

Rampage[®] 286
Enhanced Expanded Memory Board
for the
IBM Personal Computer AT[®]
and XT Model 286
and Other AT-Compatible Computers

Addendum
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ADDENDUM TO THE RAMPAGE 286 USER'S MANUAL

This addendum updates miscellaneous packaging information and corrects technical details not covered in the current user's manual.

Please replace the original page with new pages from this addendum as follows:

Original Pages

Replacement Pages

iii to viii	iii to viii
1-1 to 1-2	1-1 to 1-2
1-5 to 1-10	1-5 to 1-10
2-1 to 2-14	2-1 to 2-14
3-1 to 3-6	3-1 to 3-8
4-5 to 4-6	4-5 to 4-6
A-3 to A-10	A-3 to A-10
B-1 to B-6	B-1 to B-2
C-1 to C-4	C-1 to C-6

Please remove the following original pages from the user's manual:

F-1 to F-2

NOTES

MEMORANDUM FOR THE DIRECTOR
DATE: 10/10/54

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CONTENTS

1. INTRODUCTION	1-1
1.1 Features.....	1-2
1.1.1 Hardware Features.....	1-3
1.1.2 Software Features.....	1-4
1.2 Memory Allocation Example.....	1-5
1.3 Getting Started.....	1-8
1.4 Checklist.....	1-10
1.5 System Requirements.....	1-10
1.6 How To Use This Manual.....	1-11
1.6.1 Format Notation.....	1-11
1.6.2 Related Documentation.....	1-12
1.6.3 Manual Outline.....	1-12
2. CONFIGURING YOUR RAMPAGE 286 BOARD	2-1
2.1 Default Configuration.....	2-1
2.2 Basic Configuration.....	2-4
2.2.1 What You Need to Know Before You Start.....	2-4
2.2.2 SW1 Location and Default Settings.....	2-7
2.2.3 Conventional/Extended Memory Size Setting (SW1-1 through SW1-4).....	2-8
2.2.4 Base I/O Address Settings (SW1-5 through SW1-8).....	2-10
2.2.5 Dual Page Mode (SW1-9).....	2-11
2.2.6 SW2 Location and Default Settings.....	2-12
2.2.7 Conventional/Extended Memory Installed (SW2-1 through SW2-7).....	2-13

CONTENTS

2.2.8 Parity Checking (SW2-8).....	2-14
3. INSTALLING RAMPAGE 286 IN YOUR COMPUTER	3-1
3.1 Opening Your Computer.....	3-1
3.2 Disabling System Board Memory	3-4
3.3 Installing Rampage 286 in Your Computer.....	3-6
4. RUNNING SETUP	4-1
4.1 SETUP Examples.....	4-5
5. INSTALLING RAMPAGE 286 SOFTWARE.....	5-1
5.1 Example SuperPak Configuration.....	5-3
5.2 Starting the INSTALL Program.....	5-4
5.3 Installing Options.....	5-8
5.4 Save the Installation.....	5-9
A. SWITCH SETTING SUMMARY.....	A-1
A.1 Rampage 286 Conventional/Extended Memory Size	A-1
A.2 Base I/O Address	A-4
A.3 Dual Page Mode.....	A-6
A.4 Conventional/Extended Memory Already Installed.....	A-7
A.5 Parity Checking.....	A-10
B. MEMORY ALLOCATION FOR EEMS SOFTWARE	B-1

C. ADDING OR REMOVING MEMORY	C-1
C.1 Valid Memory Configurations	C-1
C.2 Memory Chip Specifications.....	C-2
C.3 Rules for Handling Memory Chips	C-2
C.4 Installing Additional Memory	C-4
D. ADVANCED INSTALL PROCEDURES	D-1
D.1 Using INSTALL.....	D-3
D.2 Running the INSTALL Program.....	D-5
D.3 Installing SuperPak Software for Another Computer	D-6
D.4 INSTALL Main Menu	D-8
D.5 Installing fASTdisk.....	D-9
D.6 Installing SuperDrive.....	D-12
D.7 Installing the AST Expanded Memory Manager	D-15
D.8 Installing SuperSpool.....	D-17
D.9 Saving the Installation.....	D-18
D.10 Example of Completed Installation	D-20
E. HOW RAMPAGE 286 WORKS.....	E-1
E.1 Memory Paging.....	E-1
E.2 Expanded Memory Manager -- REMM.SYS.....	E-4
E.3 Extended Memory Emulator -- REX.SYS	E-4

CONTENTS

E.4 Modifying REMM and REX.....	E-5
E.4.1 DEVICE = REMM.SYS Parameters.....	E-7
E.4.2 DEVICE = REX.SYS Parameters.....	E-9
E.4.3 Modifying CONFIG.SYS for fASTdisk.....	E-10

GLOSSARY	Glossary-1
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FIGURES

Figure 1-1. Example Memory Map.....	1-7
Figure 2-1. Rampage 286 Board Layout.....	2-2
Figure 2-2. Rampage 286 Switch SW1 (Default Setting).....	2-7
Figure 2-3. Rampage 286 Switch SW2 (Default Setting).....	2-12
Figure 3-1. Removing the PC XT Model 286 Cover.....	3-2
Figure 3-2. Removing the PC AT Cover.....	3-3
Figure 3-3. Setting the PC AT System Board Jumper.....	3-5
Figure 3-4. Installing the Rampage 286 Board.....	3-7
Figure 5-1. Initial INSTALL Screen.....	5-5
Figure 5-2. Main INSTALL Menu.....	5-7
Figure A-1. Rampage 286 Conventional/Extended Memory Size.....	A-3
Figure A-2. Rampage 286 Base I/O Address Settings.....	A-5
Figure A-3. Dual Page Mode Configuration.....	A-6
Figure A-4. Conventional/Extended Memory Already Installed .	A-8
Figure A-5. Parity Error Checking.....	A-10
Figure C-1. Rampage 286 Memory Configuration.....	C-1
Figure C-2. Installing Rampage 286 Memory Chips.....	C-3
Figure D-1. Main INSTALL Menu.....	D-8
Figure D-2. INSTALL with fASTdisk Edit Box.....	D-11
Figure D-3. INSTALL with SuperDrive Edit Box.....	D-14
Figure D-4. INSTALL with SuperSpool Edit Box.....	D-17
Figure E-1. Paging Technique.....	E-3

TABLES

NOTES

Table 2-1. Rampage 286 Default Configuration.....	2-3
Table 2-2. Rampage 286 Conventional/Extended Memory Size.....	2-9
Table 2-3. Rampage 286 Base I/O Address.....	2-10
Table C-1. Compatible 256-KB Memory Chips.....	C-2

NOTES

CHAPTER

The atmosphere is a mixture of gases and vapors. The composition of the atmosphere is constant up to about 100 km. The atmosphere is divided into several layers. The troposphere is the lowest layer, extending from the surface to about 10 km. The stratosphere extends from 10 km to about 50 km. The mesosphere extends from 50 km to about 85 km. The thermosphere extends from 85 km to the top of the atmosphere. The ionosphere is a region of the upper atmosphere where the solar radiation ionizes the gases.

Rampage[®] 286 is a flexible and powerful memory enhancement board. It represents a new generation of products to expand the available memory for the IBM Personal Computer XT (PC XT) Model 286, PC AT[®], and compatible computers. Rampage 286 offers these features:

- *Conventional memory.* Computer memory from 0 to 640 kilobytes (KB) is called conventional memory.
Your computer's system board contains a certain amount of conventional memory, and add-on boards (such as Rampage 286) can provide additional conventional memory. No matter how much memory you install in your computer, you can never have more than 640 KB of conventional memory. The Disk Operating System (DOS) can directly use all the conventional memory installed in your computer.
- *Extended memory.* Memory in the 1- to 16-megabyte (MB) address range is called extended memory. (Extended and conventional memory are also called *linear* or *non-paged* memory.)

Extended memory is used by the 80286 microprocessor when it operates in protected mode. (The *Technical Reference Manual* for your computer provides further information on protected mode.) Extended memory is used by the Operating System/2[™] (OS/2) and XENIX[™] operating systems, random access memory (RAM) disks and print spoolers. However, current versions of DOS and most application programs cannot use extended memory directly.

- *Expanded memory.* Memory above 640-KB that is made available by swapping segments of RAM in and out of conventional memory is called expanded or paged memory. Rampage 286 expanded memory supports expanded memory specification (EMS) software, including Lotus® 1-2-3 Release 2 and Symphony® 1.1. These applications use expanded memory by working with AST's expanded memory manager software, which is supplied with your Rampage 286 board.

Rampage 286 also supports the enhanced expanded memory specification (EEMS), providing superior performance with software written to support it, including Microsoft® Windows 2.0 and Quarterdeck DESQview™.

AST expanded memory software allows your computer to access up to 8 MB of memory (using four 2-MB AST expanded memory boards, including Rampage 286 and Advantage Premium™), while maintaining DOS compatibility.

NOTE

To ensure compatibility, use only AST expanded memory products (such as Advantage Premium) with Rampage 286.

- *Full compatibility with the Lotus/Intel/Microsoft (LIM) version 3.2 Expanded Memory Specification (EMS).* In addition, AST's EEMS offers a more flexible paging scheme that maximizes software performance and exceeds the capabilities of the LIM EMS.

1.1 Features

Rampage 286 hardware and software features are described in this section.

- *SuperSpool™*, an intelligent print spooler that allows you to send files to a printer while freeing your computer for other tasks.
- *INSTALL*, a software installation utility that allows easy installation of the fASTdisk, SuperDrive, SuperSpool, and expanded memory software.

NOTE

You must use a version 6.10 (or later) SuperPak diskette with Rampage 286. All your SuperPak software is fully compatible with earlier versions of AST products.

1.2 Memory Allocation Example

A typical example of how Rampage 286 memory can be allocated is presented in this section. Suppose your computer has 512 KB of conventional memory installed and your Rampage 286 provides 2 MB of RAM. You would like to use Rampage 286 to do the following:

- Fill out conventional memory to 640 KB.
- Allocate extended memory to create a 384-KB fASTdisk.
- Use all remaining Rampage 286 memory as expanded memory for use with EMS or EEMS application programs.

Set Rampage 286 for 512 KB of conventional/extended memory already installed in your computer and allocate 512 KB of Rampage 286 memory as conventional/extended memory, -- 128 KB are used to round out conventional memory and 384 KB as extended memory. The remaining 1536 KB (1.5 MB) of Rampage 286 memory would be used as expanded memory.

Memory addressed between 640 and 1024 KB, called *high memory*, is reserved for video graphics adapters and other DOS utilities. This memory comes from the read only memory basic input/output system (ROM BIOS), display adapter, disk controller, and other peripheral devices in your computer. Rampage 286 uses a portion of high memory for paging expanded memory. High memory is not counted as part of conventional or extended memory.

Figure 1-1 shows how the different types of memory are used in the computer. In this example, your computer has a total of 2560 KB including 512 KB on the system board, 2048 KB on the Rampage 286 board, and 384 KB of reserved memory. When you start the computer, it counts only the total conventional and extended memory. Therefore, you will see 1024 KB in the upper-left corner of the screen when you boot the computer (640 KB conventional memory plus 384 KB extended memory).

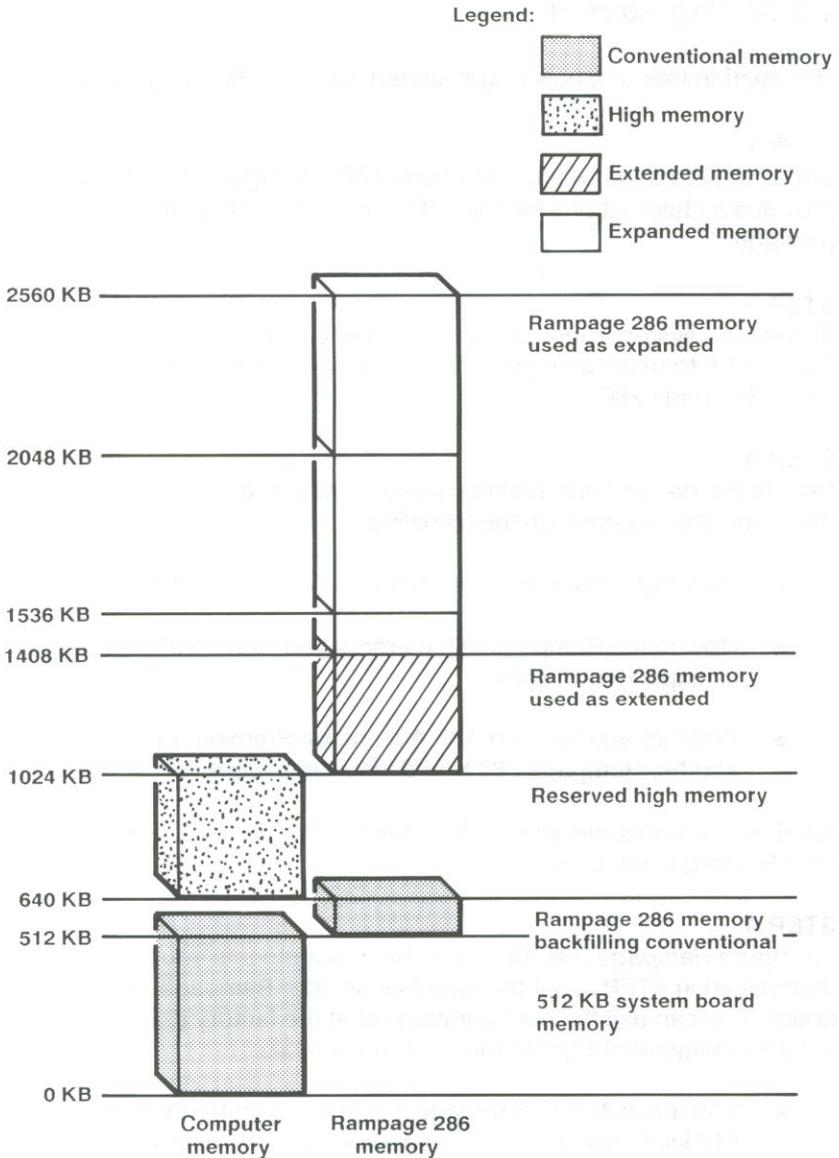


Figure 1-1. Total Memory.

1.3 Getting Started

This section tells you how to get started with your Rampage 286.

STEP 1

Check the contents of your Rampage 286 package. Section 1.4 provides a checklist of what should be included with your package.

STEP 2

Review the system requirements for Rampage 286. Read Section 1.5 to make sure your system meets the requirements for using Rampage 286.

STEP 3

Decide on the configuration you need. How you configure Rampage 286 depends on the following:

- How much memory is already installed in your computer.
- How much Rampage 286 memory you want to allocate as expanded memory.
- Whether you have an AST Advantage Premium or another Rampage 286 board installed in your PC.

Section 2 provides further help in determining how to configure your Rampage 286 board.

STEP 4

Configure Rampage 286. Based on the requirements you determined in STEP 3, set the switches on your Rampage 286 board. You can use the configuration set at the factory (the default configuration) under these circumstances:

- You are installing Rampage 286 in a computer that has 512 kilobytes (KB) of conventional memory installed.
- No other expanded memory board is installed in your system.

If the default configuration does not meet your needs, reconfigure the board as shown in Section 2.

STEP 5

Configure the PC AT system board. To improve the performance of EEMS software, you may disable part of the system board's memory and backfill it with Rampage 286 memory. This procedure gives the EEMS software more conventional memory to use for paging. See Section 3 for instructions on setting the system board's jumper or switch block for the amount of memory.

STEP 6

Install Rampage 286. Once the Rampage 286 board is configured, you must install it in your PC. Follow the instructions in Section 3.

STEP 7

Run the SETUP program. Whenever you change your memory configuration, and you plan to add a SuperDrive RAM disk drive, you need to run the SETUP program provided with your computer. Section 4 gives examples of what parameters you should supply while you are running SETUP.

STEP 8

Install the Rampage 286 software. Section 5 shows you how to use INSTALL to configure and install the Rampage 286 software.

STEP 9

Start your application software package. Rampage 286 is compatible with EMS and EEMS software. Follow the instructions provided with your software to install and use it.

1.4 Checklist

In addition to this user's manual (AST part number 000432-001), your Rampage 286 package includes the following items:

- Rampage 286 full-size expanded memory board.
- SuperPak diskette (version 6.10 or later).
- *SuperPak User's Manual* (000300-001).

1.5 System Requirements

The minimum hardware requirements using Rampage 286 is an AT-compatible computer with at least one floppy drive, an unused dual-connector expansion slot, and a bus speed of 8 megahertz (MHz) or less. (See your computer's user manual for the bus speed.) Compatible computers include the IBM PC XT Model 286, PC AT, and other computers with AT-equivalent expansion buses.

Rampage 286 will also run in a PC XT (or compatible) with the AST's Xformer/286™ replacement system board with a bus speed of 10 MHz (requires Rampage 286 version 02A or later).

Rampage 286 is compatible with DOS 2.0, or later, or OS/2 on machines that support it.

This section gives a step-by-step procedure for configuring the Rampage 286 board. It provides the information you need to configure your board in most circumstances.

Section 2.1 shows the Rampage 286 default configuration (how the board is configured at the factory). If the default configuration meets your needs, you can skip directly to Section 3.

If you need to change any of the settings, Section 2.2 leads you step-by-step through each switch and jumper setting.

2.1 Default Configuration

Rampage 286 is shipped from the factory in this configuration:

- Your computer has 512 KB of conventional memory already installed.
- Rampage 286 uses 128 KB to backfill conventional memory. The rest of the Rampage 286 memory is used as expanded.
- Multitasking is enabled.
- The base I/O address is 0218h.

If the default settings are appropriate for your system, you can skip directly to Section 3, with no further configuration. Figure 2-1 shows the default configuration which is explained in Table 2-1.

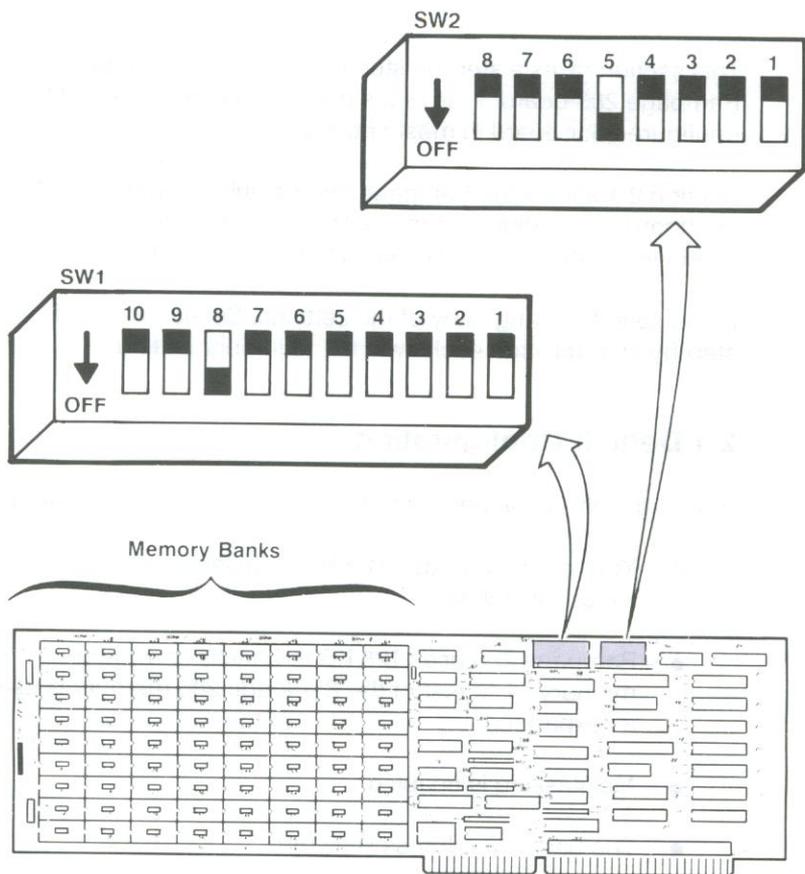


Figure 2-1. Rampage 286 Board Layout.

Table 2-1. Rampage 286 Default Configuration.

Parameter	Default	Comments
<i>Expanded Memory Parameters</i>		
Rampage 286 conventional/extended memory size	128 KB (SW1-1 ON SW1-2 ON SW1-3 ON SW1-4 ON)	The amount of Rampage 286 memory that can be allocated as conventional or extended memory. Remaining Rampage 286 memory is used as expanded memory.
Base I/O address	0218h (SW1-5 ON SW1-6 ON SW1-7 ON SW1-8 OFF)	Rampage 286 uses the I/O address to communicate with the computer, allowing it to use expanded memory. Do <i>not</i> change this parameter unless you are installing more than one Rampage 286 board in your system, or another device (such as an Advantage Premium) in your PC uses the same I/O address range.
Dual Page mode	Enabled (SW1-9 ON)	Ensures proper multitasking operation (allows two sets of Mapping registers to be used).
<i>Conventional/Extended Memory Configuration</i>		
Conventional/extended memory already installed	512 KB (SW2-1 ON SW2-2 ON SW2-3 ON SW2-4 ON SW2-5 OFF SW2-6 ON SW2-7 ON)	Change this setting if your computer has other than 512 KB of conventional memory already installed or if you want to address additional Rampage 286 memory below 640 KB to enhance multitasking
Parity checking	Enabled (SW2-8 ON)	Parity checking enables memory error checking. To ensure reliability, do not disable.

2.2 Basic Configuration

This section tells you what you need to know before you configure Rampage 286, then guides you step-by-step through each switch setting on the board.

2.2.1 What You Need to Know Before You Start

Before you change the configuration of your Rampage 286 board, you need to answer the following questions.

A. Are there any other expanded memory boards installed in your computer?

If your computer includes any other AST expanded memory boards (for example, AST's Advantage Premium board), make sure their base I/O and memory addresses do not conflict. Use only AST expanded memory boards together with Rampage 286 in the same machine.

B. How much conventional/extended memory is already installed in your computer?

One of the Rampage 286 switch settings is the total amount of conventional and extended memory already installed in your computer. Memory between 0 and 640 KB is called *conventional* memory. Memory in the range from 1 megabyte (MB) to 16 MB is called *extended memory*. (The range from 640 KB to 1 MB is called *high memory*. Portions of memory in this range are reserved for video display buffer memory and other DOS housekeeping functions.)

If you are not sure how much conventional/extended memory is installed in your computer, boot the computer and note the total amount of memory displayed in the upper-left corner of the screen. This total shown includes memory on the system and other memory boards.

You will need to separate total linear memory into conventional and extended memory when you run the SETUP program after your Rampage 286 is installed. Subtract 640 KB from your total linear memory. Any remainder is extended memory. If your total linear memory is less than 640 KB, it is all conventional.

C. How much Rampage 286 memory do you want to allocate as conventional memory?

If your computer has less than 640 KB of conventional memory installed, allocate enough Rampage 286 memory to round out your conventional memory to 640 KB.

To determine how much Rampage 286 memory to allocate as conventional memory, note the amount of memory displayed when booting the computer. If more than 640 KB is displayed, you already have a full 640 KB of conventional memory.

D. How much Rampage 286 memory do you want to allocate as extended memory?

- Extended memory is linear memory from 1 to 16 MB.
- Most application programs are not able to use extended memory. If you plan to use RAM disks, print spoolers, XENIX, or Operating System/2™ (OS/2), you may use the Rampage 286 board switches to allocate extended memory.

If you want to use extended memory only for RAM disks (AST's SuperDrive and fASTdisk) or AST's SuperSpool print spooler program, the SuperPak INSTALL program will automatically allocate Rampage 286 expanded memory as emulated extended memory. That way, you need not worry about setting your Rampage 286 hardware switches to allocate Rampage 286 memory as extended memory.

E. How much Rampage 286 memory do you want to allocate as conventional/extended memory?

Add your totals from D and E together to get the total Rampage 286 memory that you want to allocate as conventional and extended memory. One of your Rampage 286 switch settings is set according to this total.

The following sections take you step-by-step through the configuration of the two switches on your Rampage 286 board.

2.2.2 SW1 Location and Default Settings

Figure 2-2 shows the location and default setting for SW1.

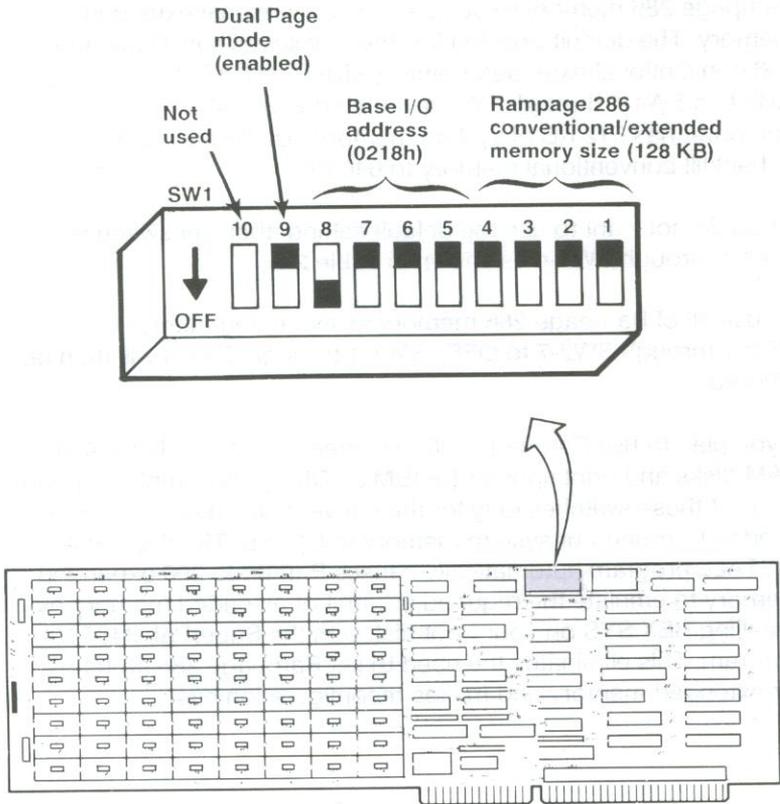


Figure 2-2. Rampage 286 Switch SW1 (Default Setting).

2.2.3 Conventional/Extended Memory Size Setting (SW1-1 through SW1-4)

Switches SW1-1 through SW1-4 determine the amount of Rampage 286 memory to be used as conventional/extended memory. The default position for these switches sets Rampage 286 conventional/extended memory size to 128 KB. Leave switches SW1-1 through SW1-4 in their default settings if your computer has 512 KB of system memory installed and you want to backfill conventional memory to 640 KB.

If you do not want to use the default setting, then set switches SW1-1 through SW1-4 as shown in Table 2-2.

To use all of Rampage 286 memory as expanded memory, set SW2-1 through SW2-7 to OFF. SW1-1 through SW1-4 will then be ignored.

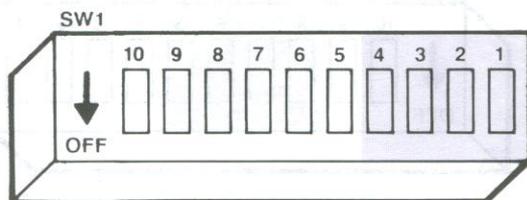
If you plan to use Rampage 286 extended memory only for AST RAM disks and print spooler (or IBM's VDISK), the simplest option is to set these switches only for the conventional memory amount needed to round out system memory to 640 KB. The SuperPak INSTALL program automatically causes Rampage 286 expanded memory to emulate the required amount of extended memory by installing REX.SYS on your boot disk with the SuperPak INSTALL program. This eliminates the need to set Rampage 286 switches for extended memory and makes reconfiguration easy.

Table 2-2. Rampage 286 Conventional/Extended Memory Size.

Rampage 286 Conventional/Extended Memory Size *	SW1-1	SW1-2	SW1-3	SW1-4
** 128 KB	ON	ON	ON	ON
256 KB	ON	ON	ON	OFF
384 KB	ON	ON	OFF	ON
512 KB	ON	ON	OFF	OFF
640 KB	ON	OFF	ON	ON
768 KB	ON	OFF	ON	OFF
896 KB	ON	OFF	OFF	ON
1024 KB	ON	OFF	OFF	OFF
1152 KB	OFF	ON	ON	ON
1280 KB	OFF	ON	ON	OFF
1408 KB	OFF	ON	OFF	ON
1536 KB	OFF	ON	OFF	OFF
1664 KB	OFF	OFF	ON	ON
1792 KB	OFF	OFF	ON	OFF
1920 KB	OFF	OFF	OFF	ON
2048 KB	OFF	OFF	OFF	OFF

* These settings are ignored if all Rampage 286 memory is to be used as expanded memory (SW2-1 through SW2-7 OFF).

** Default setting.



2.2.4 Base I/O Address Settings (SW1-5 through SW1-8)

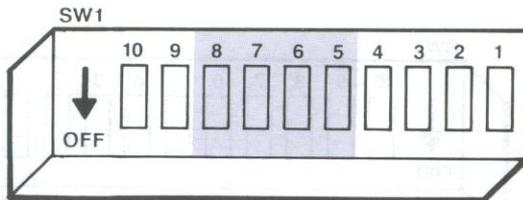
Switches SW1-5 through SW1-8 determine the base I/O address. The default position for these switches sets the Rampage 286 base I/O address to 0218h. Leave SW1-5 through SW1-8 in the default positions unless you have another board in your computer with base I/O address 0218h.

If you have another expanded memory board in your computer (such as another Rampage 286 or an Advantage Premium), or another device with a conflicting I/O address, configure Rampage 286 to use a different base I/O address (Table 2-3 summarizes the possible base I/O addresses).

Table 2-3. Rampage 286 Base I/O Address.

Base I/O Address	SW1-5	SW1-6	SW1-7	SW1-8
0208	ON	ON	ON	ON
*0218	ON	ON	ON	OFF
0258	ON	OFF	ON	OFF
0268	ON	OFF	OFF	ON
02A8	OFF	ON	OFF	ON
02B8	OFF	ON	OFF	OFF
02E8	OFF	OFF	OFF	ON

*Default setting



NOTE

When you select base I/O address 02x8h, Rampage 286 uses the following addresses:

02x8h, 42x8h, 82x8h, C2x8h,
02x9h, 42x9h, 82x9h, C2x9h

For example, selecting base I/O address 0208h causes the Rampage 286 board to use I/O addresses 0208h, 4208h, 8208h, C208h, 0209h, 4209h, 8209h, and C209h.

2.2.5 Dual Page Mode (SW1-9)

Switch position SW1-9 selects Dual Page mode which enables Rampage 286 to run several operations at once (called *multitasking*). Turn switch SW1-9 on to enable Dual Page mode. Under normal conditions, SW1-9 should be left on.

NOTE

Switch SW1-10 is not used. It can be left on or off.

2.2.6 SW2 Location and Default Settings

Figure 2-3 shows the location and default setting for SW2.

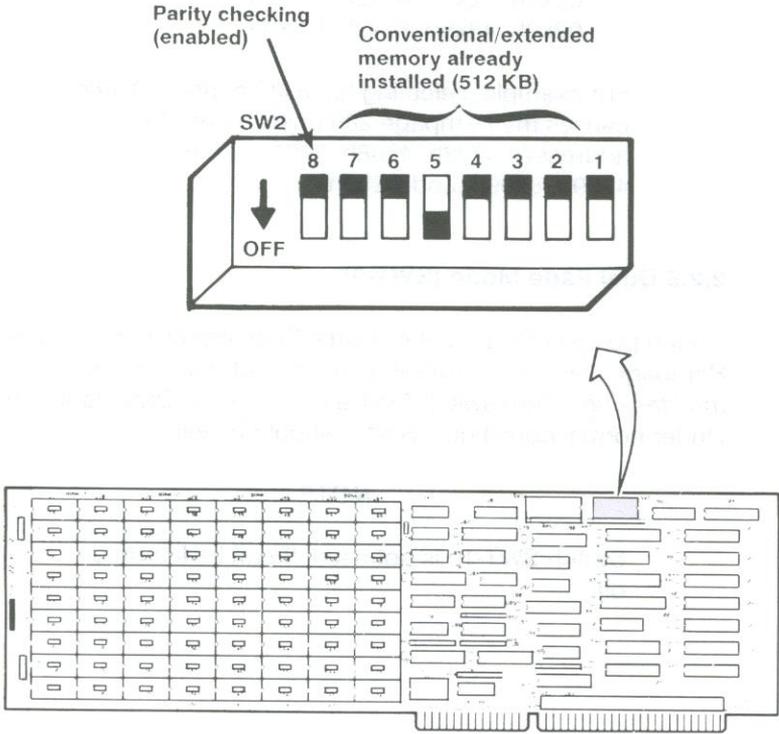


Figure 2-3. Rampage 286 Switch SW2 (Default Setting).

2.2.7 Conventional/Extended Memory Installed (SW2-1 through SW2-7)

The amount of conventional/extended memory already installed in your computer before adding Rampage 286 determines how you should set switch positions SW2-1 through SW2-7.

Leave switches SW2-1 through SW2-7 in their default setting if your computer has 512 KB already installed.

To use all of Rampage 286 memory as expanded memory, turn off switches SW2-1 through SW2-7.

Appendix A gives all the switch settings for this parameter.

2.2.8 Parity Checking (SW2-8)

Switch position SW2-8 enables or disables parity checking. By default, SW2-8 is ON, enabling parity checking. Leave SW2-8 on unless you have a special reason to disable parity checking. Only under rare circumstances would you change this setting.

NOTES

INSTALLING RAMPAGE 286 IN YOUR COMPUTER

This section provides installation instructions, including:

- Preparing your computer for installing Rampage 286 (Section 3.1).
- Installing the board in your computer (Section 3.2).

3.1 Opening Your Computer

This section tells you how to set up your computer before installing Rampage 286.

CAUTION

Be sure that the power switch is off and the power cord is removed from the wall outlet. Turn off any other equipment connected to the computer. Installing any component while the power is on can permanently damage your computer and its components.

You will need a flathead screwdriver or nut driver to perform the following procedure.

Depending on the type of computer you have, follow these instructions to remove the cover. (For more information, see your computer's user manual.)

PC XT Model 286: Use a flathead screwdriver or nut driver to remove the cover mounting screws from the rear panel of the computer. Once you have removed the cover mounting screws, pull the cover off as shown in Figure 3-1.

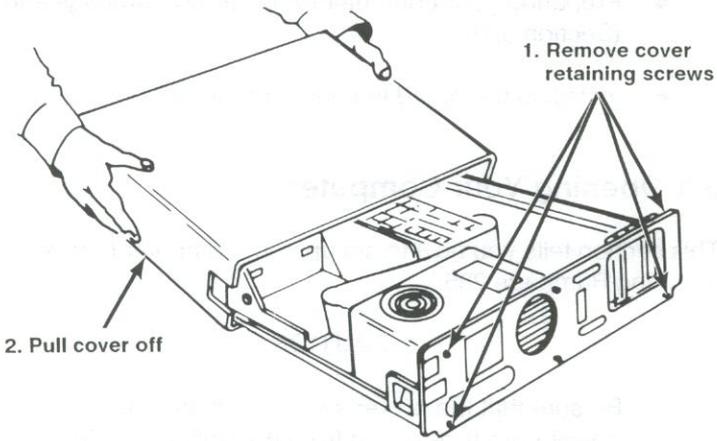


Figure 3-1. Removing the PC XT Model 286 Cover.

PC AT: Unlock the key lock at the front of the PC AT by turning the key counterclockwise. Remove the back panel (attached with plastic fastener strips) from the rear of the computer. Use a flathead screwdriver or nut driver to remove the cover mounting screws. Slide the cover toward the front until it comes off, as shown in Figure 3-2.

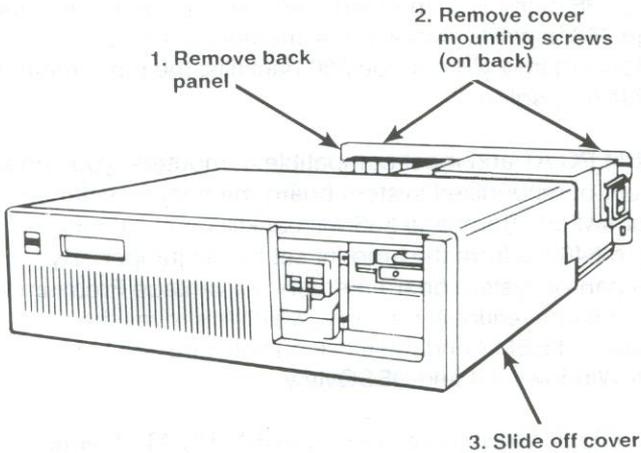


Figure 3-2. Removing the PC AT Cover.

3.2 Disabling System Board Memory

You can enhance the performance of EEMS software by disabling all or part of the system board memory and using Rampage 286 to backfill conventional memory.

Paging takes place in conventional memory. System board memory is not mapped, so it cannot be used for paging. Rampage 286 memory is mapped, and paging can occur where Rampage 286 backfills conventional memory. The more conventional memory Rampage 286 backfills, the more memory is available for paging.

On the IBM PC AT and most compatible computers, you can set the amount of recognized system board memory by setting a jumper or switch. Rampage 286 will backfill conventional memory to 640 KB from the amount set by the jumper. By disabling part of system board memory, Advantage Premium will backfill more conventional memory, which improves the performance of EEMS and multitasking software, such as Microsoft Windows 2.0 and DESQview.

The instructions shown here are for the IBM PC AT. If your computer is configured differently, see the computer's user manual for instructions.

While the computer cover is off, follow these steps to set the jumper:

STEP 1

Lift the disk controller board: To reach the jumper, you need to remove the disk controller board. Remove the disk controller board's bracket retaining screw and save it. Carefully lift the board about two inches. Be careful not to pull on the ribbon cables attached to the board.

STEP 2

Set the jumper: Locate jumper J18 toward the front of the computer. Set the jumper for the appropriate amount of memory, either 256 KB or 512 KB.

If you have 512 KB of memory on the system board, you may leave the jumper in the 512 KB position, or set it to 256 KB to backfill. If you have 256 KB on the system board, leave the jumper in the 256 KB position. Do not set it for 512 KB. (See Figure 3-3.)

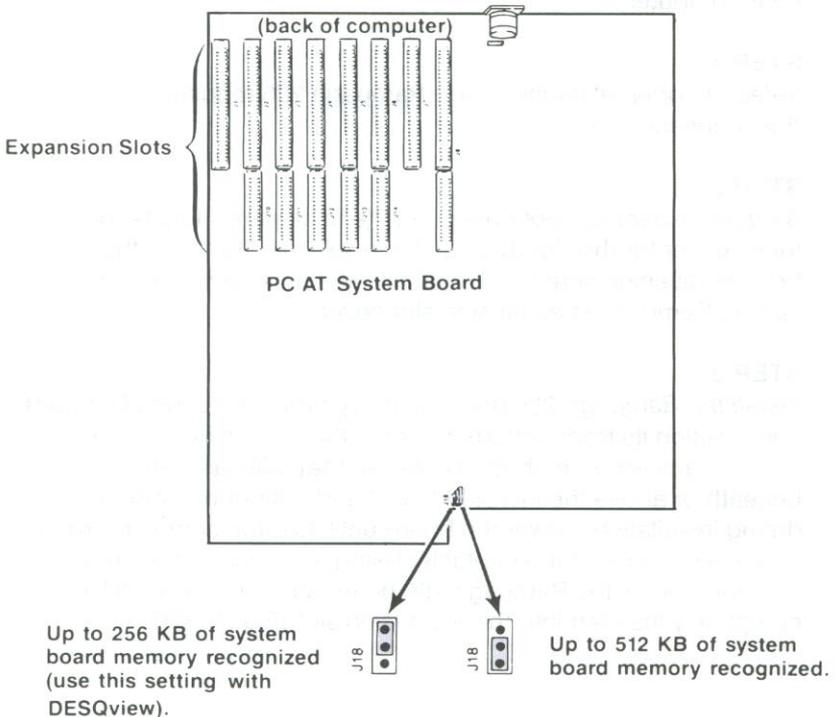


Figure 3-3. Setting the PC AT System Board Jumper.

CAUTION

Do not remove memory chips from the PC AT system board, regardless of the jumper setting.

STEP 3

Replace the disk controller board: Carefully press down on the disk controller board until it is completely inserted into the slot. Be sure all ribbon cables are securely attached. Replace the bracket retaining screw you removed earlier.

3.3 Installing Rampage 286 in Your Computer

This section tells you how to install the Rampage 286 board into your computer.

STEP 1

Select an open expansion slot: Rampage 286 requires one dual-connector slot.

STEP 2

Remove expansion slot cover: On the back panel, locate the metal cover for the slot that you have selected. Remove the bracket retaining screw with a small flathead screwdriver and save it. Remove the expansion slot cover.

STEP 3

Install the Rampage 286 board: Line up your Rampage 286 board and position its front bottom corner in the card guide channel. Position any wires or ribbon cables so they will pass either beneath or above the installed board and will not be damaged during installation. Lower the board until its edge connector rests on the expansion slot receptacle. Using an evenly distributed pressure, press the Rampage 286 board straight down until it is completely inserted into the expansion slot (Figure 3-4).

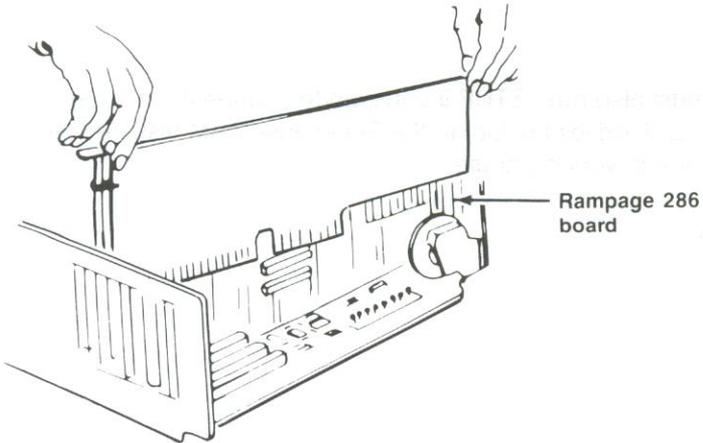


Figure 3-4. Installing the Rampage 286 Board.

STEP 4

Secure the board to the rear of the chassis: Use the screw you removed from the expansion slot cover in Step 2.

STEP 5

Replace the cover: Carefully slide the cover from the front until it stops securely against the rear panel. Reinstall the cover mounting screws you removed earlier.

If you have a PC AT, press the back panel so that the plastic fastener strips secure it in place.

STEP 6

Install cables: Replace the power cord to the system unit and be sure that the keyboard and the monitor connectors are plugged in. Reattach any other cables and connectors you removed previously.

Now you are ready to start the computer. Run the SETUP program whenever you add or subtract conventional or extended memory from your computer. The SETUP program is included on the diagnostics diskette that comes with your computer. Section 5 gives several examples of how to run the SETUP program.

You must also run SETUP if you plan to change the number of floppy disk drives (including the SuperDrive RAM disk emulation program) in your computer.

Enter the amount of memory installed above 1 MB (the amount does not necessarily have to be expressed in 512-KB increments, as implied in the display above). Press < **Enter** > to proceed with SETUP.

STEP 6

Verify that all SETUP options are set correctly: SETUP will then display the options for disk type, memory size, and adapter type. If all options are correct, press **Y** to reboot.

4.1 SETUP Examples

This section gives several sample Rampage 286 configurations and provides the appropriate SETUP parameters.

Example 1: Your PC AT has 256 KB of conventional memory installed, and you have a 512-KB Rampage 286 board. You want to use 384 KB of Rampage 286 memory to fill out conventional memory to 640 KB, and you want to allocate 128 KB as extended memory (memory addressed above 1 MB). Specify the following:

Base memory size: 640

Extended memory size: 128

Example 2: Your IBM PC XT with the Xformer/286 system board replacement has 512 KB of conventional memory installed, and you have a 512-KB Rampage 286 board. You want to use 128 KB of Rampage 286 memory to fill out conventional memory to 640 KB, and you want to allocate 384 KB as extended memory. Specify the following:

Base memory size: 640

Extended memory size: 384

Example 3: Your PC XT Model 286 has 512 KB of conventional memory installed, and you have a 2-MB Rampage 286 board. You want to use 128 KB of Rampage 286 memory to fill out

conventional memory to 640 KB, and you want to allocate all remaining memory (1920 KB) as expanded memory. Specify the following:

Base memory size: 640
Extended memory size: 0

Example 4: Your PC AT has 512 KB of conventional memory installed, and you have a 2-MB Rampage 286 board. You want to use 128 KB of Rampage 286 memory to fill out conventional memory to 640 KB, 384 KB as extended memory, and all remaining memory (1536 KB, 2048 minus 128 minus 384) as expanded memory. Specify the following:

Base memory size: 640
Extended memory size: 384

Example 5: Your PC AT has 256 KB of conventional memory installed, and you have one 2-MB Rampage 286 board and one 2-MB Advantage Premium board. You want to use 384 KB of Rampage 286 memory to fill out conventional memory to 640 KB, 1 MB as expanded (paged) memory, and all remaining memory (2688 KB) as extended memory (memory addressed above 1 MB). Specify the following:

Base memory size: 640
Extended memory size: 2688

Enhanced Expanded Memory Specification software works best when as much Rampage 286 memory as possible is allocated as conventional memory.

If you have a PC AT, it is possible to allocate as much as 384 KB of Rampage 286 memory as conventional memory.

If you have a PC XT Model 286 with 512 KB installed, you can allocate up to 128 KB of Rampage 286 memory as conventional memory. If your PC XT Model 286 has 640 KB installed, do not allocate any Rampage 286 memory as conventional memory.

<i>Rampage 286</i> Conventional/Extended Memory Size	SW1-1	SW1-2	SW1-3	SW1-4
* 128 KB	ON	ON	ON	ON
256 KB	ON	ON	ON	OFF
384 KB	ON	ON	OFF	ON
512 KB	ON	ON	OFF	OFF
640 KB	ON	OFF	ON	ON
768 KB	ON	OFF	ON	OFF
896 KB	ON	OFF	OFF	ON
1024 KB	ON	OFF	OFF	OFF
1152 KB	OFF	ON	ON	ON
1280 KB	OFF	ON	ON	OFF
1408 KB	OFF	ON	OFF	ON
1536 KB	OFF	ON	OFF	OFF
1664 KB	OFF	OFF	ON	ON
1792 KB	OFF	OFF	ON	OFF
1920 KB	OFF	OFF	OFF	ON
2048 KB	OFF	OFF	OFF	OFF

* Default setting.

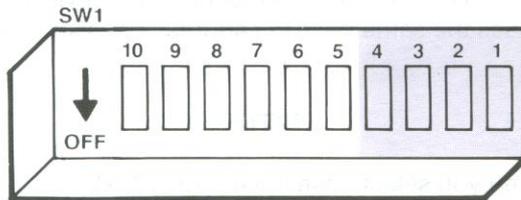


Figure A-1. Rampage 286 Conventional/Extended Memory Size.

NOTE

If Rampage 286 is configured for all of its memory to be used as expanded memory (for example, switches SW2-1 through SW2-7 OFF) the above linear memory size settings will be ignored.

You can use the REX.SYS program to configure Rampage 286 expanded memory as extended memory without resetting Rampage 286 hardware switches. However, the reverse is not true: you cannot override the setting for conventional/extended memory size to allocate extended memory as expanded memory.

To reconfigure Rampage 286 expanded memory as extended memory without resetting board switches, use the INSTALL program (described in Section 4) to add or modify the DEVICE = REX.SYS statement in your CONFIG.SYS file.

A.2 Base I/O Address

Figure A-2 shows the Rampage 286 base I/O address settings. This setting defines the base I/O address used by Rampage 286 to communicate with the computer so that it can make use of expanded memory.

If more than one AST expanded memory board is installed in a computer, each must use a different base I/O address. To prevent I/O address conflicts, make sure that no other devices in the computer uses the same base I/O address or associated I/O addresses.

NOTE

When you select base I/O address 02x8h, Rampage 286 uses these associated addresses:

02x8h, 42x8h, 82x8h, C2x8h,
02x9h, 42x9h, 82x9h, C2x9h

For example, selecting base I/O address 0208h causes the Rampage 286 board to use I/O addresses 0208h, 4208h, 8208h, C208h, 0209h, 4209h, 8209h, and C209h.

Base I/O Address	SW1-5	SW1-6	SW1-7	SW1-8
0208h	ON	ON	ON	ON
* 0218h	ON	ON	ON	OFF
0258h	ON	OFF	ON	OFF
0268h	ON	OFF	OFF	ON
02A8h	OFF	ON	OFF	ON
02B8h	OFF	ON	OFF	OFF
02E8h	OFF	OFF	OFF	ON

* Default setting

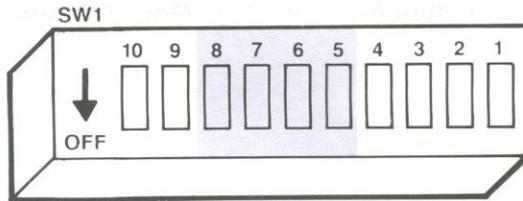


Figure A-2. Rampage 286 Base I/O Address Settings.

A.3 Dual Page Mode

Figure A-3 shows how to enable or disable Dual Page mode. Dual Page mode allows expanded memory to maintain two sets of mapping registers, which ensures proper multitasking operation. Generally, Dual Page mode is left enabled.

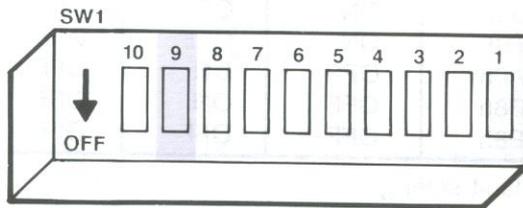


Figure A-3. Dual Page Mode Configuration.

A.4 Conventional/Extended Memory Already Installed

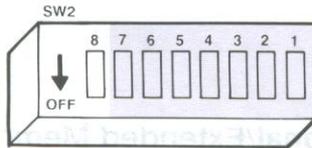
Figure A-4 shows the possible Rampage 286 settings for conventional/extended (linear) memory already installed. This setting tells Rampage 286 how much conventional and extended memory is already installed in your computer, and prevents parity errors.

Please note that this parameter does not include the high memory between 640 KB and 1 MB. For example, if your computer includes 640 KB of conventional memory and 128 KB of extended memory, the setting for conventional/extended (linear) memory already installed is 768 KB (SW2-1 through SW2-4 ON, SW2-5 through SW2-7 OFF).

NOTE

To allocate all Rampage 286 memory as expanded (paged) memory, simply set the conventional/extended memory already installed to 16 MB (SW2-1 through SW2-7 all OFF). If this is done, the settings for switches SW1-1 through SW1-4 are ignored.

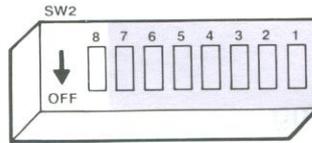
Switch Setting Summary



Memory Already Installed	SW2-1	SW2-2	SW2-3	SW2-4	SW2-5	SW2-6	SW2-7
0 KB	ON						
128 KB	ON	ON	ON	ON	ON	ON	OFF
256 KB	ON	ON	ON	ON	ON	OFF	ON
384 KB	ON	ON	ON	ON	ON	OFF	OFF
512 KB *	ON	ON	ON	ON	OFF	ON	ON
640 KB	ON	ON	ON	ON	OFF	ON	OFF
768 KB	ON	ON	ON	ON	OFF	OFF	ON
896 KB	ON	ON	ON	ON	OFF	OFF	OFF
1024 KB	ON	ON	ON	OFF	ON	ON	ON
1152 KB	ON	ON	ON	OFF	ON	ON	OFF
1280 KB	ON	ON	ON	OFF	ON	OFF	ON
1408 KB	ON	ON	ON	OFF	ON	OFF	OFF
1536 KB	ON	ON	ON	OFF	OFF	ON	ON
1664 KB	ON	ON	ON	OFF	OFF	ON	OFF
1792 KB	ON	ON	ON	OFF	OFF	OFF	ON
1920 KB	ON	ON	ON	OFF	OFF	OFF	OFF
2048 KB	ON	ON	OFF	ON	ON	ON	ON
2176 KB	ON	ON	OFF	ON	ON	ON	OFF
2304 KB	ON	ON	OFF	ON	ON	OFF	ON
2432 KB	ON	ON	OFF	ON	ON	OFF	OFF
2560 KB	ON	ON	OFF	ON	OFF	ON	ON
2688 KB	ON	ON	OFF	ON	OFF	ON	OFF
2816 KB	ON	ON	OFF	ON	OFF	OFF	ON
2994 KB	ON	ON	OFF	ON	OFF	OFF	OFF
3072 KB	ON	ON	OFF	OFF	ON	ON	ON
3200 KB	ON	ON	OFF	OFF	ON	ON	OFF
3328 KB	ON	ON	OFF	OFF	ON	OFF	ON
3456 KB	ON	ON	OFF	OFF	ON	OFF	OFF
3584 KB	ON	ON	OFF	OFF	OFF	ON	ON
3712 KB	ON	ON	OFF	OFF	OFF	ON	OFF
3840 KB	ON	ON	OFF	OFF	OFF	OFF	ON
3968 KB	ON	ON	OFF	OFF	OFF	OFF	OFF
4096 KB	ON	OFF	ON	ON	ON	ON	ON
4224 KB	ON	OFF	ON	ON	ON	ON	OFF
4352 KB	ON	OFF	ON	ON	ON	OFF	ON
4480 KB	ON	OFF	ON	ON	ON	OFF	OFF
4608 KB	ON	OFF	ON	ON	OFF	ON	ON
4736 KB	ON	OFF	ON	ON	OFF	ON	OFF
4864 KB	ON	OFF	ON	ON	OFF	OFF	ON
4992 KB	ON	OFF	ON	ON	OFF	OFF	OFF
5120 KB	ON	OFF	ON	OFF	ON	ON	ON
5248 KB	ON	OFF	ON	OFF	ON	ON	OFF
5376 KB	ON	OFF	ON	OFF	ON	OFF	ON
5504 KB	ON	OFF	ON	OFF	ON	OFF	OFF
5632 KB	ON	OFF	ON	OFF	OFF	ON	ON
5760 KB	ON	OFF	ON	OFF	OFF	ON	OFF
5888 KB	ON	OFF	ON	OFF	OFF	ON	ON
6016 KB	ON	OFF	ON	OFF	OFF	OFF	ON
6144 KB	ON	OFF	OFF	ON	ON	ON	OFF
6272 KB	ON	OFF	OFF	ON	ON	ON	ON
6400 KB	ON	OFF	OFF	ON	ON	ON	OFF
6528 KB	ON	OFF	OFF	ON	ON	OFF	ON
6656 KB	ON	OFF	OFF	ON	OFF	ON	OFF
6784 KB	ON	OFF	OFF	ON	OFF	ON	ON
6912 KB	ON	OFF	OFF	ON	OFF	ON	OFF
7040 KB	ON	OFF	OFF	ON	OFF	OFF	ON
7168 KB	ON	OFF	OFF	OFF	ON	OFF	OFF
7296 KB	ON	OFF	OFF	OFF	ON	ON	ON
7424 KB	ON	OFF	OFF	OFF	ON	ON	OFF
7552 KB	ON	OFF	OFF	OFF	ON	OFF	ON
7680 KB	ON	OFF	OFF	OFF	OFF	OFF	OFF
7808 KB	ON	OFF	OFF	OFF	OFF	ON	ON
7936 KB	ON	OFF	OFF	OFF	OFF	ON	OFF
8064 KB	ON	OFF	OFF	OFF	OFF	OFF	ON

* Default setting

Figure A-4. Conventional/Extended Memory Already Installed.



Memory Already Installed	SW2-1	SW2-2	SW2-3	SW2-4	SW2-5	SW2-6	SW2-7
8192 KB	OFF	ON	ON	ON	ON	ON	ON
8320 KB	OFF	ON	ON	ON	ON	ON	OFF
8448 KB	OFF	ON	ON	ON	ON	OFF	ON
8576 KB	OFF	ON	ON	ON	ON	OFF	OFF
8704 KB	OFF	ON	ON	ON	OFF	ON	ON
8832 KB	OFF	ON	ON	ON	OFF	ON	OFF
8960 KB	OFF	ON	ON	ON	OFF	OFF	ON
9088 KB	OFF	ON	ON	ON	OFF	OFF	OFF
9216 KB	OFF	ON	ON	OFF	ON	ON	ON
9344 KB	OFF	ON	ON	OFF	ON	ON	OFF
9472 KB	OFF	ON	ON	OFF	ON	OFF	OFF
9600 KB	OFF	ON	ON	OFF	OFF	ON	ON
9728 KB	OFF	ON	ON	OFF	OFF	ON	OFF
9856 KB	OFF	ON	ON	OFF	OFF	OFF	ON
9984 KB	OFF	ON	ON	OFF	OFF	OFF	OFF
10112 KB	OFF	ON	ON	OFF	OFF	ON	ON
10240 KB	OFF	ON	OFF	ON	ON	ON	OFF
10368 KB	OFF	ON	OFF	ON	ON	ON	ON
10496 KB	OFF	ON	OFF	ON	ON	OFF	ON
10624 KB	OFF	ON	OFF	ON	ON	OFF	OFF
10752 KB	OFF	ON	OFF	ON	OFF	ON	ON
10880 KB	OFF	ON	OFF	ON	OFF	ON	OFF
11008 KB	OFF	ON	OFF	ON	OFF	OFF	ON
11136 KB	OFF	ON	OFF	ON	OFF	OFF	OFF
11264 KB	OFF	ON	OFF	OFF	ON	ON	ON
11392 KB	OFF	ON	OFF	OFF	ON	ON	OFF
11520 KB	OFF	ON	OFF	OFF	ON	OFF	ON
11648 KB	OFF	ON	OFF	OFF	ON	OFF	OFF
11776 KB	OFF	ON	OFF	OFF	OFF	ON	ON
11904 KB	OFF	ON	OFF	OFF	OFF	ON	OFF
12032 KB	OFF	ON	OFF	OFF	OFF	OFF	ON
12160 KB	OFF	ON	OFF	OFF	ON	ON	OFF
12288 KB	OFF	OFF	ON	ON	ON	ON	ON
12416 KB	OFF	OFF	ON	ON	ON	OFF	OFF
12544 KB	OFF	OFF	ON	ON	ON	OFF	ON
12672 KB	OFF	OFF	ON	ON	OFF	ON	OFF
12800 KB	OFF	OFF	ON	ON	OFF	ON	OFF
12928 KB	OFF	OFF	ON	ON	OFF	OFF	ON
13056 KB	OFF	OFF	ON	ON	OFF	OFF	OFF
13184 KB	OFF	OFF	ON	ON	OFF	ON	ON
13312 KB	OFF	OFF	ON	OFF	ON	ON	OFF
13340 KB	OFF	OFF	ON	OFF	ON	ON	ON
13568 KB	OFF	OFF	ON	OFF	ON	OFF	OFF
13696 KB	OFF	OFF	ON	OFF	ON	ON	ON
13824 KB	OFF	OFF	ON	OFF	OFF	ON	OFF
13952 KB	OFF	OFF	ON	OFF	OFF	ON	ON
14080 KB	OFF	OFF	ON	OFF	OFF	OFF	OFF
14208 KB	OFF	OFF	ON	OFF	OFF	OFF	ON
14366 KB	OFF	OFF	OFF	ON	ON	ON	ON
14464 KB	OFF	OFF	OFF	ON	ON	ON	OFF
14592 KB	OFF	OFF	OFF	ON	ON	OFF	ON
14720 KB	OFF	OFF	OFF	ON	ON	OFF	OFF
14848 KB	OFF	OFF	OFF	ON	OFF	ON	ON
14976 KB	OFF	OFF	OFF	ON	OFF	ON	OFF
15104 KB	OFF	OFF	OFF	ON	OFF	OFF	ON
15232 KB	OFF	OFF	OFF	ON	OFF	OFF	OFF
15360 KB	OFF	OFF	OFF	OFF	ON	ON	ON
15488 KB	OFF	OFF	OFF	OFF	ON	ON	OFF
15616 KB	OFF	OFF	OFF	OFF	ON	OFF	ON
15744 KB	OFF	OFF	OFF	OFF	ON	OFF	OFF
15872 KB	OFF	OFF	OFF	OFF	OFF	ON	ON
All RAMpage memory paged	OFF	OFF	OFF	OFF	OFF	ON	OFF
	OFF	OFF	OFF	OFF	OFF	OFF	ON
	OFF						

Figure A-4 (Continued).

A.5 Parity Checking

Figure A-5 shows how to enable or disable parity error checking. To ensure the most reliable memory operation, leave parity checking enabled.

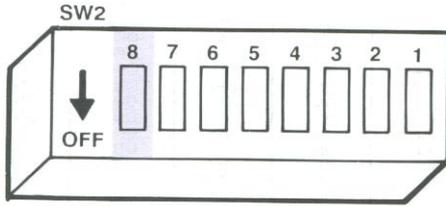


Figure A-5. Parity Error Checking.

MEMORY ALLOCATION FOR EEMS SOFTWARE

NOTES
B

For best performance with EEMS software, you may disable all or part of the system board's memory. For more instructions, see Section 3. See your EEMS application's user manual for specific memory requirements.

NOTES

The following information is provided for informational purposes only. It is not intended to be used as a substitute for professional advice. The user should consult with a qualified professional for more information.

ADDING OR REMOVING MEMORY

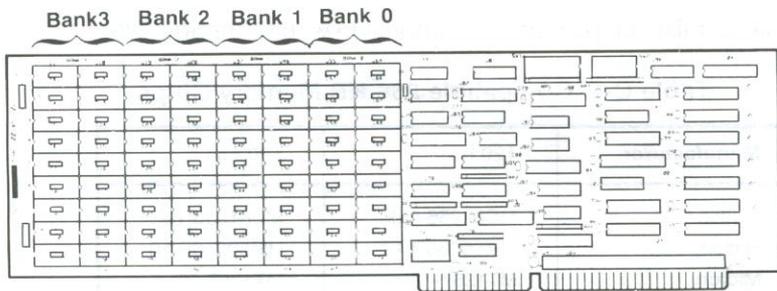
C

This section tells you how to install additional memory on Rampage 286. You can increase Rampage 286 memory to 2 megabytes (MB) by installing 256-kilobyte (KB) dynamic random access memory (DRAM) chips.

C.1 Valid Memory Configurations

You must add or subtract Rampage 286 memory in 0.5 MB (512-KB) increments. The possible memory configurations are 0.5 MB, 1 MB, 1.5 MB, and 2 MB.

Figure C-1 shows the memory configurations.



Amount of RAM	Install RAM in these banks
512 KB	0
1 MB	0, 1
1.5 MB	0, 1, 2
2 MB	0, 1, 2, 3

Figure C-1. Rampage 286 Memory Configuration.

C.2 Memory Chip Specifications

Rampage 286 requires 256-KB DRAM chips which meet these specifications:

- Pin 1 not used.
- + 5 Volt only.

Depending on your computer, select SIMMs of these speeds:

- *For the IBM PC XT Model 286 and AT-compatible computers with 8 megahertz (MHz) bus speeds:* 120 nanoseconds (ns) or faster.
- *For the XT-compatible computers with the AST Xformer/286 replacement system board:* 100 ns or faster.

Table C-1 lists chips that are compatible with Rampage 286.

Table C-1. Compatible 256-KB Memory Chips.

Manufacturer	120 ns	100 ns
Fujitsu	MB81256-12P	MB81256-10P
Hitachi	HM50256P-12	HM50256P-10
Micron	MT1257-12	MT1257-10
Motorola	MCM6256P-12	MCM6256P-10
NEC	UPD41256C-12	UPD41256C-10
Samsung	KM41256-12	KM41256-10
Texas Instruments	TMS4256-12NL	TMS4256-10NL
Toshiba	TMM41256P-12	TMM41256P-10

C.3 Rules for Handling Memory Chips

Before you start installing chips into your Rampage 286 board, there are a few rules of which you must be aware. Following

these rules will prevent damage to your Rampage 286 board and computer:

- Use chips that meet the specifications in Section C.2.
- Fill each bank with the same type of memory chip. You cannot mix 256-KB DRAMs with other chips in the same bank.
- Add or subtract Rampage 286 memory in 512-KB increments, as shown in Section C.1.
- Before handling any chips, discharge any static electricity on your body by touching a grounded surface such as the computer chassis.
- Insert each chip so the notch or pin 1 indicator points left (See Figure C-2.)

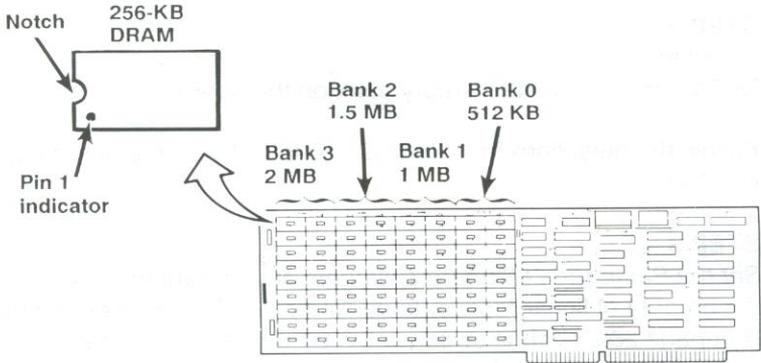


Figure C-2. Installing Rampage 286 Memory Chips.

- Be careful not to bend the chip's pins. If a chip seems too wide to fit in its socket, place it on its side on a flat surface and gently angle it under both thumbs to bend the legs inward.

- Remove a chip by prying it loose with a flathead screwdriver or chip extractor. Be careful not to damage the chip pins.
- You must run the SETUP and INSTALL programs whenever you add or remove Rampage 286 memory. Section 4 tells you how to run SETUP. For instructions on using INSTALL, see Section 5.

C.4 Installing Additional Memory

Follow this procedure to install DRAM chips on your Rampage 286 board:

STEP 1

Remove the Rampage 286 board: Shut off the power to the computer and remove the Rampage 286 board.

STEP 2

Install memory chips: Install each bank of eighteen 256-KB DRAM chips in the next empty bank on the board.

Follow the guidelines in Section C.3 to install your memory chips carefully.

STEP 3

Set the Rampage 286 board switches: If you want to increase the amount of linear (conventional and extended) memory on the Rampage 286, change switches SW1-1 through 1-4 to the appropriate settings. See Section 2 for instructions.

STEP 4

Reinstall the Rampage 286 board: Follow the instructions in Section 3 to install the Rampage 286 in your computer.

STEP 5

Run the SETUP program: You must run SETUP whenever you change the amount of linear memory in your computer. See Section 4 for instructions.

STEP 6

Run the INSTALL program: To change the amount of expanded memory, or the size of the SuperPak utilities, run the INSTALL program as shown in Section 5.

NOTES

1

2

3

