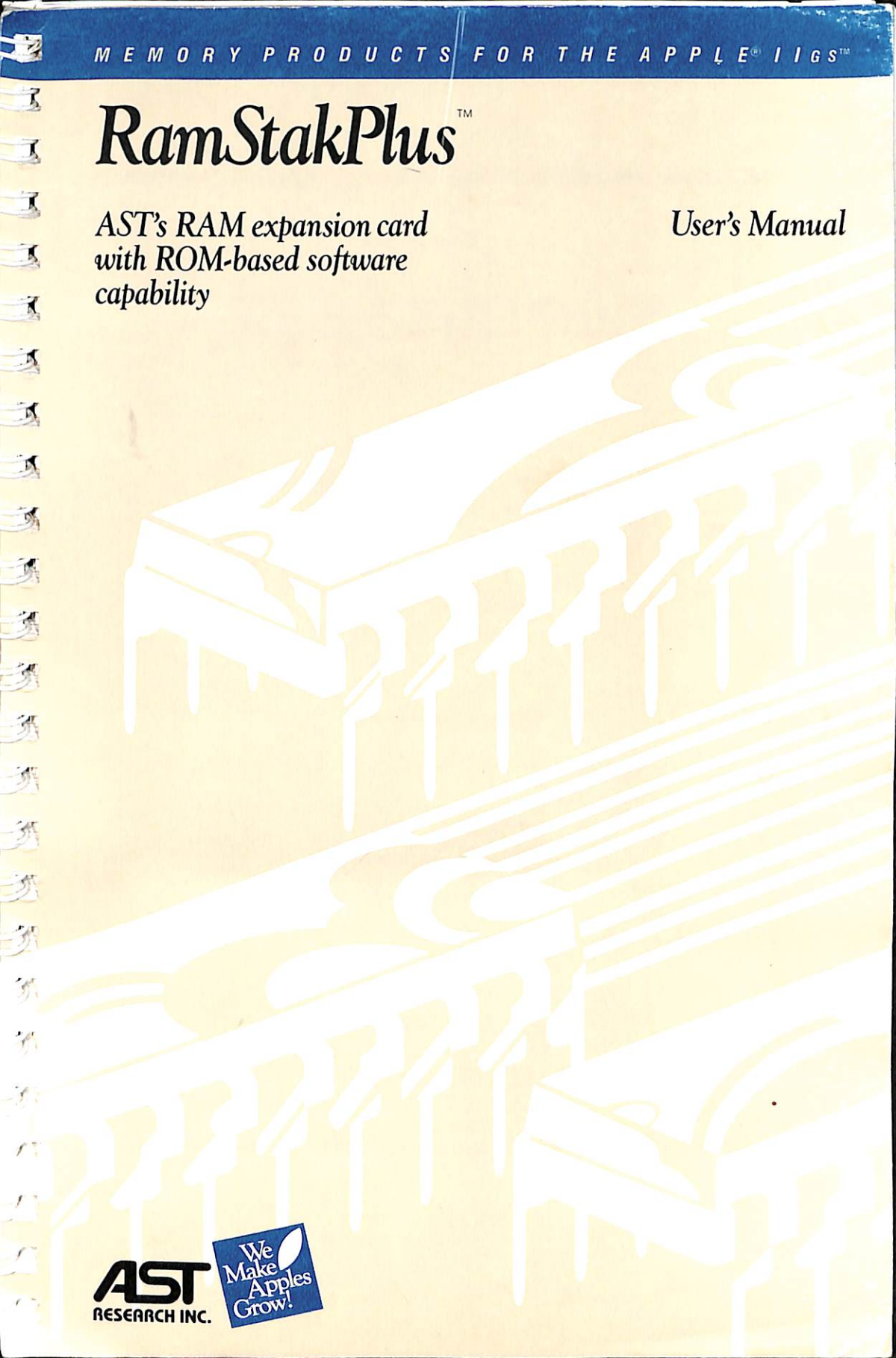
MEMORY PRODUCTS FOR THE APPLE® IIGS™

RamStakPlus™

AST's RAM expansion card with ROM-based software capability

User's Manual



AST RESEARCH INC.

We Make Apples Grow!

RamStakPlus™

RAM expansion card
with ROM disk capability
for the Apple®IIGS™

User's Manual
AST Part # 000415–001-A

February 1987

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Preface

RamStakPlus from AST Research, Inc. is a memory expansion card that adds up to 1 megabyte of RAM and ROM disk capabilities to the Apple IIGS.

This manual is organized into the following chapters:

Chapter 1: **Introduction** describes basic features of the RamStakPlus.

Chapter 2: **Installation** contains step-by-step instructions for installing the RamStakPlus in your IIGS.

Chapter 3: **Using RamStakPlus** describes how to set up and use RAM and ROM disks with your RamStakPlus.

Chapter 4: **RamStakPlus Reference** describes each command on the RamStakPlus Utilities menus.

Appendices describe specifications and troubleshooting procedures.

A **Glossary** defines terms used in this manual.

The **Index** enables you to find information quickly.

The **Warranty Card** lets you register your purchase with AST.

Packing List

Please verify that your RamStakPlus package contains all of the items listed below **before** you install the card.

- ❑ RamStakPlus card.
- ❑ RamStakPlus Utility Disk.
- ❑ RamStakPlus User's Manual which includes a warranty registration card.

If any of these items are missing, contact your AST dealer.

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Introduction

Chapter 1:

Introduction

RamStakPlus is a memory expansion card for the Apple IIGS. RamStakPlus comes with 256 Kb of RAM and sockets that you can fill with chips that increase memory to 512 Kb or 1 full megabyte.

RamStakPlus has four ROM sockets that you can fill with ROM devices to create a ROM disk.

1.1 RAMs and RAM Disks

RAMs are **R**andom **A**ccess **M**emory chips. Adding RAMs to your computer increases the available computer memory. Your IIGS has 256 Kb of RAM built into the main circuit board. The additional RAM on the RamStakPlus enables you to run larger applications or create a RAM disk for increased performance.

A **RAM disk** can hold operating systems, applications or data files just like a floppy disk can. But with a RAM disk, your IIGS operates faster because files are stored in high-speed memory instead of on a slower storage device like a floppy disk drive.

The drawback of RAM disks is that the RAMs used for storage are a volatile type of memory device. The contents of a RAM disk are lost when you shut down your computer or when certain types of errors occur.

1.2 ROM Disks

RamStakPlus has a unique **ROM disk** capability that enables you to match the performance of a RAM disk with a non-volatile memory device. The RamStakPlus has four sockets for ROM devices in which you can create a ROM disk that remains in memory — even when the power is turned off or an error occurs.

RamStakPlus supports two different families of ROM devices:

EEPROMs are Electrically Erasable Programmable Read-Only Memory chips that can be programmed and erased directly by the RamStakPlus Utilities.

EPROMs are Erasable Programmable Read-Only Memory chips that must be programmed using an EPROM programmer and erased with ultraviolet light.

1.3 RamStakPlus Features

RamStakPlus increases the performance of your Apple IIGS with the following features:

- ❑ 256 Kb of RAM that you can upgrade to 512 Kb or 1 megabyte.
- ❑ Four ROM sockets for EEPROMs or EPROMs.
- ❑ RamStakPlus Utilities that enable you to test the RAM on the card, create a ROM disk with EEPROMs or set up the files required to create a ROM disk with EPROMs (an EPROM programmer is required to program the EPROMs).
- ❑ Compatibility with Apple's IIGS memory card ensures compatibility with the Apple IIGS system and software.
- ❑ High noise-immunity circuit design ensures the integrity of your data and provides reliable operation.

1.4 System Requirements

You need the following hardware and software to operate your RamStakPlus.

HARDWARE

- ❑ An Apple IIGS.
- ❑ The RamStakPlus card.
- ❑ An Apple 3.5 Drive or a UniDisk™ 3.5.
- ❑ (Optional) RAM chips to increase memory.
- ❑ (Optional) EEPROM or EPROM chips to create a ROM disk. An EPROM programmer is also required if EPROMs are used.

SOFTWARE

- ❑ The RamStakPlus Utilities™ (included).
- ❑ ProDOS™ 16 version 1.0 (included).

1.5 Hardware Overview

Figure 1–1 shows the RamStakPlus Card.

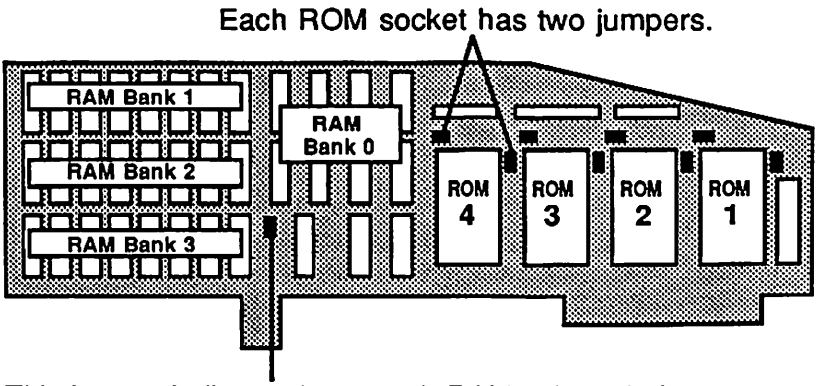

Figure 1–1

Jumpers are simple switches made of pins that can be connected with a jumper block. Jumpers are used to indicate how many RAM banks are in use and what type of device is installed in each ROM socket.

Each **RAM bank** is a set of eight sockets that can be "populated" with RAMs to increase memory by 256 Kb. Populate is computerese for adding chips to a card. Your RamStakPlus has four RAM banks (0, 1, 2 and 3). Bank 0 comes already populated with RAMs. A jumper indicates how many RAM banks are in use.

ROM sockets accept EEPROMs or preprogrammed EPROMs. Each ROM socket has two jumpers whose settings describe the ROM device in the socket.

1.6 Software Overview

The RamStakPlus Utilities let you:

- ❑ Test the RAMs installed on the RamStakPlus.
- ❑ Verify ROM jumper settings for the various ROM devices.
- ❑ Create a ROM disk by programming EEPROMs or setting up the files required for EPROM programming.

The RamStakPlus Utility Disk is named RSP and contains the following applications and folders:

The standard desktop and desk accesories.

The Apple II DeskTop Program.

The ProDos 16 operating system.

The RamStakPlus Utilities.

The standard system documents for ProDOS 16.

1.7 How to Use this Manual

This manual assumes that you know how to use your Apple IIGS, and can perform operations such as:

- ❑ Pointing and clicking.
- ❑ Opening applications and files.
- ❑ Saving files.
- ❑ Choosing menu commands.
- ❑ Using scroll bars.

If these operations are new to you, read your Apple IIGS Owner's Guide before using RamStakPlus.

To get started with RamStakPlus, follow the steps in Chapter 2: Installation.

Conventions Used in this Manual

The following conventions are used in this manual:

FORMAT	USAGE
CAPITALS	Filenames, folder names and disk names are printed in capital letters.
/RAM5	Characters that you type, buttons in dialog boxes, displayed messages and toggles that you must set are printed in a special font.
Esc	The Escape key (Esc on the Apple IIe keyboard, esc on the Apple IIGS keyboard).
Open Apple	The outlined Apple key which is also known as the Command key.
☞ **CAUTION:**	Points out situations that should be avoided.
➠ **NOTE:**	Highlights important information.
	Shows you where to drag the mouse. Press and hold the mouse button while you move the mouse. Then release it.

Chapter 2:

Installation

Chapter 2:

Installation

This chapter describes how to add RAMs or ROM devices to your RamStakPlus and install the RamStakPlus in your IIGS.

You'll want to add RAM to your RamStakPlus if you need more than the 256 Kb of RAM that comes with the card. You'll want to add ROM devices if you want to create a ROM disk.

2.1 Unpacking the RamStakPlus

Make sure that your RamStakPlus package contains every item on the Packing List at the front of this manual. If anything is missing, contact your AST dealer immediately. Save the box in case you ever need to ship the RamStakPlus.

Fill out the System Information Checklist in Appendix B: Troubleshooting. The information may be required if you contact AST Technical Support. Then complete your warranty registration card and send it to AST.

☞ **CAUTION:** Try not to touch the gold leads shown in Figure 2–1. Fingerprints leave moisture that attracts dust.

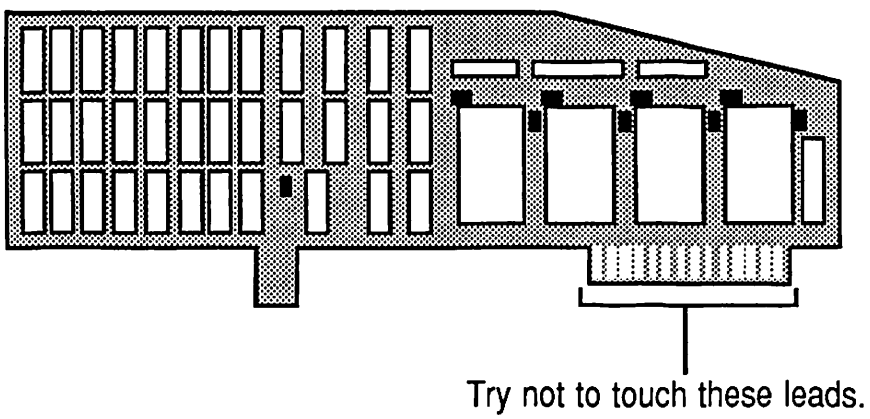

Figure 2–1

2.2 Making a Working Disk

You should always use a working copy of your master RamStakPlus Utility Disk. This ensures that you will have a replacement if a disk should fail.

First, lock the master disk so it cannot be altered. Then make a working disk and store the master in a safe place.

You can make a working disk using the DeskTop Program. The RamStakPlus Utility Disk is not copy-protected to make it easy for registered owners to use.

➠ **NOTE:** If you copy the RamStakPlus Utility Disk to a different disk or a hard disk, you must put the RAMSTAKPLUS file and ROMDISKFILES folder in the same folder or at the root directory.

2.3 Installing the RamStakPlus

The RamStakPlus can be installed directly out of the box to add 256 Kb RAM to your IIGS.

Before installing the RamStakPlus in your IIGS, you may want to:

Increase the amount of RAM on the card as described in section 2.4, Installing RAMs.

Install ROM devices as described in section 2.5, Installing Devices for a ROM Disk.

What You Need to Install the RamStakPlus

You need the following items to install the RamStakPlus:

- ❑ An Apple IIGS with at least one 3.5-inch drive.
- ❑ The RamStakPlus card.
- ❑ The RamStakPlus Utility Disk.

Installing the RamStakPlus Step-by-step

Follow these steps to install the RamStakPlus card in your IIGS.

1. Turn off the power of the IIGS and wait half a minute for the energy to dissipate. Put your monitor on the table next to the IIGS so you can open the lid of the computer.

   Leave the IIGS plugged in so that the computer is grounded.

2. Remove the lid from your IIGS.

   To remove the lid, press in the lid latches at the back of the IIGS with your index fingers and push up on the lid with your thumbs. Then lift the lid off the case and put it aside.

3. Touch the power supply box inside the IIGS to discharge any static electricity that may have built up on your clothes or in your body.

4. Press the card into the memory expansion slot until it is firmly seated in the slot.

   Figure 2–2 shows the location of the memory expansion slot in your IIGS.

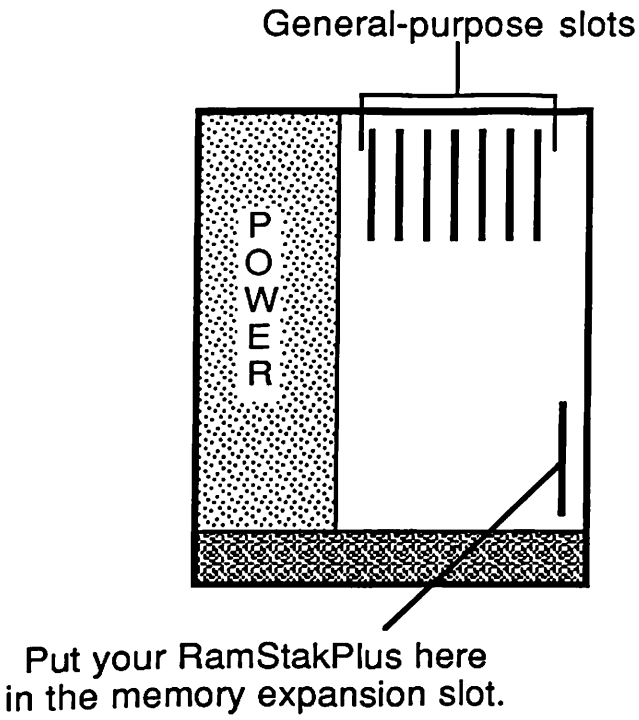

Figure 2–2

☞ **CAUTION:** You can rock the card forward and back if necessary, but never wiggle it from side to side.

5. Replace the lid of your IIGS and put the monitor back in place.

Your RamStakPlus is ready for use. But first, follow these steps to perform a simple test using the Control Panel Program to verify that the IIGS recognizes the memory on the card.

1. Put the RamStakPlus Utility Disk in your startup disk drive. Then turn on the power while holding down the Option key.

   This causes you to start up directly to the Control Panel Program. You could also start up normally and get to the Control Panel Program by pressing Open Apple-Control-Esc.

2. Choose RAM Disk from the menu.

   The amount of memory installed on your RamStakPlus should be displayed in the Largest Selectable field (256, 512 or 1024). If the wrong amount of memory appears, complete steps 3 and 4, then refer to section 3.2, Testing RamStakPlus RAM.

3. Press Esc to display the Control Panel Program Main Menu. Choose Quit from the menu.

   The Desk Accessories menu appears.

4. Choose Quit from the menu.

   The Apple IIGS Program Launcher appears.

Your RamStakPlus is now ready for use as a memory expansion card. Most applications take advantage of the additional RAM automatically.

Chapter 3, Using RamStakPlus, explains how to test the RAM on the RamStakPlus and how to create RAM or ROM disks.

2.4 Installing RAMs

RamStakPlus has four banks of RAM (0, 1, 2 and 3). It comes with 256 Kb of RAM installed in Bank 0. You can increase memory to 512 Kb by populating Bank 1 with RAMs. You can increase memory to 1 megabyte by populating all of the RAM banks.

☞ **CAUTION:** Do not operate RamStakPlus with 768 Kb of memory. Some applications do not function correctly with 768 Kb of RAM on a memory expansion card.

Figure 2–3 shows the position of the RAM banks and the RAM jumper.

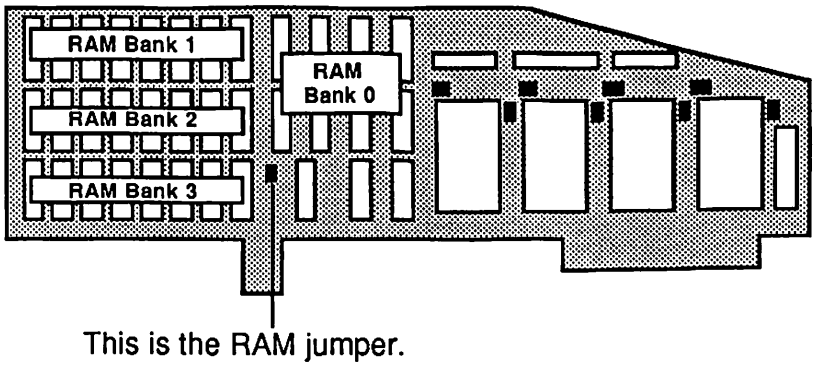

Figure 2–3

What You Need to Install RAMs

You need the following items to install RAMs:

- ❑ The RamStakPlus card.
- ❑ 8 RAMs per RAM bank that meet or exceed the specifications in Appendix A, Specifications.

Installing RAMs Step-by-step

Follow these steps to add RAMs to your RamStakPlus:

1. Set the RAM jumper for the amount of memory you will install by positioning the RAM jumper blocks as shown in Figure 2–4.

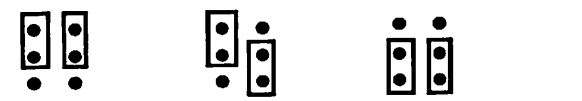

Figure 2–4

To reposition a jumper block, pull it straight off the jumper pins with your fingers. Then align the jumper block with the appropriate pins and gently press it back onto the pins.

2. Populate each socket in RAM Bank 1.

   If you are increasing memory to 1 megabyte, you must also populate RAM banks 2 and 3. Refer to section 2.6, General Instructions for Adding Chips, for instructions on plugging chips into a socket.

2.5 Installing Devices for a ROM Disk

Your RamStakPlus enables you to create a ROM disk with EEPROMs, EPROMs or both. The procedure for putting a chip in a ROM socket is the same for both ROM devices. However, the way you program the ROMs and the sequence in which you install the chips are different.

- **EEPROMs** can be programmed and reprogrammed directly by the RamStakPlus Utilities.

  These are the basic steps for creating a ROM disk using EEPROMs:

  1. Calculate the size of ROM disk you require and purchase the EEPROMs that meet your needs.

  2. Install the EEPROMs on the RamStakPlus card.

  3. Install the RamStakPlus in your IIGS.

  4. Use the RamStakPlus Utilities to program the ROM disk.

- ❑ **EPROMs** must be programmed with an EPROM programmer and erased using ultraviolet light.

  1. Calculate the size of ROM disk you require and purchase the EPROMs that meet your needs.

  2. Install the RamStakPlus in your IIGS.

  3. Use the RamStakPlus Utilities to prepare one or more files that contain an image of the ROM disk.

  4. Transfer the files to an EPROM programmer and program the EPROMs.

  5. Remove the RamStakPlus from the IIGS, install the programmed EPROMs and put the RamStakPlus back into your computer.

What You Need to Install a ROM Disk

You need the following items to install a ROM disk:

- ❑ An Apple IIGS with at least one 3.5-inch drive.
- ❑ The RamStakPlus card.
- ❑ The RamStakPlus Utility Disk.
- ❑ One or more EEPROMs or EPROMs that meet or exceed the specifications in Appendix A, Specifications. These can be purchased from your AST dealer or from computer electronics stores.
- ❑ An EPROM programmer is required if you use any EPROMs. These are available at computer electronics stores and from some user groups.

Calculating ROM Disk Size

One of the best ways to improve the performance of your IIGS is to put the operating system in a ROM disk. PRODOS (16 version 1.0) and the SYSTEM folder combined require approximately 380 blocks of memory. You can put these files in a ROM disk using four 27512 EPROMs.

➠ **NOTE:** Future versions of ProDOS may have different memory requirements.

Another popular use for the RamStakPlus is to put BASIC in the ROM disk. You can create a ROM disk with BASIC.SYSTEM and PRODOS 1.2 with a minimum configuration of four 2864 EEPROMs or four 2764 EPROMs.

Follow these steps to determine which ROM devices you need to meet your ROM disk size requirements:

1. Put the RamStakPlus Utility Disk in your startup drive. Then start up your IIGS.

   The Apple IIGS Program Launcher appears.

2. Select DESKTOP.SYS16 and click the Open button.

   The DeskTop Program appears.

3. Double-click the RSP disk icon (RamStakPlus Utility Disk) to open it.

   You'll see a folder named ROMDISKFILES in the RSP window. When you program a ROM disk, the contents of the ROMDISKFILES folder are saved in the ROM disk.

4. Put all of the files you would like to save in the ROM disk into the ROMDISKFILES folder.

   Organize your files just as you would organize a floppy disk. You can put additional folders inside the ROMDISKFILES folder.

   ➠ **NOTE:** Folders (also known as subdirectories) use approximately one block of memory.

5. Select the ROMDISKFILES folder. Pull down the the Special menu and choose Get Size.

   A dialog box displays the number of blocks used by the folder (blocks used on disk).

6. Calculate which configuration of EEPROMs, EPROMs or both will provide enough blocks of memory to hold the contents of the ROMDISKFILES folder.

   Figure 2–5 lists the supported EEPROMs and EPROMs and the number of blocks of memory provided by each chip.

SUPPORTED EEPROMS	NUMBER OF BLOCKS
2817	4
2864	16
28128	32
28256	64

SUPPORTED EPROMS	NUMBER OF BLOCKS
2764	16
27128	32
27256	64
27512	128

Figure 2–5

➠ **NOTE:** The smallest ROM disk you can create is 8 blocks with two 2817 EEPROMs.

Installing ROM Devices Step-by-step

Follow these steps to install a ROM device:

1. Choose a ROM socket.

   ➡ **NOTE:** The first ROM device must be installed in ROM socket 1. Additional ROM devices can be installed in any ROM socket. Figure 2–6 shows the location of the ROM sockets.

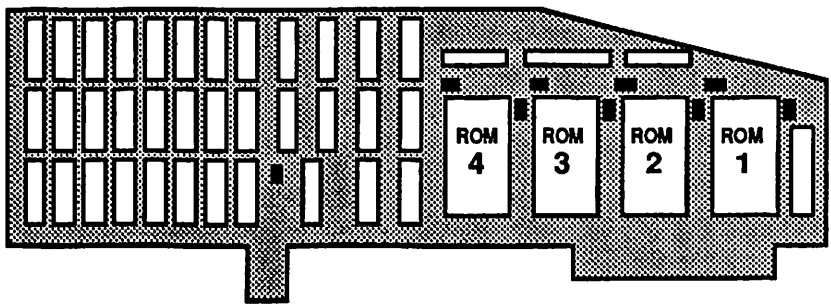

Figure 2–6

2. Set the ROM socket's jumpers for the appropriate device.

   To reposition a jumper block, pull it straight off the jumper pins with your fingers. Then align the jumper block with the appropriate pins and gently press it back on.

   The RamStakPlus is shipped with the jumpers for each ROM socket set as shown in Figure 2–7.

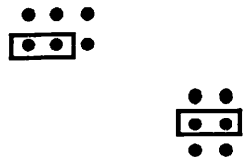

Figure 2–7

Figure 2–8 shows the jumper settings for supported EEPROMs.

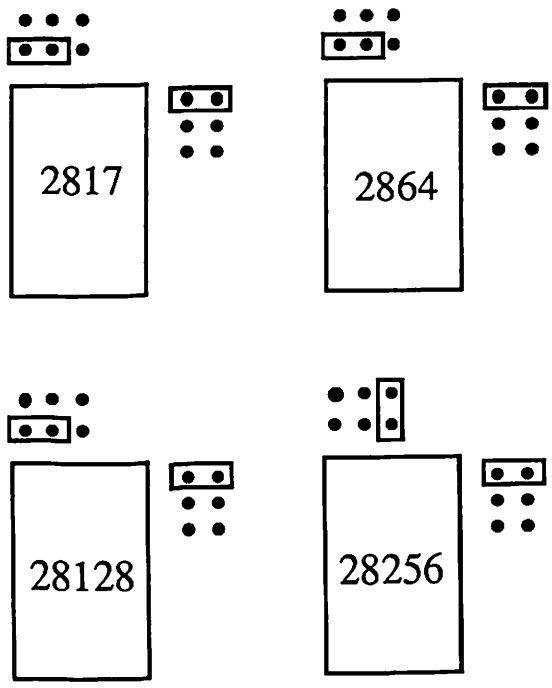

Figure 2–8

Figure 2–9 shows the jumper settings for supported EPROMs.

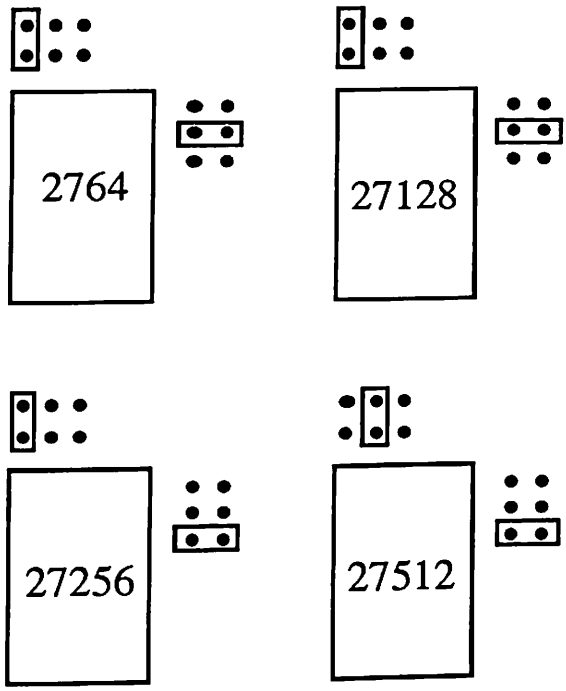

Figure 2–9

3. Plug the ROM device into the socket.

   Section 2.6, General Instructions for Adding Chips explains this procedure.

Now you are ready to install the RamStakPlus in your IIGS as described in section 2.3, Installing the RamStakPlus. Then if you are using EEPROMs, you can program the ROM disk on the card.

2.6 General Instructions for Adding Chips

The sockets used on the RamStakPlus are easy to populate with chips. However, if you feel uncomfortable installing the chips yourself, ask your AST dealer for assistance.

Follow these steps to install a chip in a socket:

1. Align the pins on the chip with the holes in the socket.

   Chips should be installed with the notched end facing up towards the top of the card as shown in Figure 2–10.

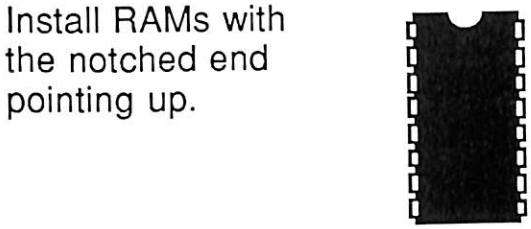

Figure 2–10

☞ **CAUTION:** Don't try to insert a chip that has bent pins. Ask your AST dealer for a replacement chip. If the pins are bent outward so they don't line up with the socket holes, you may be able to correct the problem by laying the chip on its side on a clean surface, and gently rolling the chip so the pins point slightly inward. Do this for both sides of the chip. Figure 2–11 shows how the pins on the chip should look.

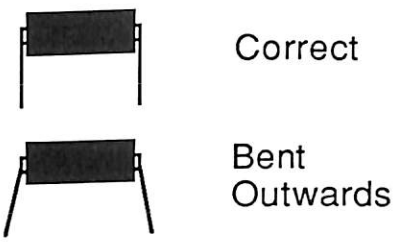

Figure 2–11

2. Gently press down on the chip with your fingers until it's firmly seated in the socket.

Chapter 3:

Using RamStakPlus

Chapter 3:

Using RamStakPlus

This chapter describes how to create a RAM disk using the Apple IIGS Control Panel Program and explains how to use the RamStakPlus Utilities to test the RAM on the card or program a ROM disk.

Your RamStakPlus card can be used without modification by applications that automatically take advantage of the extra memory on a memory expansion card.

A few additional steps are required to use the RamStakPlus memory as a RAM disk or to create a ROM disk. Both RAM and ROM disks increase the performance of your IIGS.

3.1 Starting the RamStakPlus Utilities

1. Put the RamStakPlus Utilities disk into your startup disk drive and turn on the IIGS.

   The computer starts up to the Apple IIGS Program Launcher.

2. Select RamStakPlus from the scroll box and click the Open button.

   The RamStakPlus startup dialog box shown in Figure 3–1 appears.

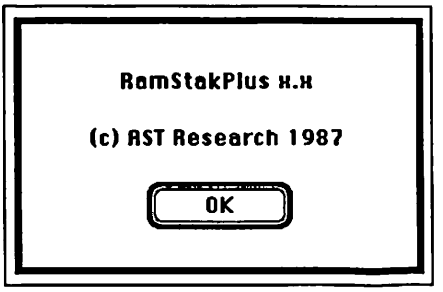

Figure 3–1

   If this dialog box doesn't appear in a few moments, refer to Appendix B: Troubleshooting.

3. Click the OK button.

The RamStakPlus Utilities are now ready to test the RAM on your RamStakPlus or program a ROM disk.

3.2 Testing RamStakPlus RAM

Follow these steps to test the RAMs on your RamStakPlus.

1. Start up the RamStakPlus Utilities.

2. Pull down the Memory menu and choose Test.

   The memory test screen appears and the RamStakPlus Utilities begin making test passes through each bank that has been populated with RAMs (as specified by the RAM jumper). The RAM bank currently being tested is outlined. The display also states which RAM bank is being tested and how many test passes have been completed.

   If a RAM chip fails the test, it is displayed as an empty box instead of a solid one. Either a RAM chip is defective or you forgot to install one. Defective RAMs should be replaced with a RAM chip that meets or exceeds the specifications in Appendix A, Specifications. You'll need to turn off your computer, remove the RamStakPlus card and pull the chip off the socket with your fingers. Then install a new chip as described in section 2.6, General Instructions for Adding Chips.

   Testing continues until you click the mouse. One test pass should be sufficient to verify that the RAM on the RamStakPlus card is functioning properly. If you are having intermittent memory problems, letting the test run overnight may find the source of the trouble.

Figure 3–2 shows the memory test screen while RAM bank 0 is being tested. The RAM chip in the top-right corner failed the test and is displayed as an empty box.

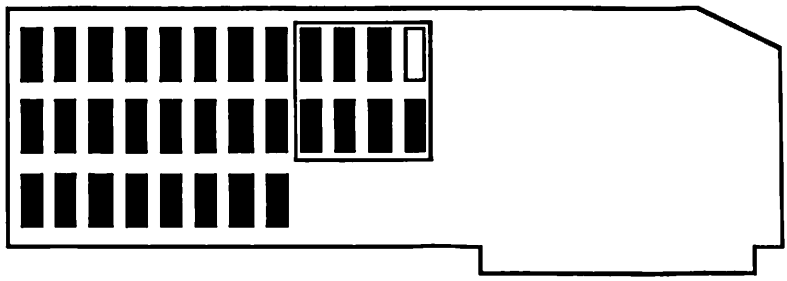

Figure 3–2

3. Click the mouse to end testing.

4. Pull down the File menu and choose Quit.

   The Apple IIGS Program Launcher or the DeskTop Program (whichever you used last) appears.

3.3 Using a RAM Disk

You can use a RAM disk to save applications or documents. Applications saved in a RAM disk operate much faster than applications stored on a floppy or hard disk. It also takes less time to open or close documents saved in the RAM disk.

The following sections explain how to create a RAM disk and describe other tasks related to RAM disk operations.

Minimum and Maximum RAM Disk Size

Creating a RAM disk involves setting a minimum and maximum RAM disk size with the Control Panel Program. When determining these values, you must consider the memory requirements of your applications as opposed to the memory requirements of the RAM disk. Figure 3–3 illustrates how one part of computer memory (RAM) can be used for a RAM disk and another part can be used for applications.

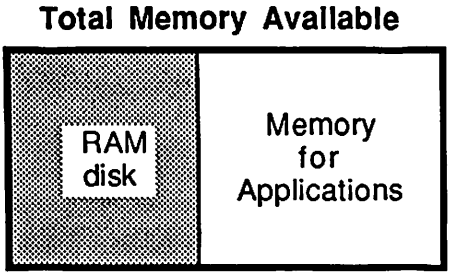

Figure 3–3

Because a RAM disk takes up memory that could be used by applications, don't create one unless you specifically plan to use it.

The **minimum RAM disk size** defines the amount of memory that can only be used by your RAM disk. It also defines the maximum amount of memory available to applications.

The **maximum RAM disk size** defines the largest possible size for the RAM disk. It also defines the minimum amount of memory available to applications. Your RAM disk is limited to the amount of RAM installed on the RamStakPlus.

Figure 3–4 illustrates an example with one megabyte of RAM installed. The maximum RAM disk size is set to 640 Kb and the minimum RAM disk size is set to 384 Kb. This means that applications will be able to use at least 384 Kb of memory (1024 - 640), but not more than 640 Kb of memory (1024 - 384).

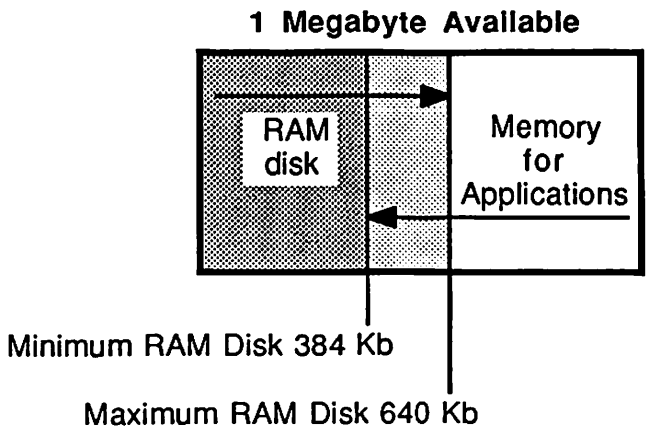

Figure 3–4

➠ **NOTE:** Applications that use a version of ProDOS earlier than 1.2 require that the maximum and minimum RAM disk size be set to the same number.

If an application needs more memory than is available, the application will warn you when you try to launch it. When this occurs, use the Control Panel Program to reduce the maximum RAM disk size.

Creating a RAM Disk Step-by-step

Follow these steps to create a RAM disk:

1. Start up your computer and press Open Apple-Control-Esc to display the Desk Accessories menu.

2. Choose Control Panel.

   The Control Panel Program Main Menu appears.

3. Choose RAM Disk.

   The RAM Disk screen appears.

4. Select Minimum RAM Disk Size and press Right Arrow or Left Arrow to toggle the minimum RAM disk size to the desired amount.

5. Select Maximum RAM Disk Size and press Right Arrow or Left Arrow to toggle the maximum RAM disk size to the desired amount.

   The maximum RAM disk size must be greater than or equal to the minimum RAM disk size.

6. Press Return to accept the changes.

   The Control Panel Program Main Menu appears.

7. Choose Quit.

   The Desk Accessories menu appears.

8. Reset your computer from the keyboard (do not restart your IIGS by turning the power off and on again).

   To reset your IIGS:
   - Hold down the Open-Apple and Control keys.
   - Press the Reset key.
   - Release the Reset key.
   - Release the Open Apple and Control keys.

   ➠ **NOTE:** You must reset the IIGS before it will recognize the changes you have made and create the RAM disk.

You are now ready to copy applications or save documents to your RAM disk. You may also want to make the RAM disk your startup device.

The RAM disk is already formatted for copying applications and saving documents. It is named RAM5 and appears in Slot 5.

Identifying the RAM Disk

Some applications ask you to identify your RAM disk by slot and drive number. A RAM disk on the RamStakPlus always appears in Slot 5. Since Slot 5 is also used for 3.5-inch drives and ROM disks, there are certain rules that identify the drive number of the RAM disk.

Rule 1: Drive 1 is always the startup device, regardless of disk drive type. Use the Control Panel Program to change the startup device.

Rule 2: RAM disk drive numbers precede ROM disk drive numbers which precede 3.5-inch disk drive numbers (the startup device is still always Drive 1).

Here are a few examples to help you understand the use of these rules:

- If a RAM disk is your startup device, it is Drive 1, your ROM disk is Drive 2, your first 3.5-inch drive is Drive 3 and your second 3.5-inch drive is Drive 4.

- If a 3.5-inch drive is your startup device, it is Drive 1, the RAM disk is Drive 2, the ROM disk is Drive 3 and the second 3.5-inch drive is Drive 4.

- If a ROM disk is your startup device, it is Drive 1, the RAM disk is Drive 2, the first 3.5-inch drive is Drive 3 and the second 3.5-inch drive is Drive 4.

➠ **NOTE:** ProDOS 1.1.1 supports no more than two drives per slot. When a RAM disk is used, applications based on ProDOS 1.1.1 do not recognize Drive 3 which would contain your first or second 3.5-inch drive. Applications based on ProDOS 1.2 support two devices per slot. You can have a RAM disk, a ROM disk and two 3.5-inch drives in Slot 5, but the third device appears to be in Slot 2, Drive 1; and the fourth device appears to be in Slot 2, Drive 2.

Copying Applications to the RAM Disk

You can copy applications to your RAM disk using the DeskTop Program.

Saving Documents to the RAM Disk

Documents can be saved to a RAM disk just like you would save them to a regular disk.

☞ **CAUTION:** RAM is volatile memory. Documents saved in a RAM disk are lost if a system error occurs or the power is turned off. If you save documents in a RAM disk, be sure to copy them onto a floppy or hard disk periodically and before turning off the computer.

Applications may ask for a slot and drive number when you save a document. If a 3.5-inch drive is your startup device, then the RAM disk is in Slot 5, Drive 2. If the RAM disk is your startup device, then the RAM disk is in Slot 5, Drive 1.

Applications may ask for a pathname. Type a slash, the RAM disk name (the standard name for a RAM disk is RAM5), another slash and the document name. For example: `/RAM5/YourDocument`.

Starting up from the RAM Disk

You can start up applications from the RAM disk using the standard procedures of the Apple IIGS Program Launcher or the DeskTop program.

You can also make the RAM disk your startup device so that the IIGS starts up from the RAM disk when you reset (Open Apple-Control-Reset).

Making the RAM Disk Your Startup Device

If you make your RAM disk the startup device, the operating system in the RAM disk will start up when you reset your IIGS (Open Apple-Control-Reset). Your RAM disk must be formatted before it can be used as the startup device. You can format a RAM disk just as you would format any other disk.

☞ **CAUTION:** You must copy an operating system, such as ProDOS, into the RAM disk before making the RAM disk the startup device. If you forget to do this, you'll see either the `Check Startup Device` or `Unable to Load ProDOS` messages when you reset the computer.

➠ **NOTE:** If you use the Format a Disk command on the Special menu of the DeskTop Program, the RAM disk appears as follows:

`UniDisk 3.5 S5,1`	If the RAM disk is the startup device.
`UniDisk 3.5 S5,2`	If a 3.5-inch drive or ROM disk is the startup device.

3.4 Programming a ROM Disk

This section describes how to program a ROM disk. The basic procedures for creating a ROM disk are:

- ❑ Install any EEPROMs to be used on the card and install the card in your IIGS. EPROMs are installed after they are programmed.
- ❑ Use the DeskTop Program to organize the ROMDISKFILES folder as you would like it to be programmed into the ROM disk.
- ❑ Use the RamStakPlus Utilities to set the ROM socket configuration and initiate programming of the ROM devices using the contents of the ROMDISKFILES folder.
- ❑ If you used any EPROMs, the files created by the RamStakPlus Utilities must be transferred to an EPROM programmer. Then the EPROMs must be programmed and installed on the RamStakPlus card.
- ❑ Reset your IIGS so it will recognize the ROM disk.

Creating a ROM Disk Step-by-step

Follow these steps to create a ROM disk:

1. You must first install the RamStakPlus card in your IIGS. If you are using EEPROMs, these must also have been installed on the card.

2. If you have created a RAM disk, turn it off using the Control Panel Program.

3. Run the DeskTop Program and double-click the RSP disk icon (RamStakPlus Utility Disk) to open it.

   You'll see a folder named ROMDISKFILES in the RSP window. When you begin programming the ROM disk, the contents of the ROMDISKFILES folder will be used to program the ROM disk.

   ➠ **NOTE:** If you already set up your ROMDISKFILES folder, proceed to Step 5.

4. Put all of the files you want saved in the ROM disk into the ROMDISKFILES folder.

   Organize your files just as you would organize a floppy disk. You can put additional folders inside the ROMDISKFILES folder.

   To calculate ROM disk capacity, add up the number of blocks provided by each EEPROM on the RamStakPlus card and each EPROM to be installed on the card. Then subtract four blocks. Section 2.5, Installing Devices for a ROM Disk, contains a chart showing the number of blocks available on each ROM device.

   To check the number of blocks used in the ROMDISKFILES folder, select the folder and choose Get Size from the Special menu of the DeskTop Program.

5. Double-click the `Ramstakplus` icon to launch the RamStakPlus Utilities.

   The RamStakPlus startup dialog box appears.

6. Click the OK button, pull down the ROM menu and choose Create ROM-Disk.

   The ROM disk screen appears. Figure 3–5 shows the parts of the ROM disk screen.

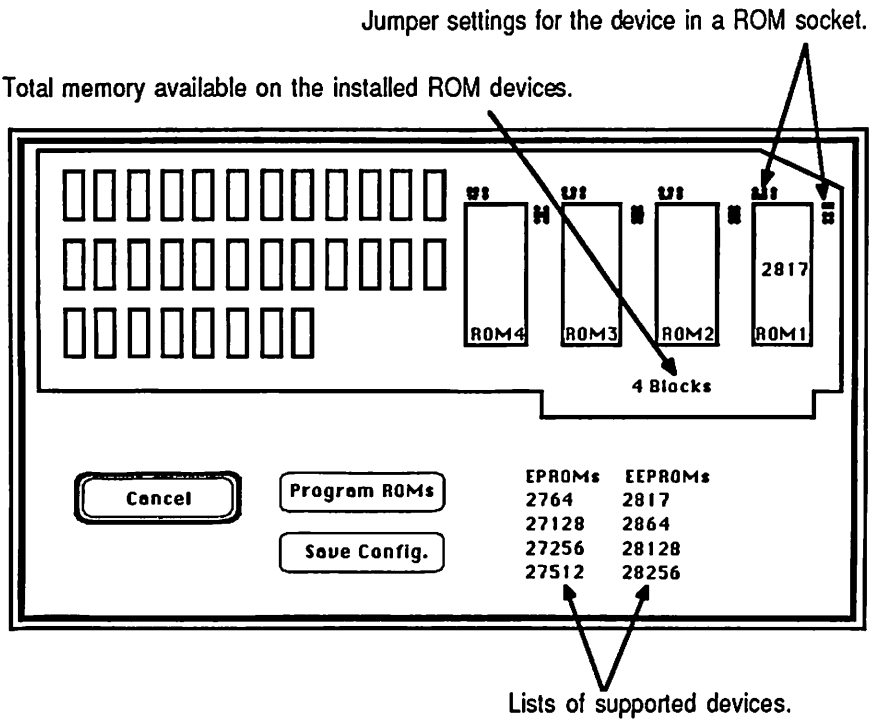

Figure 3–5

7. Drag the appropriate device number from the list of supported devices onto ROM socket 1 as shown in Figure 3–6.

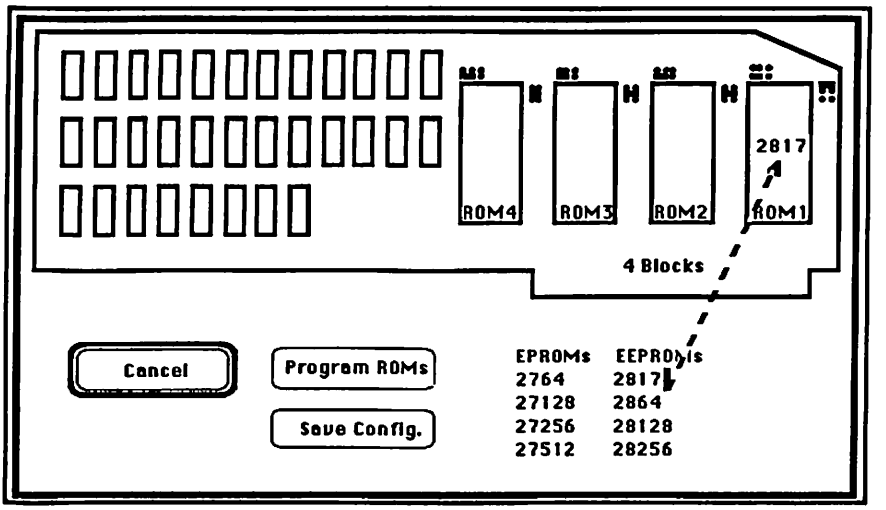

Figure 3–6

The correct jumper setting for the ROM socket is displayed. You can use the display to verify that you set the jumper correctly.

You can change a device number by dragging another one onto the ROM socket. Clicking the ROM socket, clears the device number from the socket.

8. Drag device numbers onto each additional ROM socket that you are using.

9. Click the `Save Config.` button to save the ROM socket configuration.

   The configuration information is saved on disk in a file named ROM.CONFIG.

10. Click the `Program ROMs` button to begin programming the ROMs.

    A status message like the one shown in Figure 3–7 appears.

Figure 3–7

It shows the available capacity of the ROM devices you configured and the total file length (number of blocks) of the ROMDISKFILES folder.

11. If the total file length exceeds the available capacity, a dialog box like the one shown in Figure 3–8 appears.

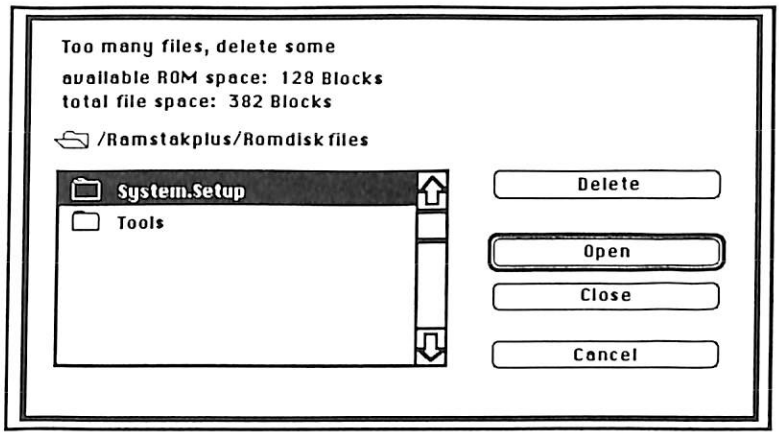

Figure 3–8

You must delete some files from the ROMDISKFILES folder until the total file space is less than the available ROM space. As soon as you have deleted enough files, ROM programming continues.

`Delete` Enables you to delete a selected file. You cannot delete folders with this button.

`Open` Enables you to open a selected folder. You cannot open applications with this button.

`Close` Enables you to close a folder and return to the previous level of folder. You cannot close the ROMDISKFILES folder. Access is limited to those files and folders inside the ROMDISKFILES folder.

`Cancel` Enables you to cancel ROM programming.

12. A status message like the one in Figure 3–9 appears. It indicates which files are being read.

Figure 3–9

13. The next status message you see depends on whether the ROM socket being prepared is configured for an EEPROM or an EPROM. Figure 3–10 shows the status message that appears while a socket configured for an EEPROM is being processed.

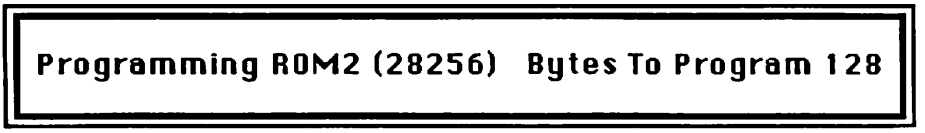

Figure 3–10

This status message shows the ROM socket, device number and the amount of memory remaining to be programmed.

Figure 3–11 shows the status message that appears while an EPROM is being processed. It indicates that a file is being created on disk. The file contains an image of the ROM which must be transferred to an EPROM programmer for programming. The filename consists of the ROM socket number and the device number configured for the socket.

Figure 3–11

When ROM device programming or ROM file preparation is completed, you are returned to the menu bar.

14. Pull down the File menu and choose Quit to return to the Apple IIGS Program Launcher or the DeskTop Program (whichever was used last).

15. Before your ROM disk can be recognized by the IIGS, you must reset the computer.

    To reset your IIGS:
    - Hold down the Open-Apple and Control keys.
    - Press the Reset key.
    - Release the Reset key.
    - Release the Open Apple and Control keys.

If you used EEPROMs only, you are ready to begin using your ROM disk.

If you used any EPROMs, you must transfer the ROM files to an EPROM programmer and program the EPROMs. Refer to the EPROM programmer's documentation for details. Once your EPROMs are programmed, remove the RamStakPlus card and install the programmed EPROMs as described in Section 2.5, Installing Devices for a ROM Disk. Then you are ready to begin using your ROM disk.

3.5 Reprogramming a ROM Disk

ROM disk can be reprogrammed in the same way that they were programmed the first time. However, if you used any EPROMs, they must be removed and erased using ultraviolet light. Refer to your EPROM programmer's documentation for details.

3.6 Using a ROM Disk

Once all of the ROM devices you plan to use are installed and programmed, your ROM disk will be recognized automatically when you start up the IIGS.

➠ **NOTE:** When you first install the ROM disk, you must reset the computer so that it can recognize the ROM disk.

The ROM disk operates just like a write-protected disk, except that the files in the ROM disk are processed much faster. The ROM disk is titled ROM and located in Slot 5. The ROM disk drive number varies depending on your system configuration. Refer to the Identifying the RAM Disk section in this chapter for a description of how disk drive numbers are determined for devices in Slot 5.

Making the ROM Disk the Startup Device

If you programmed an operating system, such as ProDOS, into your ROM disk, you can make the ROM disk the startup disk. When you turn on your Apple IIGS, it will start up almost immediately using the operating system in the ROM disk.

Follow these steps to make the ROM disk the startup disk:

1. Put the RamStakPlus Utility Disk into your startup disk drive. Turn on your IIGS and your monitor.

2. Press Open Apple-Control-Esc.

   The Desk Accessories screen appears.

3. Choose Control Panel.

   The Control Panel Main Menu appears.

4. Choose Slots.

   The Control Panel Slots screen appears.

5. Press Up Arrow or Down Arrow to highlight Startup Slot.

6. Press Left Arrow or Right Arrow to toggle the slot setting to `ROM Disk`.

7. Press Return to display the Control Panel Program Main Menu.

8. Choose Quit.

   The Desk Accessories screen appears.

9. Choose Quit again.

   The Apple IIGS Program Launcher or the DeskTop program (whichever you used last) appears.

10. Reset your computer.

    To reset your IIGS:
    - Hold down the Open-Apple and Control keys.
    - Press the Reset key.
    - Release the Reset key.
    - Release the Open Apple and Control keys.

You'll notice how quickly the computer starts up. Unless you change the startup slot, the IIGS will startup from the ROM disk each time you start up the machine. The ROM disk as a startup device appears in Slot 5, Drive 1.

Chapter 4:

RamStakPlus Reference

Chapter 4:

RamStakPlus Reference

This chapter describes each command on the RamStakPlus menus. Sections in this chapter follow the order of the menus as they appear in the menu bar.

4.1 Apple Menu

The Apple menu contains the About RamStakPlus command shown in Figure 4–1 and any desk accessories you have installed.

Figure 4–1

About RamStakPlus

This command displays an information window that shows which version of the RamStakPlus Utilities you are using. Click the OK button to continue.

4.2 File Menu

The File Menu in Figure 4–2 lets you end your RamStakPlus Utilities session.

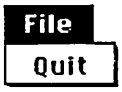

Figure 4-2

Quit

This command ends your RamStakPlus Utilities session and returns you to the Apple IIGS Program Launcher or the DeskTop Program, whichever was used to launch the RamStakPlus Utilities.

4.3 Memory Menu

The Memory menu shown in Figure 4–3 lets you test the RAMs installed on the RamStakPlus card.

Figure 4–3

Test

This command initiates testing of the RamStakPlus RAMs. Clicking the mouse ends testing.

4.4 ROM Menu

The ROM menu shown in Figure 4-4 lets you specify the configuration of ROM devices to be used on the RamStakPlus card and initiate programming of those devices.

Figure 4-4

Create ROM-Disk

This command enables you to set and save the ROM socket configuration, program EEPROMs and create the image files required to program an EPROM with an EPROM programmer. You can also use this command to verify the proper jumper settings for ROM sockets.

Appendices

APPENDIX A

Appendix A:

Specifications

All specifications are subject to change without notice.

Memory Capacity	RAM: 256 Kb (min.) 512 Kb 1 megabyte (max.) ROM: EEPROM 2 Kb - 32 Kb / socket. EPROM 8 Kb - 64 Kb / socket.
RAM Parameters	150 ns, 256 Kb DRAMs, 16 pin DIP.
ROM Parameters	200 ns, EPROMs/EEPROMs, 28 pin DIP.
Installation	Apple IIGS extended memory slot.
Software media	3.5-inch diskette.
Board Size	10.0-inch L x 2.75-inch W.
Power Usage	256 Kb: 500 mA active, 165 mA standby. 1 megabyte: 560 mA active, 205 mA standby. ROM devices: 60 mA active, 25 mA standby per device.
Warranty	Two-year limited warranty.

APPENDIX A

Appendix B:

Troubleshooting

RamStakPlus and the RamStakPlus Utilities are designed to be easy to install and reliable to operate. However, should a problem occur, the suggestions in this appendix may help you find the solution. If you can't correct the problem yourself, refer to the Technical Support section of this appendix.

Symptoms and Solutions

This section describes symptoms of problems and possible solutions for those problems. When a problem occurs, try the operation again. If the problem still exists, shut down the Apple IIGS and restart it.

If your IIGS exhibits erratic behavior (especially if you just installed the RamStakPlus).

You may have a bad RAM chip. Use the RamStakPlus Utilities to test the RAM on the card as described in section 3.2, Testing RamStakPlus RAM. If you have a defective chip, replace it.

If the message Check Startup Device appears when you start up the computer.

You may have set the RAM disk as your startup device. Since the RAM disk is empty when you start up, the IIGS can't complete its startup procedure. Use the Slots option on the Control Panel Program to change the startup slot to one of your disk drives so you can start up.

If the message Unable to Load ProDOS appears when you start up the computer.

The IIGS can't find the operating system on the startup device, so it displays this message. You may have set the ROM disk as your startup device without having programmed a version of ProDOS into the ROM disk. Use the Slots option on the Control Panel Program to change the startup slot to one of your disk drives so you can start up.

If the `Program ROMs` button is dimmed on the ROM disk screen.

There are several possible sources of this problem.

- ❑ Make sure that you have configured a ROM in ROM socket 1. The first ROM device you use must go in ROM socket 1. Additional ROM devices can be placed in any ROM socket.

  You can check this by choosing Create ROM-Disk from the ROM menu of the RamStakPlus Utilities. A device number should appear in ROM socket 1.

- ❑ Verify that the ROMDISKFILES folder is in the same folder as the RAMSTAKPLUS file. The ROMDISKFILES folder and the RAMSTAKPLUS file must be in the same folder. You can check this from the Apple IIGS Program Launcher or from the DeskTop Program.

- ❑ Make sure that you have over 5 blocks of memory configured in your ROM sockets.

  You can check this by choosing Create ROM-Disk from the ROM menu of the RamStakPlus Utilities. The ROM disk screen shows the total number of blocks available for the configured ROM devices. See Figure 3–5 for details.

Technical Support

The System Information Checklist and the Trouble Report help you organize the information that AST Technical Support needs in order to assist you. Complete the System Information Checklist when you install your system and update it as necessary.

When a problem occurs, try the solutions described in this appendix. If you cannot correct the problem, fill out the Trouble Report and contact your AST dealer for assistance. If your AST dealer is unable to help, you can contact AST Technical Support through one of the following phone numbers:

(714) 553-0340	Telephone support between 7 a.m. and 5 p.m. (Pacific Coast Time) Monday through Friday.
(714) 660-9175	Modem users can leave a message for Technical Support on the 24-hour AST bulletin board system.
(714) 660-8063	FAX machine.

System Information Checklist

Authorized representive in your office _____

Telephone _____

Technical Support person contacted _____

Company _____ Date _____

Date of Purchase _____

Purchased from _____

Model Number _____

Serial Number _____

Type of computer _____

Memory _____

Configuration _____

Peripherals installed _____

_____

_____

If you are using a network, which one? _____

_____

Model? _____

Trouble Report

Describe the problem. (What, when, how?) _____

_____

_____

_____

Can you duplicate the problem? What causes the problem to occur? _____

_____

_____

_____

List any error messages that occur. _____

_____

If the problem is intermittent, how often does it occur?

_____

You can make copies of this page to make it easier to report problems. AST Research, Inc. grants you permission to copy this page only.

Glossary

block	A unit of measure for memory. One block equals 512 bytes.
boot	To start up your computer. See **start up.**
click	To press and release the mouse button.
double-click	To press and release the mouse button twice in rapid succession.
drag	To press and hold the mouse button while you move the mouse.
DRAM	Dynamic RAM.
EEPROM	Electronically Erasable Programmable Read-Only Memory that can be programmed using the RamStakPlus Utilities.
EPROM	Erasable Programmable Read-Only Memory chips that must be programmed using an EPROM programmer.
EPROM programmer	A device used to program files into EPROMs.

jumper	A simple switch that consists of pins connected by a jumper block.
jumper block	The small piece of plastic that connects jumper pins.
Kb	An abbreviation for kilobytes. Kilobytes are a standard measurement for memory equivalent to 1024 bytes.
megabyte	A standard measurement for memory equivalent to approximately one million bytes.
memory	Your computer's internal memory (RAM).
populate	To add chips to a circuit board.
RAM	Random Access Memory. Computer memory in which system, application and data files are stored.
RAM bank	A set of sockets that accept RAMs. Each RAM bank on the RamStakPlus holds 256 Kb of memory.

reset

Sometimes called a "warm boot." Follow these steps to reset your IIGS:

1. Hold down the Open-Apple and Control keys.
2. Press the Reset key.
3. Release the Reset key.
4. Release the Open Apple and Control keys.

ROM

Read-Only Memory. Permanent memory that typically contains parts of the operating system or an application.

ROM device

An EEPROM or EPROM chip.

ROM socket

A socket on the RamStakPlus card that accepts ROM devices.

root directory

The lowest level directory on a disk volume. For example, when you open a disk icon, it opens to the root directory. Folders on the disk are subdirectories.

socket

RAM or ROM chips attach to these connectors on the RamStakPlus card.

start up — To turn on your IIGS or to launch an application. Turning on your IIGS is also known as a "cold boot."

startup device — The disk that contains the operating system required to start the computer. This can be a floppy disk drive, hard disk drive, RAM disk or a ROM disk.

subdirectory — A folder. See **root directory.**

Index

R

S

FCC WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to a computer that complies with Class B limits. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. When connecting to a peripheral device, a shielded I/O cable is required to ensure compliance with FCC rules.

Instructions to User

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ❑ Reorient the receiving antenna.
- ❑ Move the computer away from the receiver.
- ❑ Plug the computer into a different outlet so that computer and receiver are on different branch circuits.
- ❑ Ensure that all cable connectors are fastened securely to the computer's chassis.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission (FCC) helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.
Stock No. 004-000-00345-4.

RamStakPlus
LIMITED WARRANTY

AST Research, Inc. (AST) warrants the original purchaser of this AST product that it is to be in good working order for a period of 2 years from the date of purchase from AST or an authorized AST dealer. Should this product, in AST's opinion, malfunction during the warranty period, AST will, at its option, repair or replace it at no charge, provided that the product has not been subjected to misuse, abuse, or non-AST authorized alterations, modifications and/or repairs.

Products requiring Limited Warranty Service during the warranty period should be delivered to AST or an AST authorized service center with proof of purchase. If the delivery is by mail, the purchaser agrees to insure the product or assume risk of loss or damage in transit. The purchaser also agrees to prepay shipping carges to AST.

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