triple, enough memory is available to run Photoshop (12 MB allocation), Quark Xpress (12 MB), and Adobe Illustrator (12 MB).

For configurations with 80 MB of built-in memory or more, the setting on the right side of the setting bar displays "Maximum." The memory limit for RAM Doubler 2 is 256 MB of application memory.

Other Amounts

By holding down Option while moving the slide bar, you can adjust RAM Doubler 2 to a specific memory amount.

The Application Monitor

The Application Monitor dynamically displays all open applications and the amount of RAM allocated to each application. To view or hide the Application Monitor, click the triangle. In addition to providing memory use information, this display shows how RAM Doubler increases memory efficiency to increase total memory. (For more information on how RAM Doubler 2 uses memory, see Chapter 4.) The Application Monitor displays the following items:

- **Memory in Use** — This is the amount of built-in memory currently in use by all open applications, represented by the dark portion of the bar. Although applications can have more memory *allocated*, (displayed by the amount in the "RAM allocated" column), the dark portion represents the amount of memory actually in use by running applications.
- **Memory Reclaimed by RAM Doubler 2** — The white portion of the bar represents memory allocated by applications but not currently in use. RAM Doubler 2 dynamically reclaims any unused memory and makes it available to run additional applications.

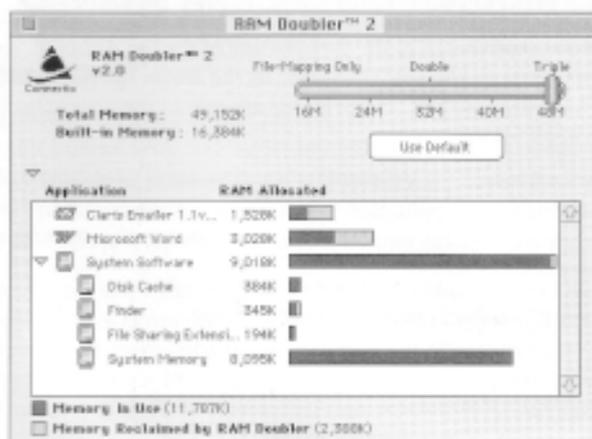
The Application Monitor is shown on the next page.

Click here to show or hide the Application Monitor



System Software

To reveal the memory usage represented by System Software, click on the triangle to the left of the System Software in the Application Monitor. This includes the disk cache, background applications, the Finder and the system memory. Background applications include some system functions, such as File Sharing, and third party drivers. Since this information is hidden to About This Macintosh, RAM Doubler 2's Application Monitor is an excellent way to monitor total system memory usage. An example is shown below.



Tips for using RAM Doubler 2

- You must start with at least 8 MB of physical RAM. At the other end of the spectrum, RAM Doubler 2 extends memory up to 256 MB. Thus, if you have 84 MB of RAM or more installed, RAM Doubler 2 provides up to 256 MB of memory for additional applications. If you have more than 84 MB, RAM Doubler 2 extends memory to a total of 256 MB.
- When using RAM Doubler 2, do not increase the memory allocation of application beyond the amount of built-in memory installed. If you allocate a memory partition larger than the physical memory available, some applications—in particular, Adobe Photoshop—might decrease in performance. If you receive Not Enough Memory or Out of Memory errors within these applications, use Get Info to increase the memory allocation to your applications.
- Performance using RAM Doubler 2 is generally not noticeably different from physical RAM. The major exceptions are if you use time critical applications, such as audio or video authoring software, or if you put all your extended memory to work on a single, huge application. In these situations slowdowns beyond the normal 1-5% might be seen.
- RAM Doubler 2 does not extend RAM disk memory, since it is removed from the System before RAM Doubler 2 starts. In particular, if you use Apple's RAM Disk, the memory for the RAM Disk is allocated by the Macintosh ROM and becomes unavailable for extending.
- With System 7.5.2 or later, the Memory control panel always reports that virtual memory will be off after restart when RAM Doubler 2 is installed. (RAM Doubler 2 does not load if virtual memory is on.)

About 32-bit addressing

If you have an older Macintosh model, to fully extend memory you must be running in 32-bit addressing mode. Most newer Mac models are always in 32-bit addressing mode. Older Mac models have 32-bit addressing as an option in the Memory Control Panel; it should be turned on for full memory extension. If your Memory Control Panel lacks a 32-bit addressing option, one of the following three cases applies:

- It is a newer Macintosh model, such as a Quadra 630 or Power Mac, which is always in 32-bit addressing mode.
- It is a Mac II, IIfx, IIfx or SE/30 which needs to use Connectix MODE32 7.5 to run 32-bit addressing.
- It is a 68000-based Macintosh that is not capable of 32-bit addressing and not compatible with RAM Doubler 2.

If you have never run in 32-bit addressing mode before, check to see if your favorite applications still work. If you have problems, you'll have to use 24-bit addressing, which limits the memory you can use to 14 MBs. If everything works fine, you should be able to install RAM Doubler 2 without problems.

If you get numbers in the About This Macintosh window that aren't what you are expecting, you are probably in 24-bit addressing mode. Apple wrote the About This Macintosh window in a very specific way, which sometimes confuses users who don't know how it performs calculations, especially when memory is extended under 24-bit addressing mode. In 32-bit addressing mode, these calculations are clearer to understand, so use 32-bit addressing if you can.

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, you should 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 Iici, Ilvx, Centris 650, Quadra 650, 800, 900 and 950, put cards in adjacent slots nearest the power supply.

4 HOW RAM DOUBLER 2 WORKS

How RAM Doubler 2 extends memory

RAM Doubler 2 uses the following techniques in the order presented to maximize memory performance:

- Reallocating unused application memory.
- Compressing least-recently used memory.
- Swapping memory to hard disk.

RAM Doubler 2 starts by reallocating memory that an application has reserved but is not in current use. Unused application memory is indicated by the "white bar" space in the "About this Macintosh" memory display. Making unused application memory available to the System is usually sufficient for extending 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 as fast as the physical memory in your machine. When reallocating memory, there is virtually no performance penalty.

If more memory is needed, RAM Doubler 2 locates memory blocks the computer has used but probably will not need again. Typical examples are software used to start up the computer, or to open an application. This memory normally is unavailable to other applications. RAM Doubler 2 compresses infrequently used memory blocks by proprietary data compression techniques. By compressing these memory blocks, additional RAM is freed for other applications. Compression results in a slight performance penalty (2-5%). This is still fast because you don't have 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 extension. However, situations exist that can require additional work by RAM Doubler 2:

- If the data in memory is already compressed, RAM Doubler's 2 compression techniques generally are unable to additionally compress memory.
- The time necessary to compress memory can adversely affect performance. This can be the case with Macs having less than 8 MBs of physical RAM.
- Giving a single application more memory than the amount of physical RAM.

In these situations, RAM Doubler 2 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 2 is optimized for memory access performance and uses the method of doubling that slows down the Macintosh the least. Most Macintosh users see no difference in system performance using RAM Doubler 2.

RAM Doubler 2 and Power Macs - File Mapping

On the Power Mac, RAM Doubler 2 provides an additional memory management feature called File Mapping. File Mapping reduces the amount of memory required to use native applications. In a recent sampling of native Power Mac applications, the average RAM required to launch an application was almost 2 MB less when File Mapping is enabled. You can find out how much memory is saved by choosing a "Get Info" from the File menu in the Finder.

An example of the File Mapping benefit is Microsoft Excel 5.0 for the Power Macintosh. Without File Mapping, Excel 5.0 requires 13 MB of RAM to launch; with 4 MB of System Software running, a 16 MB Power Mac would not have enough memory to launch Excel 5.0 (total of 13 MB + 4 MB = 17 MB!). With File Mapping enabled, Excel 5.0 memory requirements are reduced to just 4 MB, a savings of 9 MB.

NOTE: This memory savings is in addition to the extended memory RAM Doubler 2 provides.

System 7 virtual memory also provides the File Mapping benefit. However, RAM Doubler 2 is a better solution because it performs faster and saves valuable hard drive compared to System 7 virtual memory. Virtual memory requires hard disk space, and RAM Doubler 2 does not.

5

FREQUENTLY ASKED QUESTIONS

Q *Does RAM Doubler 2 REALLY give me the functional equivalent of tripling my memory?*

A Yes! Your Macintosh looks (in About This Macintosh) and acts (in compatibility, performance and capacity) like a Macintosh that has more memory to run more applications. However, the additional memory provided by RAM Doubler 2 is not recommended for a single, memory-intensive application. For best performance, you should not increase an application's memory allocation beyond the amount of physical RAM installed. For example, a 16 MB configuration with RAM Doubler 2 has 48 MB available to run more applications, as long as each application uses less than 16 MB.

Q *Can I use RAM Doubler 2 with virtual memory? Are they compatible?*

A No. RAM Doubler 2 and virtual memory are mutually exclusive since both demand control of the MMU. For most Macs, virtual memory is made obsolete by RAM Doubler 2—you get equal or better performance without decreasing your disk drive space. If you have a Power Mac and are using virtual memory for File Mapping (see RAM Doubler 2 and Power Macs on page 16 for a description), you should use RAM Doubler 2 instead. RAM Doubler 2 provides File Mapping without reducing performance or hard drive space like virtual memory.

Q *Why did my hard disk space decrease?*

A RAM Doubler 2 occasionally and temporarily uses hard disk space to improve your Mac's performance (See "How RAM Doubler 2 Works" on page 15.) When you shutdown or restart your computer, any disk space RAM Doubler 2 uses is freed.

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 swapping is rarely used.)

Q *Is RAM Doubler 2 compatible with Adobe Photoshop? Can I use RAM Doubler 2 to give more memory to Adobe Photoshop?*

A Yes, RAM Doubler 2 is compatible with all versions of Photoshop and Photoshop's proprietary virtual memory scheme. However, RAM Doubler 2 is not a recommended method to give Photoshop additional memory. With RAM Doubler 2.0 installed, keep Photoshop at its current memory partition, and use the extra memory RAM Doubler 2 provides to keep other applications running. If you need to adjust the memory requirements of Photoshop, set Photoshop to use available application memory (Built-in Memory minus the System Software). If you need more memory for Photoshop than you have in built-in memory, you might consider purchasing more physical RAM.

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. By using the minimal swap file, RAM Doubler 2 generally minimizes any slow down. Remember that the size of memory partitions for applications and the document size effects the performance. For example, if Word has a minimum size partition and you are working on a large document, the performance will be slow. Word will have to spool pieces of the document to the hard disk. These slowdowns are not reflective of RAM Doubler 2. Check the amounts of memory that you should allocate to your applications for optimal performance.

Q *What about updates?*

A Connectix periodically releases maintenance updates to RAM Doubler 2 on Connectix forum locations online including the Web (www.connectix.com), AOL (keyword = Connectix), and CompuServe (GO Connectix). You can also find our updates on Internet sites that post Mac software updates and local user group BBS's. You can subscribe to an electronic mailing list on our web page that automatically notifies you through email when a new update is available (See page 24). If you don't have access to one of the online services, updates are also directly available from Connectix for a \$9.95 shipping and handling charge (plus California Sales Tax, if applicable).

Q *How can I test to see if my Mac and applications can use RAM Doubler 2?*

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 doesn't work with VM, it might not be possible to work with RAM Doubler 2. In this case, you should contact the vendor of the product about compatibility.

Q *Can I use RAM Doubler 2 with my games?*

A Yes, but should be aware of two things: First, RAM Doubler 2 is not a method to give games additional memory. With RAM Doubler 2 installed, keep your games memory partitions less than the amount of built-in memory. If you need more memory for games than you have in the built-in memory, consider purchasing physical RAM. Second, some games do not work with extended memory (either RAM Doubler 2 or vir-

tual memory). For these games and for the best game performance overall, many manufacturers recommend booting with extensions off before running a game.

Q *Why isn't my memory fully extending to double or triple?*

A RAM Doubler may not double your memory if you have an older Mac model that is using 24-bit addressing and you have 8 MB or more of physical RAM. 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. See page 13 for more information about 32-bit addressing.

Q *Why do I still get the "Out of Memory" or "Not Enough Memory" messages?*

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

Memory Allocation: While your Mac can have more memory, your programs cannot have enough memory set aside. If you frequently run out of memory in a particular application, you might 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 in the Finder; specify the amount of memory the application uses in the box labeled "Current size" or "Preferred size." (System 7.1 and later also adds a "Minimum size"—Refer to your Macintosh User's Guide for more details.)

Fragmented Memory: Memory can become fragmented, whether it is located on your hard disk or in RAM. The system software's memory management is not able to relocate entire applications to unify free space in memory. This often happens when you repeatedly open and close applications. After 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 *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 the previous Out of Memory question) with a particular application, it is best to leave the allocation at the default size. Remember, RAM Doubler 2 is a way to run more applications rather than give an individual memory-intensive application more memory.

Q *Can I use RAM Doubler 2 with products that double my hard drive space?*

A RAM Doubler 2 works with all file-level compression utilities, such as AutoDoubler, Now Compress and Stuffit. RAM Doubler 2 is also compatible with Stacker and eDisk 2, but no other driver-level disk compression products.

Q *Will RAM Doubler 2 make my Mac run hotter or void my Apple warranty?*

A No to both questions. RAM Doubler 2 does its magic entirely in software and does not alter your hardware.

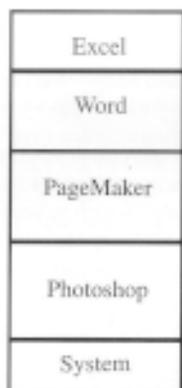
Q *Is there a RAM Doubler for my 486/Pentium PC?*

A Yes, RAM Doubler for Windows 3.1 is available. RAM Doubler for Windows makes your existing RAM work more efficiently. You can run more applications in Windows and not see any "insufficient memory" messages.

Q *I have 16 MBs of memory after installing RAM Doubler 2. After opening Excel, Word, PageMaker, and Photoshop, I cannot open any window in the Finder. The Finder shows "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.*

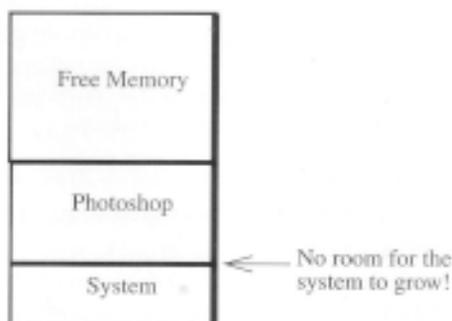
A You've found one of the anomalies in the Macintosh OS. The same thing happens regardless of whether you have RAM Doubler 2 installed or not. Essentially, Finder is unable to move applications to free up room for the System heap to grow. Here's how it works:

■ 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 the following diagram:



There is no free memory at this point.

■ Next, you quit Excel, Word, and PageMaker, which leaves the memory map like this:



Notice 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.

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6 SUPPORT AND SALES

In the unlikely event that you have a problem with Connectix RAM Doubler 2, please read this section first.

Contacting Connectix Support

If you have questions or problems with Connectix RAM Doubler 2, contact us by telephone, by fax, or through electronic mail. But first, try the following:

1. Read this manual. It may only take a few moments to get the answers you need. Also, check the "ReadMe" file. This has information on known problems and solutions.
2. Write down the events that lead to the problem. Have you changed anything in your computer recently?

Have the following available when you contact Technical Support:

- Registration number—on the Registration Card
- Software version number—on the installer
- Macintosh model—located in "About This Macintosh..."
- Apple System software version—in "About This Macintosh..."

If you have an electronic mail address, you can subscribe to the RAM Doubler List Server to receive electronic mail with the current information about RAM Doubler, which includes automatic notification of new updates.

To subscribe, either send mail to majordomo@connectix.com with "subscribe ram-doubler list" in the body of the message or subscribe on the web at <http://www.connectix.com/mail.ram.html>

Connectix Technical Support can be contacted at the following online services:

<u>Online Service</u>	<u>Mail Address</u>	<u>Forum Location</u>
■ America OnLine	Connectix	Keyword = Connectix
■ CompuServe	75300, 1546	Go CONNECTIX

You can also contact us on the World Wide Web, or by e-mail, fax, or phone:

- WWW: <http://www.connectix.com>
- E-mail: rdmsupp@connectix.com
- Fax: 415-571-5195
- Phone: 415-571-5100 or 800-839-3632

Contacting Connectix Sales

Contact Connectix Sales for more information about other Connectix products.

- Internet: sales@connectix.com
- Fax: 415-571-5195
- Fax-back system: 800-571-7558 (for current product information)
- Phone: 800-950-5880 or 415-571-5100 (Sales only)

Contacting Connectix Support in Europe

Country	Telephone Number
Germany	0130-823887 (toll-free)
France	05-917943 (toll-free)
Britain	0800-966199 (toll-free)
Holland	20-5814384

For all other European countries, dial +31-20-5814385. This number is in Holland, however information will be provided in English.

European Addresses

Mailing: SEI, Attn: Connectix, Orlyplein 85, 1043 DS Amsterdam, The Netherlands

FAX: Fax questions to: +31-20 581 4380

- **Internet:** For e-mail use the internet address: CONNECTIX@NL.SYKES.COM

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RAM DOUBLER 2

Do More With Your Mac

Over one million Macintosh users have installed the original award-winning RAM Doublerr™. Don't quit your applications—

save time and keep them running with RAM Doublerr 2. Connectix RAM Doublerr 2's patent pending software technology is the easy way to increase your memory—no screwdriver required!

RUN MORE APPLICATIONS

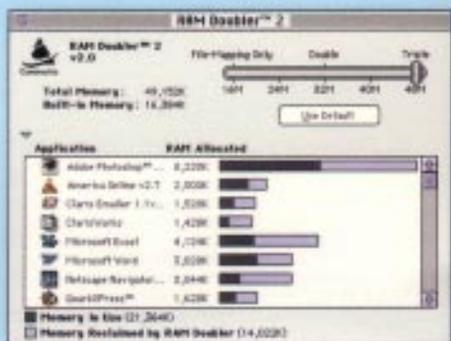
- **Keep More Applications Running**—Save time and keep them running with RAM Doublerr 2.
- **Ideal for Power Mac**—Run large native applications with less memory. RAM Doublerr 2's Power Mac File Mapping reduces the memory requirements of native apps.
- **Compatible**—Works with a wide range of Macintosh hardware, software applications, and entertainment titles.
- **Easy To Use**—After installation, RAM Doublerr 2 works automatically every time you start your Mac. Just set it, forget it, and go!

TRIPLE YOUR MEMORY

- **Perfect for Performas and PowerBooks**—RAM Doublerr 2 exceeds Macintosh memory expansion limits to extend total application memory.
- **Up to 256 MB Total Memory**—If you have 16 MB, you'll have 48 MB of total memory with RAM Doublerr 2. RAM Doublerr 2 triples the amount of built-in memory up to 256 MB.

EVEN FASTER AND BETTER THAN BEFORE

- **Flexible Memory Settings**—The RAM Doublerr 2 control panel can be set for any amount from Power Mac memory savings to triple memory.
- **Works Faster**—RAM Doublerr 2 RAM compression is up to twice as fast as the original RAM Doublerr.



The RAM Doublerr 2 Control Panel lets you set the total amount of memory and dynamically monitors application and system memory usage.



With RAM Doublerr 2 installed all these applications are running on a 16 MB Power Mac, with memory available to run more! Without RAM Doublerr 2's Power Mac memory savings and total memory extension, these same Power Macintosh applications require 64 MB of RAM to run simultaneously.

Connectix provides toll-free technical support 7 days a week and a 30-day money back guarantee for all its products. **Connectix**



2655 Campus Drive
San Mateo, CA 94403 USA
800-950-5880
FAX: 415-571-5195
email: info@connectix.com
www.connectix.com