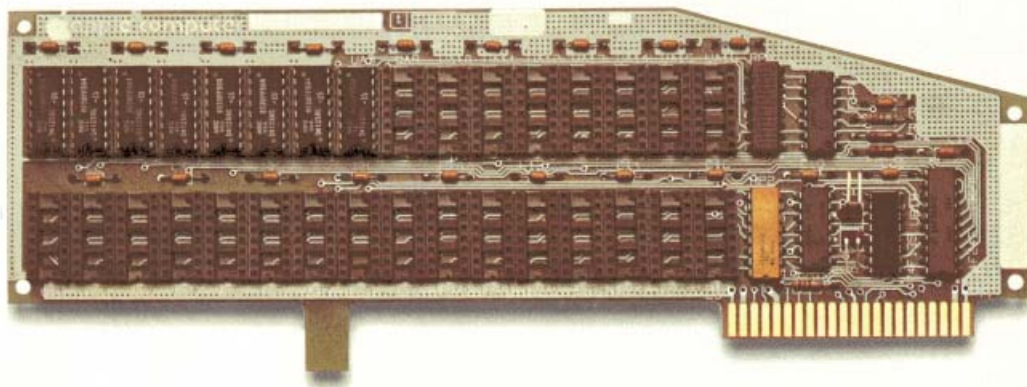




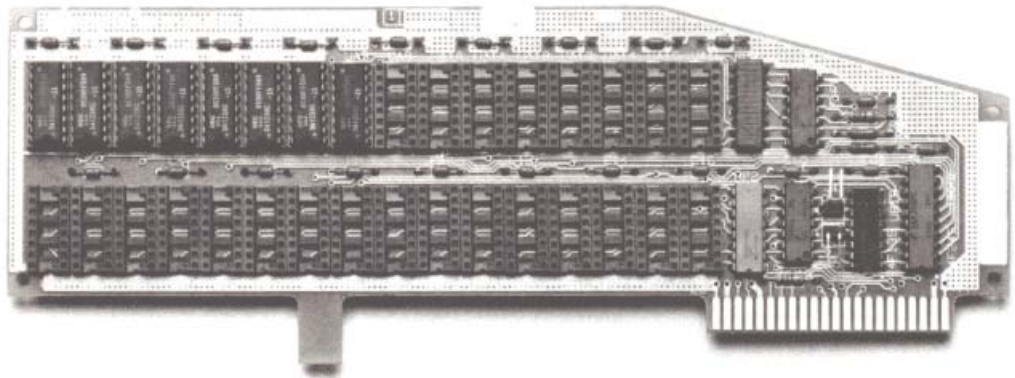
Apple® II

Apple IIgs™
Memory Expansion Card
Owner's Guide





Apple II[®] Memory Expansion Card Owner's Guide



🍏 APPLE COMPUTER, INC.

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Introduction

The Apple® IIGS Memory Expansion Card adds 256K, 512K, or 1 megabyte of memory to the 256K of RAM built into the Apple IIGS. The amount of memory it adds depends on whether you install the card straight out of the box or upgrade it to 512K or 1 megabyte.

❖ *Adding memory:* You can upgrade the card yourself, by getting one or more Apple 256K memory expansion kits, or you can have your authorized Apple dealer upgrade the card for you. Each kit adds 256K to the memory on the card. Chapter 3 explains how to install the chips that come in the upgrade kit.

Many applications designed especially for the Apple IIGS will use the extra memory on the card automatically—as an extension of the memory that's built into the computer. You don't have to know anything special to use the card in this way; just install it and leave the rest up to the application.

You can also use the memory on the card as a RAM disk—memory that you access like a disk. The advantage of using the card as a RAM disk is that when you copy an application to the RAM disk and run it from there, the computer can access different parts of the application much more quickly than it can when the application is on a regular disk. And if you copy several applications to the RAM disk, you can switch between those applications much more quickly than if the computer had to get the next application from a regular disk.

The first chapter of this guide explains how to install the card in the Apple IIGS. The second chapter explains how to use the memory on the card as a RAM disk. The third chapter explains how to upgrade the 256K card to 512K or to 1 megabyte.

Radio and television interference

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with our instructions—it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if a "rabbit-ear" television antenna is used. (A rabbit-ear antenna is the telescoping-rod type usually found on television receivers.)

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripheral devices. To further isolate the problem, disconnect the peripheral devices and their input/output (I/O) cables one at a time. If the interference stops, it was caused by either the peripheral device or the I/O cable. These devices usually require shielded I/O cables. For Apple peripheral devices, you can obtain the proper **shielded cable** from your authorized Apple dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

A **shielded cable** uses a metallic wrap around the wires to reduce the potential effects of radio-frequency interference.

If your computer does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the computer to one side or the other of the television or radio.
- Move the computer farther away from the television or radio.
- Plug the computer into an outlet that is on a different circuit than the television or radio. (That is, make certain the computer and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with a coaxial cable lead-in between the antenna and television.

If necessary, consult your authorized Apple dealer or an experienced radio/television technician for additional suggestions.

Important

This product was FCC-certified under test conditions that included use of shielded cables and connectors between system components. It is important that you use shielded cables and connectors to reduce the possibility of causing interference to radio, television, and other electronic devices.

Chapter 1

Installing the Card

Here's how you install the Apple IIGS Memory Expansion card in the Apple IIGS. If you have one or more memory expansion kits, you should add those chips to the card before installing the card in the Apple IIGS. Turn to Chapter 3 for upgrade instructions.

Important If your computer's power is on, turn it off and wait at least 30 seconds before installing or removing the memory expansion card.



Figure 1-1
Remove lid

1. Make sure the Apple IIGS power switch is turned off, but leave the power cord plugged into a grounded outlet. This keeps your computer system grounded.
2. Remove the Apple IIGS lid as shown in Figure 1-1. The easiest way to remove the lid is to wrap your hands around the rear corners of the case and hold the lid latches in with your index fingers while you push up on the lid with your thumbs. When you feel the lid release, lift it all the way off the case and put it to one side.
3. Take the memory expansion card out of the box and remove the protective wrapping. When you handle the card, avoid touching the gold "fingers" along the bottom edge of the card. The moisture from your fingers can attract dust that would weaken the card's connection to the computer.

Important Save the two jumper blocks packed with the card. You'll need them if you upgrade to 512K or to 1 megabyte.

4. Touch the power supply case inside the computer to discharge any static electricity that may be on your clothes or body. (See Figure 1-2.)
5. Put the card in the memory expansion slot as shown in Figure 1-3. You'll have to exert some pressure to get the card in the slot. But don't wiggle the card from side to side in your efforts to insert it. Rock it forward and back until it's firmly seated in the slot.



Figure 1-2
Touch power supply case

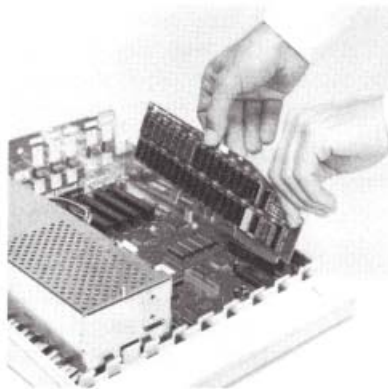


Figure 1-3
Put card in memory expansion slot




Figure 1-4
Replace lid

6. Replace the Apple IIGS lid by laying the front edge of the lid in the groove in the front of the Apple IIGS case and lowering the back edge of the lid into place. Press down on the back corners of the lid until you hear the latches click shut. (See Figure 1-4.)
7. Go to the Control Panel Program (turn on the power while holding down the Option key) and choose the RAM disk option from the menu. The number next to "Largest selectable" should match the amount of memory on your card. If it doesn't, consult your authorized Apple dealer.



Chapter 2



Memory Expansion Card as RAM Disk

Many applications designed especially for the Apple IIGS take advantage of the extra memory on a memory expansion card automatically. In some cases you can't use the application—or can't take advantage of all the application's features—without adding a memory expansion card. If you got the card specifically to use those kinds of applications, you can stop reading right here.

Another way you can use the memory on the card is as a RAM disk. This requires a little more effort on your part, but it's worth the effort if you want to speed up access to applications that aren't designed to use the extra memory on the card automatically. Just keep in mind that if you use memory on the card as a RAM disk, that memory isn't available for use by applications designed to use the memory automatically.

To use the memory on the memory expansion card as a RAM disk, you need to know how to copy applications to the RAM disk and how to start them up from there. You may also want to know how to save documents to the RAM disk. This is not a substitute for saving documents on a disk, because the memory on the card is temporary just like the RAM that's built into your computer. But saving documents to the RAM on the memory expansion card can be useful if you have more than one application that uses the same data or if you refer to certain data regularly.

The *Apple IIgs Owner's Guide* explains how to change Control Panel settings.

Setting RAM disk size

Before you can use the memory on the card as a RAM disk, you need to use the Control Panel Program to tell the computer how much of the memory on the card you want to set aside for use as a RAM disk. (See Figure 2-1.)

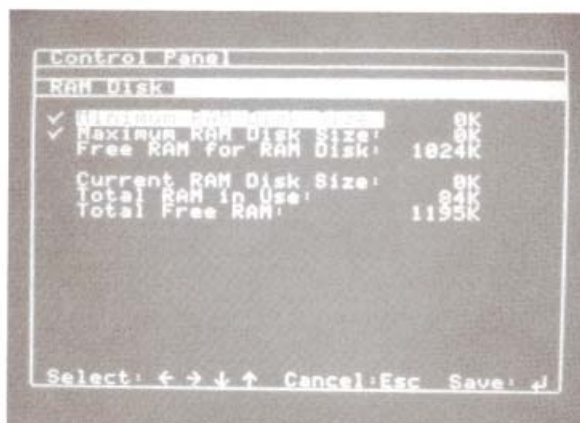


Figure 2-1
RAM disk screen on Control Panel Program

If you won't be copying applications to the card or saving documents to the card, don't designate any of the memory on the card for use as a RAM disk. This leaves all of the memory on the card for use by applications that use the memory automatically. If you will be copying applications to the card and saving documents on the card, use the Control Panel Program to designate the maximum and minimum RAM disk size. Setting an upper limit restricts the amount of memory on the card that you can use as a RAM disk. Setting a minimum amount restricts the amount of memory that applications can use; it guarantees that there will always be a certain amount of memory available for you to use as a RAM disk.

Important If your application uses a version of ProDOS earlier than 1.2, you must set the minimum and maximum RAM disk size to the same number.

In the example shown in Figure 2-2, there is 512K available on the card. The minimum RAM disk size has been designated as 256K, and the maximum RAM disk size has been designated as 320K. That means that applications will have a minimum of 192K ($512 - 320$) to use and can use as much as 256K ($512 - 256$) if you aren't already using that memory as a RAM disk.

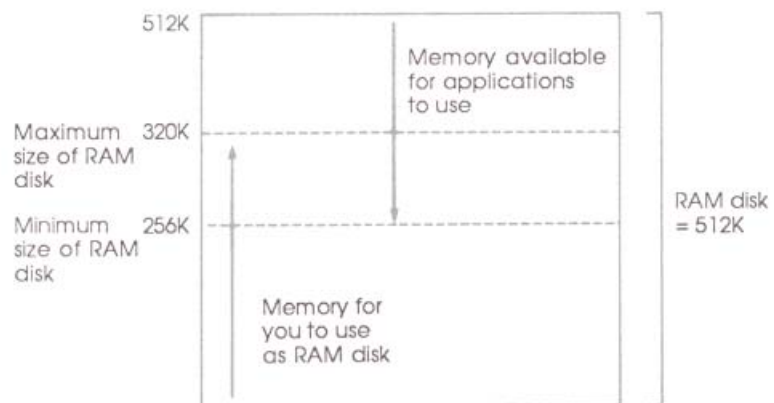


Figure 2-2
Set RAM disk size

If an application needs more memory than you've designated, it will tell you so, and you can use the Control Panel Program to change the maximum RAM disk size to a lower number.

Important Decreasing the maximum RAM disk size won't erase what's already stored on the RAM disk. You will have to decrease the RAM disk size by using the Control Panel Program and restart the computer (by turning the power off and then back on) before your new RAM disk settings will take effect.

Addressing the RAM disk

Many applications will ask for the location of your RAM disk by slot and drive number. A memory expansion card used as a RAM disk appears to be in slot 5, just as a 3.5-inch drive connected to the disk drive port appears to be in slot 5. The following rules and examples explain how to figure out where your RAM disk is in relation to your 3.5-inch drives.

Rules

1. Your startup device is always drive 1. (Remember, you can change the startup device by using the Control Panel Program.)
2. RAM disks come before 3.5-inch disks.

Examples

- If a RAM disk is your startup device, it is drive 1, your first 3.5-inch drive is drive 2, and your second 3.5-inch drive is drive 3.
- If a 3.5-inch drive is your startup device, it is drive 1, the RAM disk is drive 2, and the second 3.5-inch drive is drive 3.
- ❖ *Note:* ProDOS® 1.1.1 supports only two devices per slot; so with ProDOS 1.1.1-based applications, “drive 3”—your second 3.5-inch drive—is invisible. Applications that use ProDOS 1.2 recognize up to four devices per slot, so this isn't a problem (although it will take some getting used to: the third device is assigned to slot 2, drive 1; and the fourth device to slot 2, drive 2). See your authorized Apple dealer to get ProDOS 1.1.1 applications upgraded to ProDOS 1.2.

Using the RAM disk

To copy and run applications from the RAM disk, you need to:

1. (Optional) Format the RAM disk. This is necessary only if you plan to use the RAM disk as your **startup device**. The RAM disk is preformatted at startup for storing applications and documents.
 2. Copy applications to the RAM disk.
 3. (Optional) Make the RAM disk your startup device by using the Control Panel Program.
 4. Start up your application from the RAM disk.
- ❖ *Startup device:* Making the RAM disk your startup device means that when you press C -Control-Reset (or type `PR#5` from the BASIC programming environment), the computer will start up from the application on your RAM disk instead of looking for a program disk in one of your disk drives.

Keep in mind that if you make the RAM disk your startup device and then turn off the power, you'll get the message `Check Startup Device` the next time you try to start up. That's because you lose what's on the RAM disk when you turn off the power. If this happens, go into the Control Panel and change the startup slot to one of your disk drives so you can start up.

Formatting the RAM disk

Format the RAM disk the same way you would format a regular disk, using the formatting option on your utility disk. Choose ProDOS as the format if the applications you want to copy to the RAM disk are ProDOS-based. Choose Pascal if your applications are Pascal-based. You can name the RAM disk anything you like, but naming it `/RAM5` is a good way to remind yourself that the RAM disk emulates a drive connected to slot 5 inside the computer.

If the formatting program asks for the slot and drive number of the RAM disk, answer slot 5 and drive 2. (This assumes that you have at least one 3.5-inch drive and that you're using a 3.5-inch drive as your startup device. If you don't have a 3.5-inch drive, or if you've used the Control Panel Program to designate the RAM disk as your startup drive, answer slot 5 and drive 1.)

Important You can't put DOS 3.3 applications and documents on the RAM disk, so don't try to format the disk for DOS 3.3. DOS 3.3 was designed for 5.25-inch disks with a storage capacity of 143K. It can't use the space on larger storage devices like RAM disks, 3.5-inch drives, and hard disks.

Copying an application to the RAM disk

Copy all the files from your application disk to the RAM disk using the Copy Files program on your utility disk.

Important If you copy more than one application's files to the RAM disk, put all but one application's files in separate subdirectories. This avoids the problem of duplicate filenames in the main directory.

Starting up from the RAM disk

If you want to start up directly from an application on the RAM disk, use the Control Panel Program to change the startup slot to RAM disk. (See Figure 2-3.) After that, any time you press $\text{Ctrl}+\text{R}$ (or type PR#5 from the BASIC programming environment), the application on your RAM disk will start up.

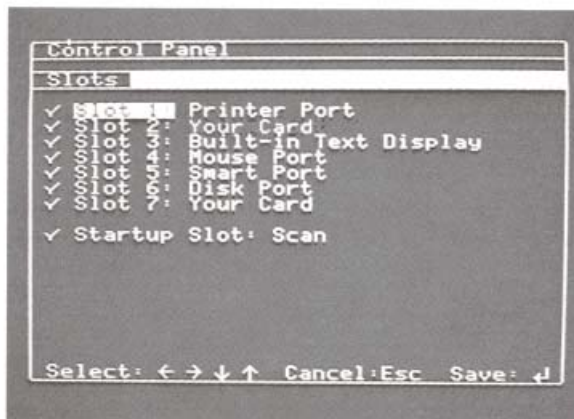


Figure 2-3
Change startup slot using Control Panel Program

Most ProDOS applications put you into BASIC after you choose the Quit option from the Main Menu.

If the RAM disk is not your startup device, or if you have more than one application on the RAM disk, get into the BASIC programming environment and type `-/RAM5/file` (where `RAM5` is the name of your RAM disk and `file` is the name of your application's system file). The system file is the file with the name ending in `.SYSTEM`. (For example, to start up AppleWorks from the RAM disk, you'd type `-/RAM5/APLWORKS.SYSTEM`.)

Saving a document to the RAM disk

You can save documents on your RAM disk the same way you save them on a regular disk. Just remember that a document saved on a RAM disk is saved only temporarily.

Important

Save the contents of the RAM disk to a regular disk before you turn off the power or your documents will be gone for good.

- If your application asks for the slot and drive number, answer slot 5 and drive 1 if the RAM disk is your startup device. Answer slot 5 and drive 2 if a 3.5-inch drive is your startup device. (To applications, the RAM disk looks just like a disk in a drive connected to slot 5.)
- If the application asks for a pathname, type a slash, the name of your RAM disk, another slash, and the name of the document. (If you didn't format the RAM disk, its name is `/RAM5`.)



Chapter 3



Upgrading to 512K or to 1 Megabyte

The Apple IIGS Memory Expansion Card comes with 256K. You can upgrade it to 512K by getting an upgrade kit or to 1 megabyte by getting three upgrade kits. (Each upgrade kit adds 256K of RAM to the card.) It's not a good idea to upgrade the card to 768K because some applications have trouble dealing with that memory configuration. The memory expansion kit comes with 8 RAM chips. You'll also need the jumper blocks that came with the card.

There are only two steps to upgrading the memory expansion card:

1. Put a plastic jumper block on the lower set of pins if you're upgrading to 512K. (See Figure 3-1.) Put plastic jumper blocks on both sets of pins if you're upgrading to 1 megabyte. (See Figure 3-2.)
2. Put the RAM chips in the sockets according to the general instructions that follow. To upgrade to 512K, put the chips in the locations shown in Figure 3-1. To upgrade to 1 megabyte, put a chip in every socket. (See Figure 3-2.)

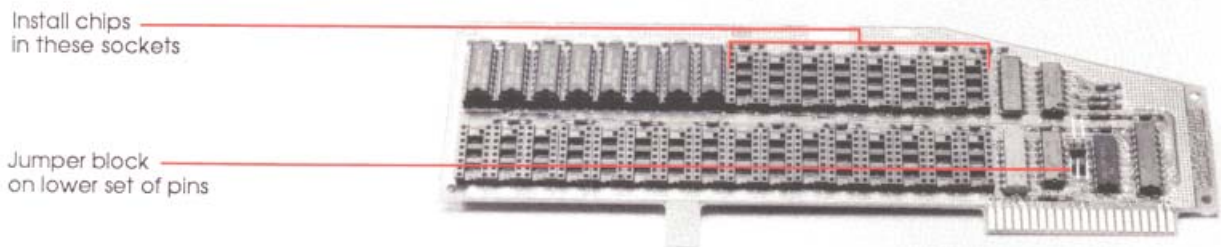


Figure 3-1
512K upgrade

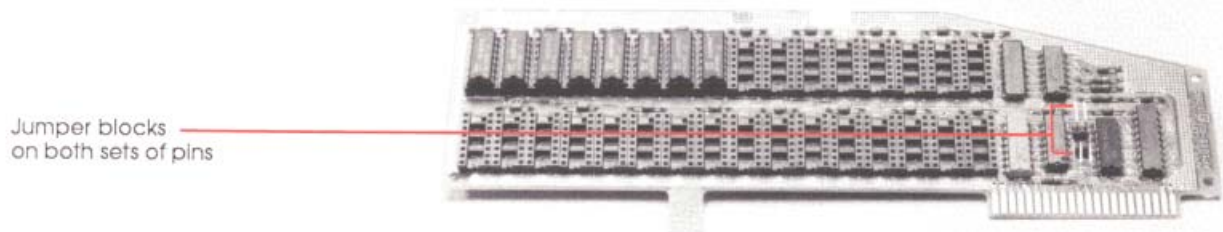


Figure 3-2
1-megabyte upgrade

Important If you have any apprehension about installing the chips yourself, have your authorized Apple dealer do it for you. Installing a chip incorrectly can ruin the chip.

General instructions

If you decide to install the chips yourself, keep these points in mind:

- Install each chip so that the notched end is pointing down. (See Figure 3-3.)

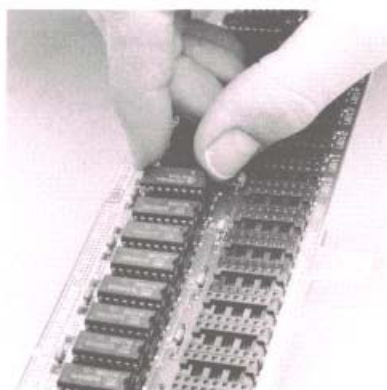


Figure 3-3
Install chips

- Align all of the pins on the chip with the holes in the card so you don't inadvertently bend or break a pin in the process of installing the chip. Do not try to insert a chip with bent pins. Ask your dealer for a replacement chip.
- ❖ *Pins don't line up?* If the pins are splayed outward and don't line up with the holes, lay the chip on its side on a clean surface and gently "roll" the chip until the pins are pointing slightly inward. (See Figure 3-4.) Turn the chip over and do the same thing to the pins on the other side.
- Press down evenly on each chip until it's firmly seated.



Figure 3-4
Roll a chip

After you finish upgrading the card, install it according to the instructions in Chapter 1. To confirm that your card has been upgraded to 512K or 1 megabyte, go to the Control Panel Program and choose RAM disk from the menu. The RAM disk screen will show you how much memory is available on the card.

