

FASTCARD IV

Multifunction
Page-Switching
Memory
Expansion
Board



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(c) September, 1985
THESYS Memory Products Corporation

3000 W. Mariposa W2S
Nogales, AZ 85621
(602) 948-2626

FASTCARD IV

USER

MANUAL

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THESYS MEMORY PRODUCTS
LIMITED WARRANTY AND FIELD SERVICE NOTICE APPLICABLE TO ALL
FASTCARD AND FASTFILE HARDWARE PRODUCTS

THESYS Memory Products Corporation (THESYS) warrants for a period of 12 months from the date of purchase from THESYS or an authorized THESYS representative (the "Warranty Period") that the hardware product to which this Limited Warranty applies (the "Product") will be free from defects in material and workmanship under normal use and service and will perform substantially in accordance with THESYS' applicable published specifications. This Limited Warranty extends only to the original purchaser ("Purchaser") (and not to any additional user or transferee).

THESYS' entire liability and the sole remedy of the Purchaser shall be the repair or, at THESYS' option, replacement of any Product which is defective or fails to perform as herein provided and which is returned to the factory in accordance with the instructions below before the expiration of the Warranty Period. This Limited Warranty shall extend to any replaced item for the remainder of the term of the original Warranty. No other warranty shall be applicable with respect to any replaced item.

Replacement parts and products will be furnished on an exchange basis and will be either reconditioned or new, at the option of THESYS. All replaced parts and products shall become the property of THESYS. After any applicable Warranty work has been completed, the Product will be returned to the sender, freight prepaid by THESYS.

Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, or unauthorized repair or installation are not covered by this Limited Warranty. THESYS shall make the final determination as to the existence and cause of any alleged defect.

This Limited Warranty does not extend to any item or items not manufactured by THESYS which are furnished or used in conjunction with the Product. Without limiting the foregoing, this Limited Warranty does not cover any battery supplied with the Product nor any damage to any Product due to improper insertion of any battery.

No warranty is made with respect to custom equipment or products produced to Purchaser's specifications, except as may be specifically set forth in any written contract for such custom equipment. Non-warranty repair work will require customer authorization before beginning the repair.

THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE; ANY IMPLIED WARRANTY DEEMED TO BE GRANTED BY THESYS SHALL BE LIMITED TO THE DURATION OF THE LIMITED WARRANTY HEREIN. THESYS SHALL IN NO EVENT BE LIABLE OR RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY LOSS OR CLAIMED LOSS OF BUSINESS OR ANTICIPATED PROFIT ARISING FROM THE USE OR INABILITY TO USE THE PRODUCT, EVEN IF THESYS OR AN AUTHORIZED AGENT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow limitations on how long an implied warranty lasts, or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Products may not be returned without first obtaining a Return Material Authorization from THESYS' Customer Support Department at the following numbers, Monday through Friday, between the hours of 8 a.m. and 5 p.m. Mountain Standard Time.

Outside Arizona:

(602) 948-2626

In Arizona:

Proof of purchase date must be provided. Upon shipment of Product, Purchaser agrees to insure the Product or assume the risk of loss or damage in transit, to prepay the shipping charges, and to use the original shipping container or equivalent. If the Product is damaged in transit, Purchaser must file any claims with the shipper.

When calling for service, have the serial number available in order for THESYS' Customer Support to identify the Product and to validate the applicable warranty.

Any Product returned for repair is to be shipped freight prepaid.

SHIPPING INSTRUCTIONS

1. Call THESYS Customer Support to obtain a Return Material Authorization (RMA) number.
2. Write a letter explaining the nature of the failure or difficulty. Include your RMA number in the letter.
3. Pack the Product and the letter in the original packing materials. (If original packing materials are not available, use equivalent packaging.)
4. Write the RMA number on the outside of the package.
5. Ship the package freight prepaid to:

THESYS Customer Service
3000 W. Mariposa Road, W-5
Nogales Foreign Trade Zone
Nogales, Arizona, 85621

THESYS will not be held responsible for customer-owned equipment left more than 60 days without authorization to either repair it or return it as-is.

CUSTOMER SUPPORT POLICY

THESYS Memory Products Corporation provides help and advice to FASTCARD IV users, after the FASTCARD IV serial number is properly registered.

Registration of the serial number places the warranty into effect and establishes the user's eligibility for future updates to the product. Refer to the WARRANTY NOTICE for details of the warranty coverage and conditions.

The user should complete the WARRANTY REGISTRATION CARD included in the FASTCARD IV package and mail the card to THESYS Memory Products Corporation.

USER-ASSISTANCE TELEPHONE NUMBER

For assistance, users may call the following number between 8 a.m. and 5 p.m., Mountain Standard Time:

(602) 948-2626

Before You Call THESYS

1. Check the appropriate section of this manual for an answer to your question.
2. If you cannot find an answer, gather the following information before calling the Support Specialist:
 - a. Any error messages you are receiving;
 - b. THESYS product name (FASTCARD IV, etc.);
 - c. FASTCARD software level (printed on the label of the FASTCARD diskette);
 - d. Computer name (IBM, Compaq, etc.) and model;
 - e. The names of the manufacturers of any other boards installed in your computer.
3. Have your computer near at hand when calling.

FCC STATEMENT

This equipment generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with the manufacturer's instructions, it 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 a 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:

- * relocate or reorient the receiving antenna;
- * relocate the computer with respect to the receiver;
- * move the computer away from the receiver;
- * plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. Further information may be found in the booklet *How to Identify and Resolve Radio-TV Interference Problems*, Stock Number 004-000-00345-4, prepared by the Federal Communications Commission. This booklet is available from:

United States Government Printing Office
Washington, DC 20402

WARNING: This equipment was certified with the use of a shielded cable. A shielded cable must be used to assure minimum interference.

READ THIS FIRST

This manual applies to FASTCARD IVs using the Expanded Memory Manager Version 3.2, Release 2.0 (or higher), only. This information is displayed when you boot your system with FASTCARD IV installed, under the heading "The Expanded Memory Manager." Please verify that it is the correct version as soon as your board is installed.

After reading this chapter, see the "FASTCARD IV Description" for an overview of the FASTCARD IV features. Then, turn to "Hardware Installation" to install your board. After the board is installed, go to "Software Installation" if you wish to use Expanded Memory. Then, see "FASTMENU Options" for an explanation of the FASTMENU. Finally, go to "Using THESYS' Intelligent Memory System" for instructions on how to set up the disk caching and print buffering features.

The FASTCARD IV diskette contains a file called READ.ME, which contains additional information regarding FASTCARD IV. In addition, it contains a list of questions most often asked about FASTCARD IV, and corresponding answers. We strongly recommend that you read it before continuing. In addition, you may want to print out a paper copy of READ.ME.

To read READ.ME:

1. Insert the FASTCARD IV diskette into drive A.
2. At the DOS prompt, type:

TYPE A:READ.ME

and press Enter.
3. Read the text as it appears on the screen. To stop it scrolling, use Ctrl S. To continue, press any key.

To print READ.ME:

1. Type: PRINT A:READ.ME
2. Press Enter.

In addition, there are certain points of which you should be aware before you install and use your FASTCARD IV. They are:

1. FASTCARD IV's IMS disk and print enhancement features function with double-density floppy disk drives, "bootable" hard disk drives, and high-density (1.2MB) floppy drives. You should not enhance pseudo disk drives such as networks or RAM disks.
 - a. If you have an add-on DOS-level disk drive (e.g., the non-bootable Tallgrass Technologies hard disk), do not use IMS disk enhancement.
 - b. Do not use other disk enhancement products or utilities with FASTCARD IV (e.g., 1 DIR by Bourbaki, Inc.).
 - c. Do not use FASTCARD IV's disk enhancement features on a hard disk installed in the IBM Expansion Chassis system.
2. To use FASTCARD IV's print enhancement feature with a serial printer, see "Setting up FASTCARD IV to Buffer Serial Printers."
3. Normally, FASTCARD IV clears any information waiting to be printed when the printer is turned off. However, this feature does not function with all parallel printers. In such cases, the print buffer must be cleared with the "CPB" command. See "IMS Commands" in "Using THESYS' Intelligent Memory System."

4. FASTCARD IV's disk enhancement feature *may* trigger some software manufacturers' copy protection safeguards. (For example, you may receive a message such as "Data Error," "Disk not Ready," or "Illegal Copy," or the system may behave erratically.) If this occurs, you should normalize disk buffers on the drive containing the copy-protected software. (See "IMS Commands.")
5. AT&T 6300 users: Make certain that your "Resident Diagnostics" version is 1.21 or higher. (The version ["Rev"] number appears when you boot your machine, under the words "Resident Diagnostics.") If the number is lower than 1.21, contact your AT&T dealer to obtain an updated version *before* you install FASTCARD IV.
6. IBM PC, XT, and AT users: See "IBM Installation Notes" before proceeding.
7. Make certain that, when power is turned off to your computer, it *stays* off for at least ten seconds, to insure complete clearing of FASTCARD IV's memory.
8. After FASTCARD IV has been installed in your computer, you must run FASTMENU Option 4, "Reset for Reinstallation" *before* you:
 - a. Remove FASTCARD IV to install it in another computer, or
 - b. Install another type of card in the same computer with FASTCARD IV.

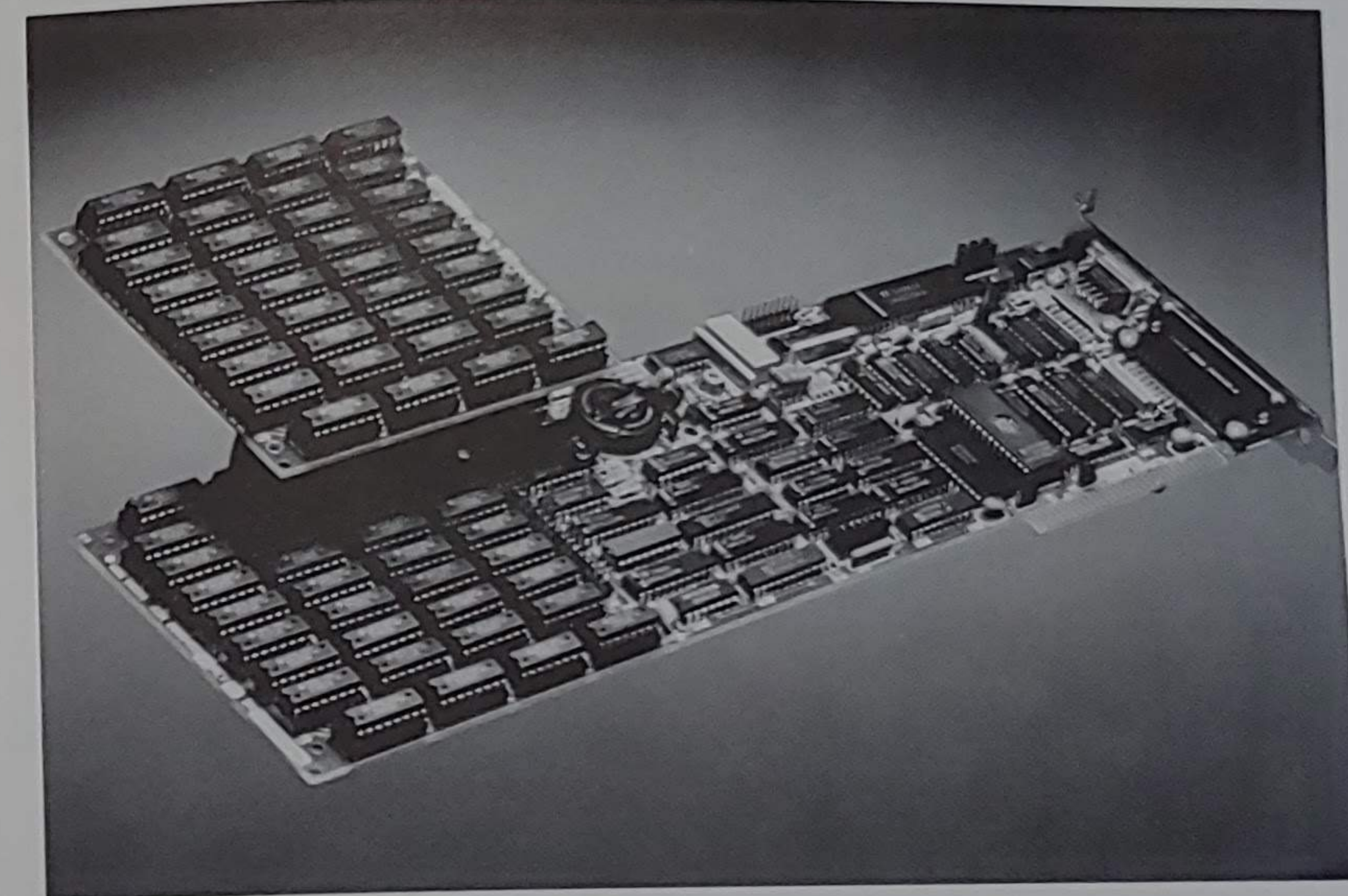
Failure to do so may result in loss of data. See "FASTMENU Option 4, Reset for Reinstallation" in the "FASTMENU Options" chapter.

READ THIS FIRST

9. Some PCs require that the PC motherboard be fully populated (usually to 256K) before using FASTCARD IV's memory as conventional memory. See your computer's installation manual if you have any questions about filling memory to 640K.
10. A reminder about PC use:

When the disk drive light is on:
 - a. *Don't* turn off the computer;
 - b. *Don't* boot the computer;
 - c. *Don't* open the diskette door.
11. Backup programs, such as COPYIIPC, should not be run with disk buffers (also called "caching") enabled. Normalize drives when running these programs.
12. Do not use disk caching ("disk buffers") with hard-disk backup devices (for example, a tape drive that acts like a floppy drive).■

FASTCARD IV DESCRIPTION



FASTCARD IV, developed by THESYS Memory Products Corporation, is an intelligent memory management system designed for use on the IBM PC, XT, and compatible computers.

FASTCARD IV includes the Lotus/ Intel/Microsoft Expanded Memory Device Interface Specification, which makes it possible for FASTCARD IV to provide up to two megabytes of RAM. Many software producers are now offering products designed to use this extra memory.

However, FASTCARD IV not only allows use of new specially developed software, but, since FASTCARD IV's RAM disks and disk and printer enhancements can make use of the Expanded Memory, users of *standard* software products can benefit from the extra memory.

FASTCARD IV includes THESYS' Intelligent Memory System (IMS), which significantly speeds up disk and printer operations.

FASTCARD IV fits any standard IBM full-length expansion slot and can easily be installed by the user. FASTCARD IV operates with the following hardware and software:

- IBM PC, XT, and compatibles.
- PC-DOS and MS-DOS.
- Most software, whether or not designed specifically to be used with the Expanded Memory Specification.
- One or more floppy disk drives plus one hard disk drive.

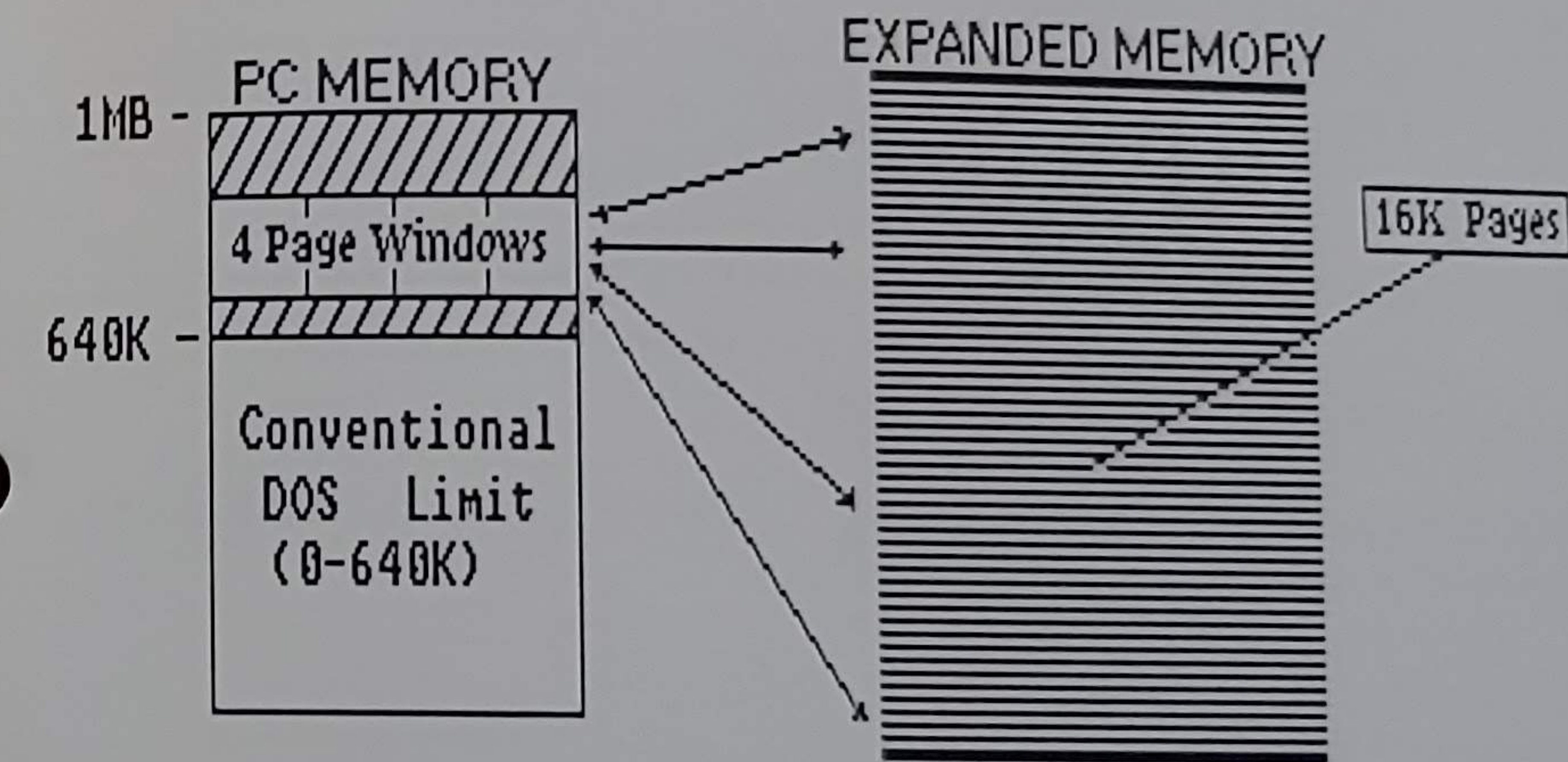
FEATURES OF FASTCARD IV

LOTUS/INTEL/MICROSOFT EXPANDED MEMORY

FASTCARD IV is designed according to the Lotus/Intel/Microsoft Expanded Memory Device Interface Specification. This means that each FASTCARD IV allows the user to expand RAM up to two megabytes; in addition, up to three FASTCARD IIIs may be added, for a total memory expansion of eight megabytes.

The Expanded Memory Specification uses a technique called "page-switching" to achieve this increase in memory. Essentially, page-switching works like this:

The Expanded Memory is divided into 16K "pages." (See Illustration below.) 64K of the PC's memory (just above the 640K DOS limit) is set aside as a "page frame," divided into four 16K page "windows." Each window can hold one of the 16K pages from the Expanded Memory. The pages are rapidly "switched" in and out of the page windows, as they are needed. (A copy of the specification can be obtained from Lotus Development Corporation, 617-253-9150.)



THESYS' INTELLIGENT MEMORY SYSTEM

THESYS' Intelligent Memory System provides unique features offered by no other Expanded Memory product. These features are:

- **AUTOMATIC MEMORY ALLOCATION**--THESYS' Intelligent Memory System monitors the computer's operations and automatically allocates memory as it is needed to improve system performance. Any memory that is not being used for other purposes will automatically be used for disk and print enhancement.

- **DISK ENHANCEMENT--THESYS' Intelligent Memory System** stores frequently accessed hard and floppy disk information in a portion of electronic memory called a "cache" or "buffer." When a program requests information from the disk, FASTCARD IV checks the cache first. If the information is there, it is loaded directly and the disk is bypassed. This speeds disk performance by as much as 50 times and reduces disk head movement, thereby extending the life of the disk drives.
- **PRINT ENHANCEMENT--THESYS' Intelligent Memory System** enables FASTCARD IV to serve as a buffer (i.e., a holding area) for information to be printed. This frees the computer to do multiple tasks.
- **BACKGROUND OPERATION--THESYS' Intelligent Memory System** operates on its own, in the "background," without user intervention.

See the Chapter entitled "Using THESYS' Intelligent Memory System" for additional information.

OTHER FASTCARD IV FEATURES

- **SPLIT MEMORY MAPPING--**Split memory mapping allows the RAM to be used to fill the system memory to 640K and provide Expanded Memory above the 640K limit.
- **BUILT-IN DIAGNOSTICS--**The system performs a complete test of the Expanded Memory before the computer boots, identifies any faulty memory, and reports it to the user.
- **FAULT TOLERANCE--**If faulty Expanded Memory is detected, the system bypasses it automatically.

- **AUTOMATIC SETTING OF EXPANDED MEMORY RAM ADDRESS--**FASTCARD IV searches the address space of the computer and sets the Expanded Memory Address automatically. The address may be changed at your option with a program included on the FASTCARD IV diskette, FASTMENU.
 - **SOFTWARE CONTROLLABLE PAGE REGISTER ADDRESSES--**To use the Expanded Memory, it is necessary to select an I/O port address. With other boards, this is accomplished using DIP switches. However, FASTCARD IV automatically sets page register addresses and, if you wish to change an address, a simple, menu-driven program is used to do so, without opening the computer to reset switches. See "FASTMENU Option 2, Redefine Page Addresses" in "FASTMENU Options."
 - **CONSERVATION OF RAM--**Since FASTCARD IV has utilities which are contained in firmware, system RAM is conserved for user applications.
 - **MULTIPLE ELECTRONIC (RAM) DISKS--**FASTCARD IV provides electronic RAM "disks" which function as very fast disk drives. These RAM disks are set up using the EMDISK.DRV software included on the FASTCARD IV diskette. With this program, you can set up any number of RAM disks, of variable sizes. For instance, if you have two megabytes of Expanded Memory, you can set up one 2-million-byte RAM disk, or ten 200-thousand-byte RAM disks. (See "Installing RAM Disks Using EMDISK.DRV.")
- Data on RAM disks is retained only as long as power is on.*
- **REMEMBERING USER SETUPS--**Like an IBM AT, FASTCARD IV "remembers" the most recent setups when the computer is turned off. When the computer is turned on, it automatically sets the memory configuration and addresses, disk and print buffer features, etc.

FASTCARD IV DESCRIPTION

- **CUSTOM PASSWORD SECURITY**--If the user chooses, a custom password of any length may be defined that will be permanently stored in FASTCARD IV. Thereafter, whenever the computer is turned on, the password will be required *before the computer will boot*. This prevents unauthorized access to the computer.
- **CLOCK/CALENDAR**--A built-in clock, powered by a 3-volt lithium battery, automatically sets the date and time when the computer is booted. See "FASTMENU Option 5 - Clock/Calendar" in "FASTMENU Options."
- **SERIAL PORT**--FASTCARD IV has one nine-pin serial port for asynchronous communications, which can be used with a serial printer, modem, mouse, or other device which uses an RS-232 interface.
- **PARALLEL PRINTER PORT**--A parallel printer port is included.
- **GAME PORT INTERFACE**--FASTCARD IV includes a game port interface which is software compatible with the IBM game adapter when using IBM joysticks. A game port cable, purchased from your local dealer, may be plugged into the game port connector on FASTCARD IV.

BENCHMARK DEMONSTRATION

The benefits of FASTCARD IV may be demonstrated by the "Benchmark" program which is included on the FASTCARD IV program diskette. The Benchmark Demonstration Program provides a graphic comparison of operating speeds with and without IMS.

To run the Benchmark Program, place the FASTCARD IV program disk in the computer (after IMS has been installed) and enter "AUTOBMRK" at the DOS prompt.

For further testing capabilities, the BASIC program BENCHMRK.BAS is also included on the program diskette. Programmers may use this program to vary the Benchmark test and to test the performance of most mass storage devices.■

HARDWARE INSTALLATION

The first part of this chapter discusses the FCSETUP program, a package intended to simplify installation of FASTCARD IV for the average user. The knowledgeable user may bypass the FCSETUP program and go to the chapter entitled "FASTCARD IV Switch and Jumper Settings."

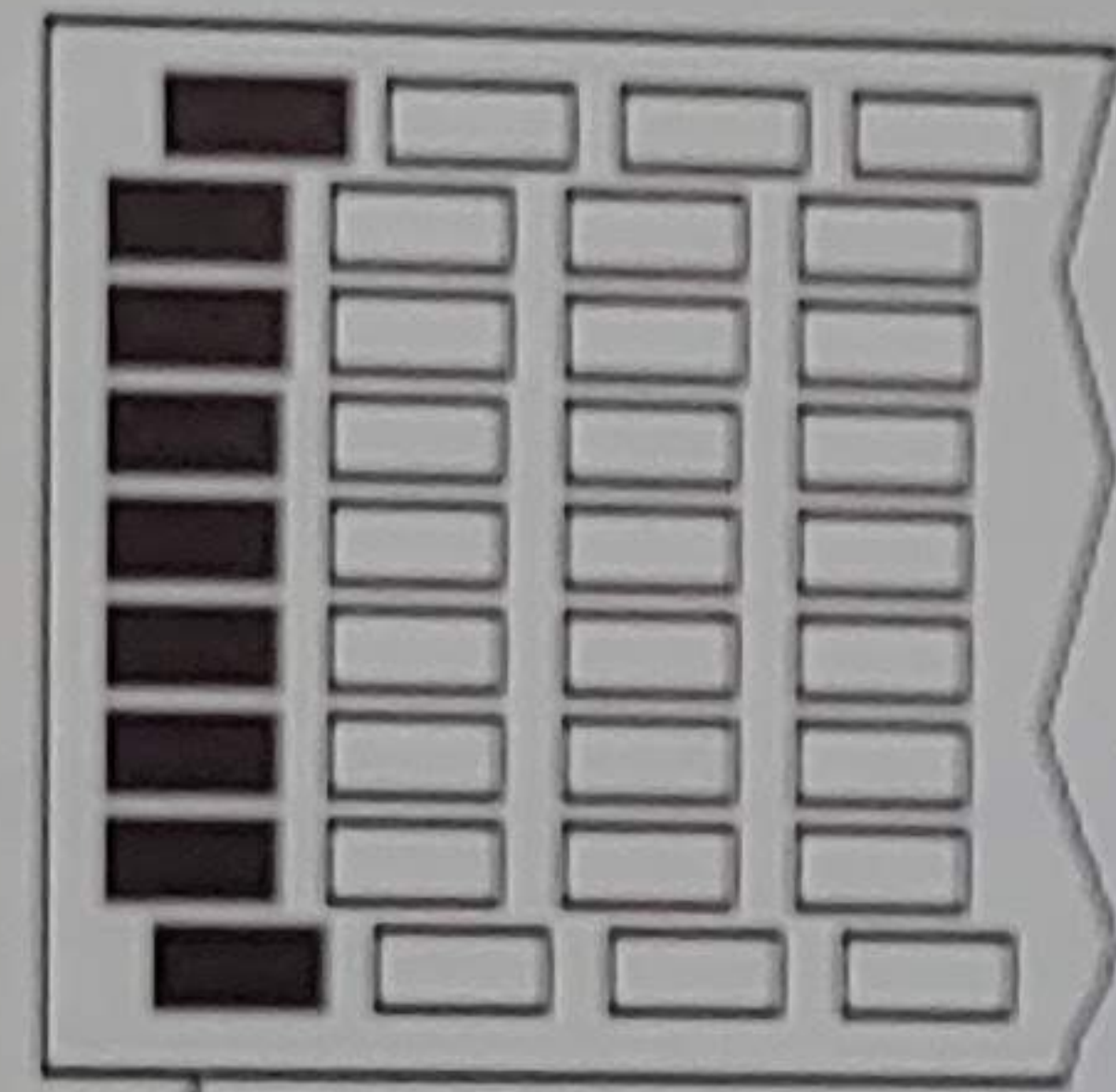
BEFORE INSERTING FASTCARD IV INTO THE COMPUTER--RUNNING THE FCSETUP PROGRAM

1. Remove FASTCARD IV from the package and place it on the tabletop beside your computer where you may examine it easily.
2. If you have purchased additional memory for your FASTCARD IV, install the memory on the board and/or daughter board, as applicable. See "Installing DRAMs on FASTCARD IV." (Also make certain that you are installing enough memory for the IMS features to function, if you wish to use IMS. See "Free RAM Required by IMS" in "Using THESYS' Intelligent Memory System.")
3. If you have purchased a daughter board for your FASTCARD IV, install it. See "Installing the FASTCARD IV Daughter Board."
4. If there are any FASTCARD IIIs installed in your computer, see "Installing FASTCARD IV in a Computer with FASTCARD III" before continuing with the installation of your FASTCARD IV.
5. Turn on power to your computer and boot it normally.
6. Place the FASTCARD IV diskette into Drive A and type FCSETUP at the A> prompt. (You must have at least 128K of memory to run FCSETUP. If you are installing FASTCARD IV in a 64K computer, call THESYS User Assistance for help.) Press return.

7. Answer the questions and follow the prompts as they appear on the screen. The questions are:

- *How many vertical columns of RAM will be on this card?*

Enter the number (1-8) of vertical columns of RAM chips on the FASTCARD IV. The black rectangles in the illustration below form one vertical column.



One Vertical Column of RAM

- *Do you want FASTCARD IV to detect RAM parity errors? Y/N*

Parity errors are errors in communication between your computer and other devices (such as FASTCARD IV). Normally, enter Y to this question unless you have a computer that cannot respond to expansion board parity errors (e.g., an AT&T 6300).

- *Will you be using the Custom Password feature?*

If you wish FASTCARD IV to require entry of a password each time power is turned on to your computer, enter Y. (See also "FASTMENU Option 1, Password Definition," in "FASTMENU Options.") If not, enter N.

- *Is FASTCARD IV ROM address of (address) acceptable?*

FASTCARD's ROM needs 32K of address space. The FCSETUP program has searched your address area and is recommending the best address. Answer Y unless you have some specific reason to set up another address.

- *Is the FASTCARD IV information listed below correct? Y/N*

The screen displays the responses you have given. Review the information. If it is correct, press Y. If any of the information is incorrect, press N and answer the questions again.

8. Make the necessary adjustments in the DIP switch and shorting plug settings on FASTCARD IV, as displayed by the next screen. (See "FASTCARD IV Switch and Jumper Settings.")

Press any key to go to the next screen.

9. Make certain the RAM is installed on your board and/or daughter board as illustrated by the final screen.

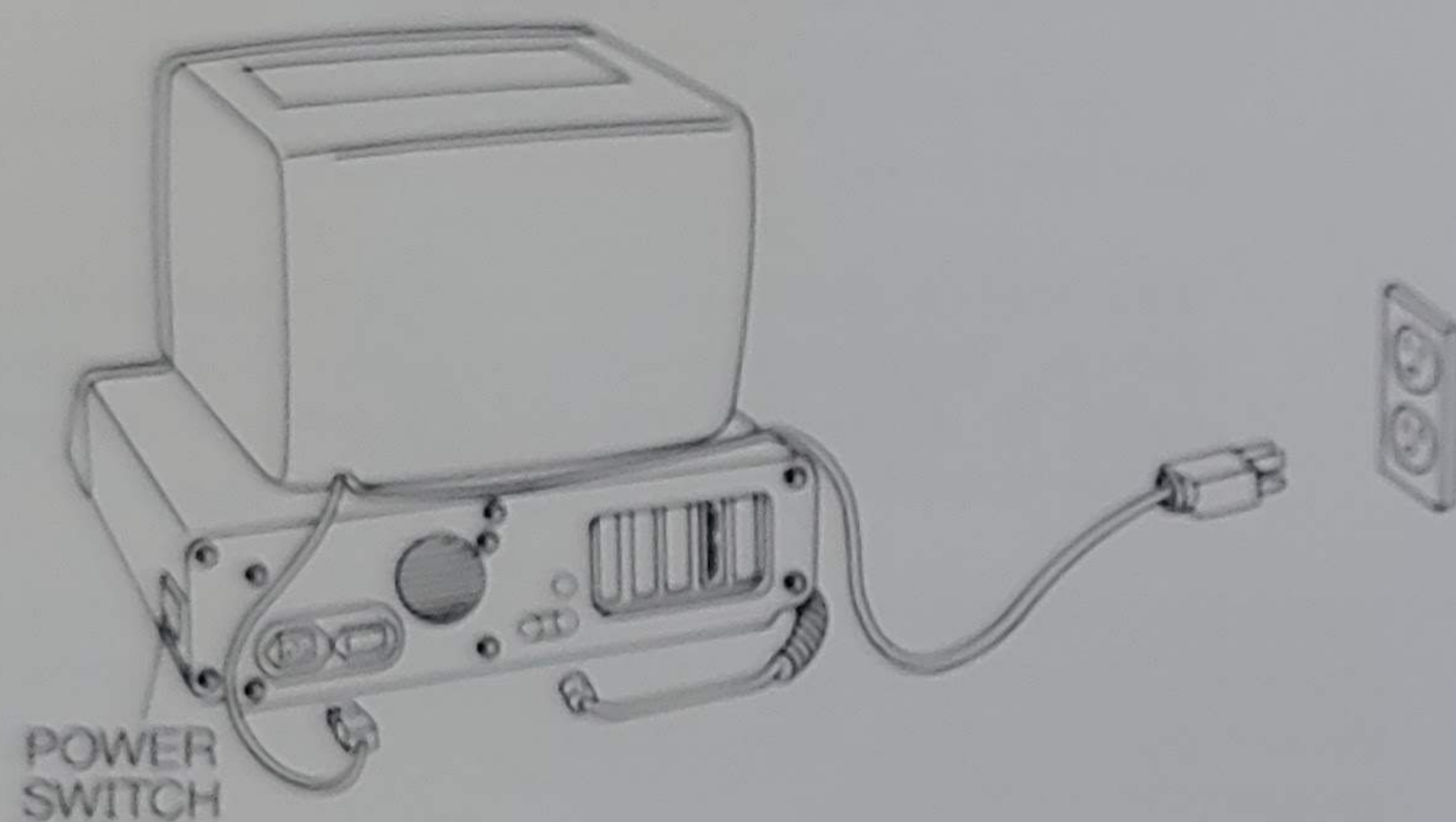
INSERTING FASTCARD IV INTO THE COMPUTER

After the adjustments have been made according to the FCSETUP program, FASTCARD IV can be inserted into the computer.

Without the daughter board, FASTCARD IV can be used in any of the available full-length expansion slots on the PC system board. However, if the daughter board is installed, select a slot which can accommodate the width of the entire unit.

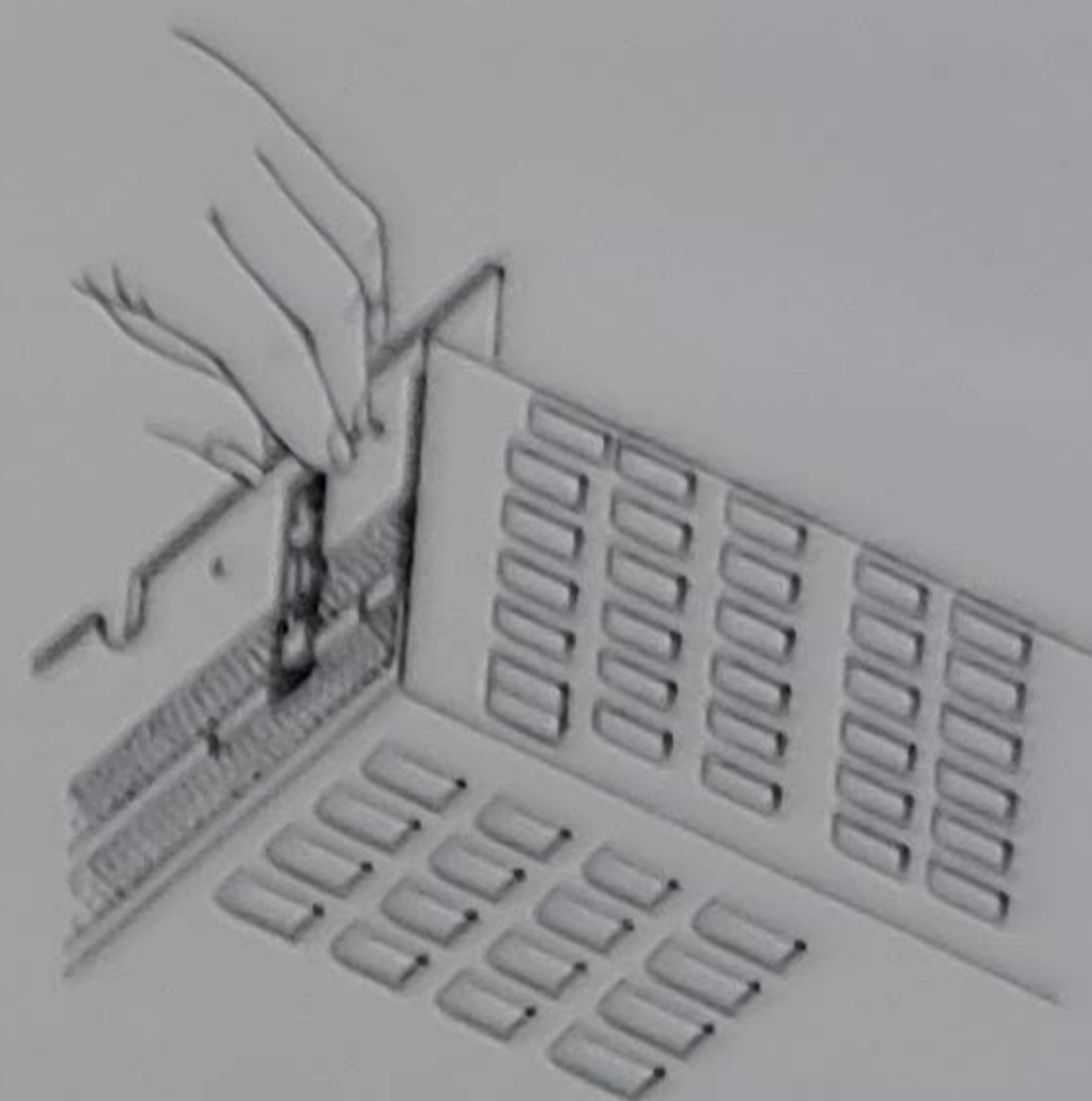
Complete the following steps to insert the board.

1. Turn the PC off and unplug the power cord. (Inserting or removing the FASTCARD IV board with the power on could result in damage to the board or to the computer.)

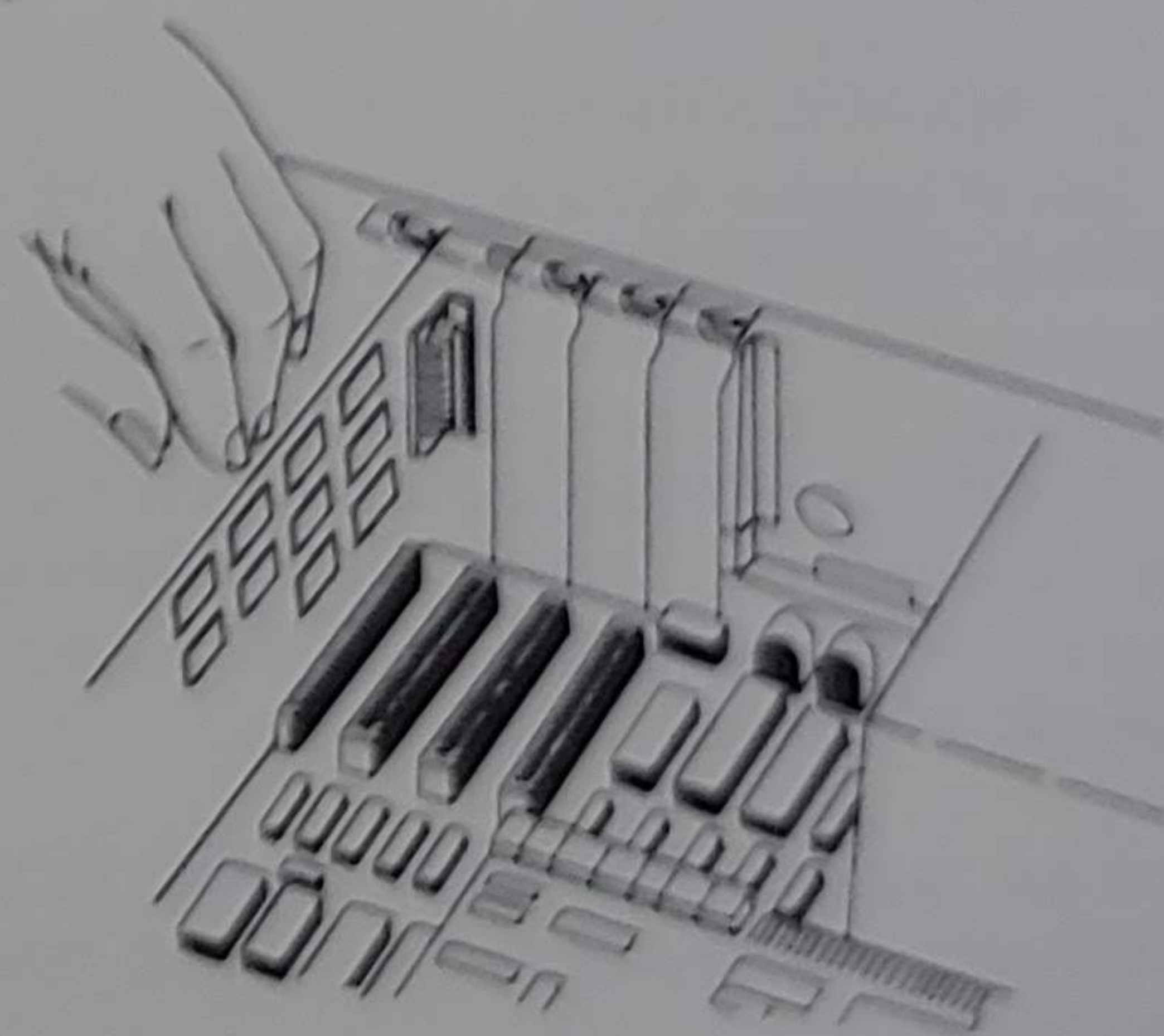


2. Remove the cover from the computer.
3. If adding FASTCARD IV will increase your *system* memory (e.g., from 256K to 640K), you may need to reset the DIP switches on your computer's system board for 640K. See your owner's manual for instructions on doing so.
4. Select an available expansion slot and remove the bracket screw and the bracket from the cut-out in the back panel.

5. If your computer requires a card guide, snap the plastic insertion guide (included in the FASTCARD IV box) into the appropriate holes on the inside of the front panel of the unit, at the same slot position where the back plate was removed.

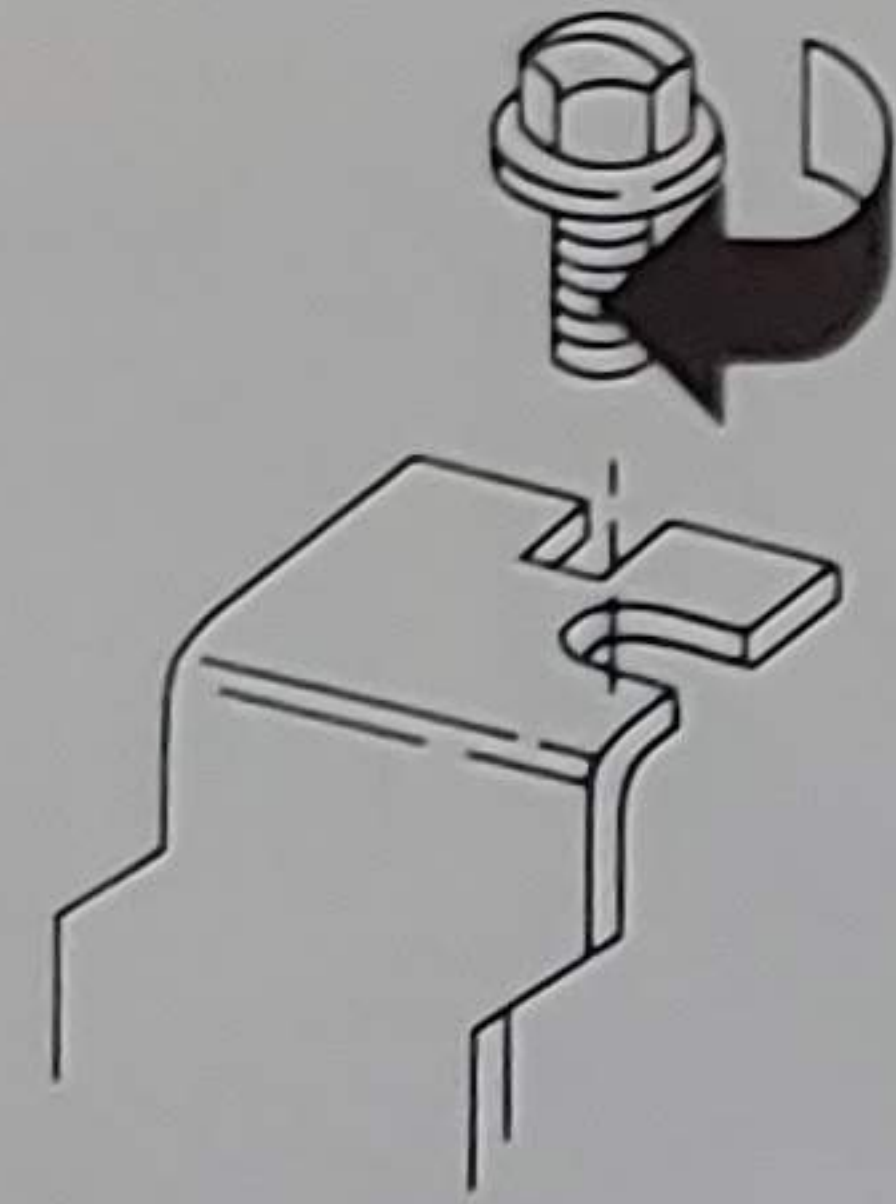


6. Touching only the outer edges of FASTCARD IV, align it in the card guide channel and slide it into the socket, guiding the connectors carefully into the center of the slot.



7. When the card is seated in the correct position, gently press straight down with the palm of your hand until it snaps securely into place.

8. Line up the chrome bracket at the back of the unit with the screw hole, making sure that the bracket is flat against the back ledge.
9. Replace the screw that was removed from the bracket in Step 4 and tighten it into place.



10. Replace the cover.
11. Replace and tighten the screws on the back panel of the unit.
12. If you are using FASTCARD IV only to increase lower memory (640K and below), plug in the power cord and boot the computer normally. The installation is now complete. (See "FASTMENU Option 1--Password Definition," in "FASTMENU Options" for instructions on defining your password, if you wish to use this option. See also "FASTMENU Option 5--Clock/Calendar" in "FASTMENU Options" for instructions on using the clock feature without Expanded Memory.)
13. If you are going to use FASTCARD IV's Expanded Memory, plug in the power cord and boot the computer normally.

The "power-on" test will begin, testing the integrity of the Expanded Memory. A number ("nnn" in the illustration below) is shown on the screen which indicates the number of 16K pages of Expanded Memory available.

```

THESYS FASTCARD IV version ----
Page Frame hexadecimal address ----
Page Register hexadecimal address ----
Program Rom hexadecimal address ----

```

nnn <---- [Number of 16K pages of Expanded Memory]

Multiply 16 times the final number to determine the number of kilobytes of Expanded Memory available. For example, if the screen indicates "104":

$$16 \times 104 = 1,664 \text{ kilobytes of Expanded Memory}$$

To access the Expanded Memory, see "Software Installation" for instructions on installing the FASTCARD IV driver and other software on hard disk and floppy disk systems.

See "FASTMENU Options" for an explanation of the FASTMENU.

See "Using THESYS' Intelligent Memory System" for instructions on using IMS.■

- c. The cursor will move to the next line but the DOS prompt will not be there. Type `DEVICE=FASTIV.DRV`, press return, then type each entry which appeared in the original `CONFIG.SYS` file. (Exception: If you already have a `FASTCARD III`, omit the `FASTIII.DRV` entry. Use only `FASTIV.DRV`.)

```
DEVICE=FASTIV.DRV <Return>
DEVICE=XXXXX.XXX <Return>
DEVICE=XXXXX.XXX <Return>
```

(If you have an entry "`BUFFERS=[Number]`" in your original `CONFIG.SYS` file, do not re-enter it when you retype the `CONFIG.SYS` file.)

(You may also wish to enter `EMDISK RAM` disks at this point. See "Installing RAM Disks Using `EMDISK.DRV`".)

- d. Press the `F6` key. Press return. The message "`1 FILE COPIED`" will appear.
4. If the directory does not contain a `CONFIG.SYS` file, copy the file provided on the `FASTCARD IV` program diskette to the hard disk.
5. Copy `FASTIV.DRV`, `EMDISK.DRV`, and `IMS.COM` to the hard drive's root directory. (You may, for your convenience, also copy the `FCSETUP.EXE` program, the `STATUS.EXE` program, and the `FASTMENU.COM` program.)

6. If you have enough Expanded Memory to use the disk and printer enhancement features of `THESYS' IMS` (see "Using `THESYS' Intelligent Memory System`") and you wish `IMS` to be invoked automatically when you boot, add the command "`IMS`" to your hard drive's `AUTOEXEC.BAT` file. (See your computer's User Guide for instructions on setting up an `AUTOEXEC.BAT` file.)

If you do not wish `IMS` to be invoked automatically, you may activate it by entering "`IMS`" at the DOS prompt.

INSTALLING THE FASTCARD IV DRIVER ON APPLICATIONS DISKETTES

The `FASTCARD IV` driver must be installed on any applications diskette that is to be used for booting the computer with the `FASTCARD IV` system. To install the driver:

1. Check the application diskette's directory to see if it contains a `CONFIG.SYS` file. (If not, go to step 3.)
2. If the directory contains a `CONFIG.SYS` file, edit the file to add `DEVICE=FASTIV.DRV`, as follows:

- a. At the DOS prompt, enter

```
TYPE CONFIG.SYS
```

The computer will display the current contents of the file:

```
DEVICE=XXXXX.XXX
DEVICE=XXXXX.XXX
```

- b. At the DOS prompt, enter:

```
COPY CON: CONFIG.SYS <Return>
```


SOFTWARE INSTALLATION

The following section applies only to those users who are going to use FASTCARD IV's Expanded Memory.

INSTALLING FASTCARD IV SOFTWARE ON A HARD DISK SYSTEM

To install FASTCARD IV software on a hard disk system:

1. Place the FASTCARD IV diskette into the A drive.
2. Check the hard drive's directory to see if it contains a CONFIG.SYS file. (If not, go to step 4.)
3. If the directory contains a CONFIG.SYS file, edit the file to add DEVICE=FASTIV.DRV, as follows:

- a. At the DOS prompt, enter `TYPE CONFIG.SYS`

The computer will display the current contents of the file:

```
DEVICE=XXXXX.XXX  
DEVICE=XXXXX.XXX
```

- b. At the DOS prompt, enter:

```
COPY CON: CONFIG.SYS <Return>
```


- c. The cursor will move to the next line but the DOS prompt will not be there. Type `DEVICE=FASTIV.DRV`, press return, then type each entry which appeared in the original `CONFIG.SYS` file. (Exception: If you already have a `FASTCARD III`, omit the `FASTIII.DRV` entry. Use only `FASTIV.DRV`.)

```
DEVICE=FASTIV.DRV <Return>
DEVICE=XXXXX.XXX <Return>
DEVICE=XXXXX.XXX <Return>
```

(If you have an entry "`BUFFERS=[Number]`" in your original `CONFIG.SYS` file, do not re-enter it when you retype the `CONFIG.SYS` file.)

(You may also wish to enter `EMDISK.DRV` RAM disks at this point. See "Installing RAM Disks Using `EMDISK.DRV`".)

- d. Press the F6 key. Press return. The message "1 FILE COPIED" will appear.
3. If the directory does not contain a `CONFIG.SYS` file, copy the file provided on the `FASTCARD IV` program diskette to the applications disk.
4. Copy `FASTIV.DRV` and `IMS.COM` from the `FASTCARD IV` diskette to the application diskette's root directory. (If you are installing `EMDISKS`, also copy `EMDISK.DRV`.)

5. If you have enough memory to use `THESYS' IMS` (see "Using `THESYS' Intelligent Memory System`") and you wish `IMS` to be invoked automatically when you boot, add the command "`IMS`" to the application diskette's `AUTOEXEC.BAT` file. (See your computer's User Guide for instructions on setting up an `AUTOEXEC.BAT` file.)

If you do not wish `IMS` to be invoked automatically, you may activate it by placing the `FASTCARD IV` diskette (or an applications diskette containing the `IMS.COM` file) into the default drive and entering "`IMS`" at the DOS prompt.

See "FASTMENU Options" for an explanation of the `FASTMENU`.

See "Using `THESYS' Intelligent Memory System`" for instructions on using `IMS`. ■

FASTMENU OPTIONS

SETTING UP THE FASTMENU OPTIONS

FASTMENU is a program included on the FASTCARD IV diskette which is used to set up certain FASTCARD IV features.

This section describes how to use the FASTMENU program.

The FASTMENU options screen is accessed by entering FASTMENU at the DOS prompt. (Make certain that the FASTMENU.COM program is installed on the appropriate disk or diskette.) The ESC key is used to return to the menu from any of the screens and to DOS from the menu. The ESC key must always be used to exit the FASTMENU options screen.

The FASTMENU options are described below.

FASTMENU OPTION 1 - Password Definition

If you selected the password feature during installation (that is, if switch 1 on your FASTCARD is turned *on*), use Option 1 to define your password. Follow the prompts. You may define a password of virtually any size.

Entry of your password will now be required when the computer is turned on.

You may use FASTMENU to change the password at any time. If you forget the password, use the following procedure to enter a new password:

1. Turn the computer off and remove the cover.
2. Set Switch 1 on the FASTCARD IV DIP switch to the "off" position.
3. Turn the computer on and, using FASTMENU, define a new password. (Be sure to press the ESC key to exit FASTMENU.)
4. Turn the computer off.
5. Set Switch 1 on the FASTCARD IV DIP switch to the "on" position.

FASTMENU Option 2 - Redefine Page Addresses

Use this option to select new page frame or page register addresses. (This option will be used only in the unlikely event that there is a conflict between the page addresses and another device.)

FASTMENU Option 3 - Power-on Test

If you do not wish for FASTCARD IV to automatically test and count the number of expanded memory pages each time the computer is turned on, you may turn that function off through this option.

FASTMENU Option 4 - Reset For Reinstallation

This option must be run *before* you:

- Remove FASTCARD IV to install it in another computer or
- Install another type of card in the same computer with FASTCARD IV.

To insert FASTCARD IV into another computer:

1. Run the Reset for Reinstallation option.
2. Turn off power to the computer.
3. Remove the FASTCARD IV from the computer.
4. Install FASTCARD IV into the new computer just as if it were a new installation.

To insert any other manufacturer's board into the same computer with FASTCARD IV:

1. Run the Reset for Reinstallation option.
2. Turn off power to the computer.
3. Remove the FASTCARD IV from the computer.
4. Install the other board in the computer.
5. Reinstall FASTCARD IV into the computer just as if it were a new installation.

FASTMENU Option 5 - Clock/Calendar

If you are using Expanded Memory, use this option to enable the automatic clock/calendar. First, set the date and time using the DOS "DATE" and "TIME" commands. Then, select this option and follow the prompts to set your FASTCARD clock.

If you are not using Expanded Memory, you may still use the clock/calendar by inserting the command FASTCLK into your AUTOEXEC.BAT file and copying the file FASTCLK.COM from the FASTCARD IV diskette to your boot disk. (See your computer's user guide for instructions on setting up an AUTOEXEC.BAT file.) Then, follow the procedure outlined in the above paragraph to set your FASTCARD clock.■

USING THESYS' INTELLIGENT MEMORY SYSTEM

WHAT IS IMS?

THESYS' Intelligent Memory System (IMS) speeds up the disk and printer operations of your computer by providing two features: disk caching, also called disk buffering, and print buffering.

Disk caching (pronounced "cashing") is a process whereby disk information is saved or "cached" in electronic memory after it is used once. Then, when the same information is needed again, FASTCARD IV checks electronic memory to see if the information has been cached. If it has, the information is retrieved from electronic memory, saving a great deal of time, not to mention wear and tear on your disks and drives.

IMS can cache up to two 360K floppy disk drives (or one 1.2MB and one 360K floppy drive) and one hard disk drive.

IMS keeps an ongoing record (retained even when power is off) of how much time has been saved by disk caching and how many disk accesses have been avoided. Each time you enter an IMS command, this information is displayed. (See "IMS Commands" in this chapter.)

Print buffering enables FASTCARD IV to retain information while it is waiting to be printed, freeing the computer to perform other tasks.

FREE RAM REQUIRED BY IMS

IMS requires 256K of *free* Expanded Memory to function. Therefore, if any of FASTCARD IV's memory is used to fill system memory to 640K, enough memory must be provided on FASTCARD IV not only to fill system memory but also to allow IMS to function, as follows:

Amount used to fill
System RAM

576K
320K-512K
64K-256K
ØK

Amount of
Memory for
IMS to Function

4 banks
3 banks*
2 banks**
1 bank

*IBM PC, XT, AT with 256K

**IBM AT with 512K

IMS COMMANDS

When using the IMS commands, "IMS" is always entered first, followed by a space. A slash (/) is entered next, followed by the three letters of the desired command. Multiple commands may be entered at the same time, separated by slashes.

(Note: When using IMS commands, physical disk drives are referred to numerically rather than alphabetically.)

When particular set-ups are needed for a specific application, the appropriate commands may be incorporated into an AUTOEXEC.BAT file on that program disk.

After the following examples, a list of all of the commands is given.

Example of using *one command at a time*:

A>IMS /HLP

This command will display help information.

Example of using *two or more commands*:

A>IMS /EF1/EF2/DPB

The above command enhances performance on Floppy Drives 1 and 2 and disables the print buffer.

DEFINITIONS OF IMS COMMANDS

The following is a list of the IMS commands and a brief explanation of each. The commands are grouped as General Commands, Printer Commands, and Disk Drive Commands.

GENERAL COMMANDS

/CPS - CHECK PROGRAM STATUS

This command displays a list of the current disk and print enhancement setups.

/DTA - DO TIMING ANALYSIS

This command measures the performance of your hard disk drive and stores the information in FASTCARD IV's permanent memory.

/HLP - DISPLAY HELP INFORMATION

This command displays a list of the valid commands.

PRINTER COMMANDS

/CPB - CLEAR PRINT BUFFER

This command clears the memory that FASTCARD IV is using as a print buffer.

/DBC - DISABLE PRINT BUFFER CLEAR

Normally, the print buffer clears automatically when the printer is turned off. This command turns off that feature.

/DPB - DISABLE PRINT BUFFER

This command returns print operations to normal and turns off the print buffer feature.

/EBC - ENABLE PRINT BUFFER CLEAR

This command turns on the feature that automatically clears the print buffer when the printer is turned off.

/EP1 - ENHANCE PRINTER #1

This command instructs FASTCARD IV to improve print operations to Line Printer 1 (LPT1:) by providing a print buffer. (If you do not define a printer, LPT1: is the default buffered printer.)

/EP2 - ENHANCE PRINTER #2

This command instructs FASTCARD IV to improve print operations to Line Printer 2 (LPT2:) by providing a print buffer.

/EP3 - ENHANCE PRINTER #3

This command instructs FASTCARD IV to improve print operations to Line Printer 3 (LPT3:).

/EPB - ENABLE PRINT BUFFER

This command turns on the print buffer feature.

/RAP - RESUME ALL PRINTING

This command is used to resume printing that has been halted by the /SAP command. Any accumulated data that has been loaded into the buffer while print was suspended will be printed.

/SAP - SUSPEND ALL PRINTING

This command is used to halt printing to the "enhanced" printer. (See /EP1, etc.) Any documents sent to the printer will be held by FASTCARD IV in the buffer in the sequence they are sent. When the /RAP command is invoked, the data that was being held will be printed.

DISK DRIVE COMMANDS**/CAD - CLEAR ALL DISK BUFFERS**

This command clears all memory which FASTCARD IV is using as disk buffers.

/CF1 - CLEAR FLOPPY DISK 1 BUFFERS

This command clears the memory being used as a buffer for floppy disk 1 only.

/CF2 - CLEAR FLOPPY DISK 2 BUFFERS

This command clears the memory being used as a buffer for floppy disk 2 only.

/CHD - CLEAR HARD DISK BUFFERS

This command clears the memory being used as a buffer for the hard disk only.

/DBW - DISABLE BUFFERED WRITES

Turns off the feature which organizes input before sending it to the disk. (See also /EBW.)

/EAD - ENHANCE ALL DISK BUFFERS

This command tells FASTCARD IV to enhance performance and provide disk buffers to all drives.

/EBW - ENABLE BUFFERED WRITES

Normally, input is sent directly to the disk. This command turns on the IMS feature which organizes input before sending it to the disk, resulting in increased speed and reliability.

/EF1 - ENHANCE FLOPPY DISK 1 BUFFERS

This command enhances operation of and provides a buffer to Floppy Drive 1 only.

/EF2 - ENHANCE FLOPPY DISK 2 BUFFERS

This command enhances operation of and provides a buffer to Floppy Drive 2 only.

/EHD - ENHANCE HARD DISK BUFFERS

This command enhances operation of and provides a buffer to the hard disk only.

/NAD - NORMALIZE ALL DISK BUFFERS

This command turns off the drive enhancement feature for all drives and disables the disk buffers.

/NF1 - NORMALIZE FLOPPY DISK 1 BUFFERS

This command turns off drive enhancement and the disk buffer for Floppy Drive 1.

/NF2 - NORMALIZE FLOPPY DISK 2 BUFFERS

This command is identical to the one above, except that it turns off enhancement of drive 2.

/NHD - NORMALIZE HARD DISK BUFFERS

This command is the same as the one for Floppy Drive 1 and 2, except that it turns off enhancement of the hard disk.■

FASTCARD IV SWITCH AND JUMPER SETTINGS

The following information is contained in this section:

FASTCARD IV SWITCH SETTINGS

- A Note about DIP Switches
- Setting the FASTCARD IV DIP Switches

SETTING THE FASTCARD IV NUMBER

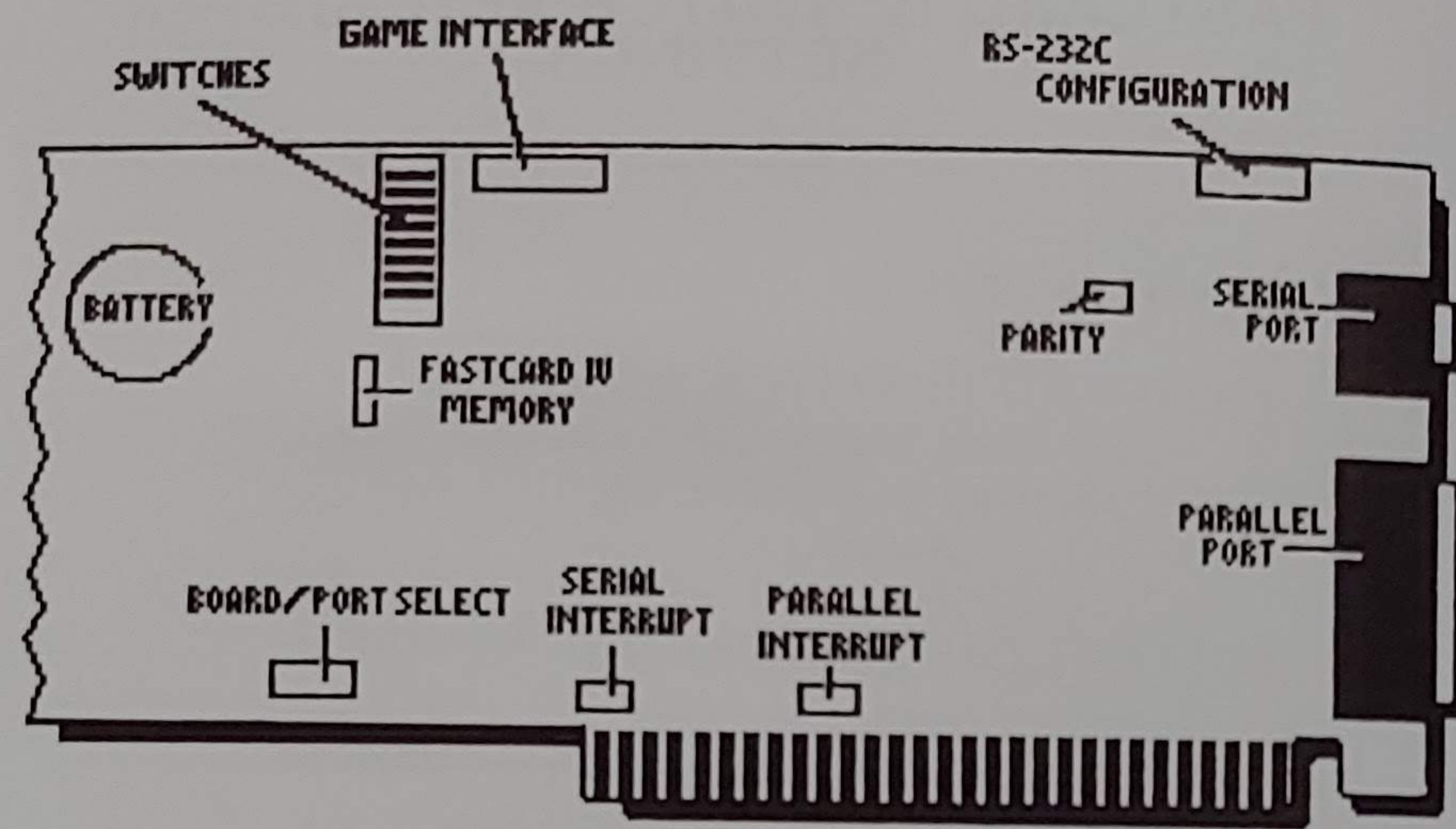
SETTING UP THE FASTCARD IV PORTS

- Setting up the Serial Port
- Setting up the Parallel Port
- Setting up a Game Port

USING THE RS-232C CONFIGURATION JUMPERS

FASTCARD IV MEMORY JUMPERS

PARITY JUMPERS



FASTCARD IV Switch and Jumper Locations

FASTCARD IV SWITCH SETTINGS

A NOTE ABOUT DIP SWITCHES

Designs of DIP switches vary. Your FASTCARD IV may have either of the following types of switches.

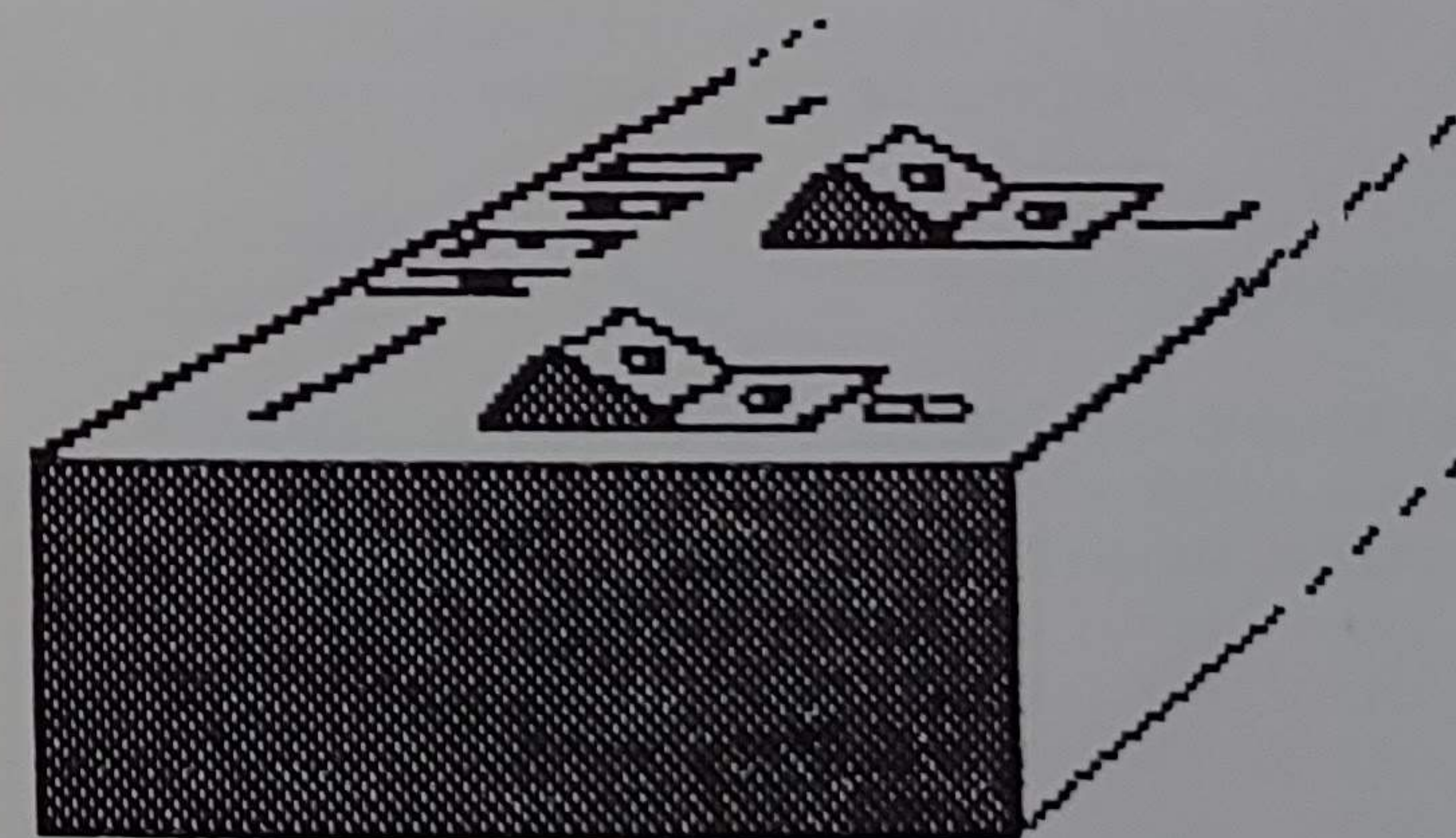
Slide Type

The slide type DIP switch is very straightforward. The word "ON" is printed on top of the switch. To turn it on, slide the switch over so the knob is toward the side that says "ON".

Rocker Type

The rocker type DIP switch operates a little differently.

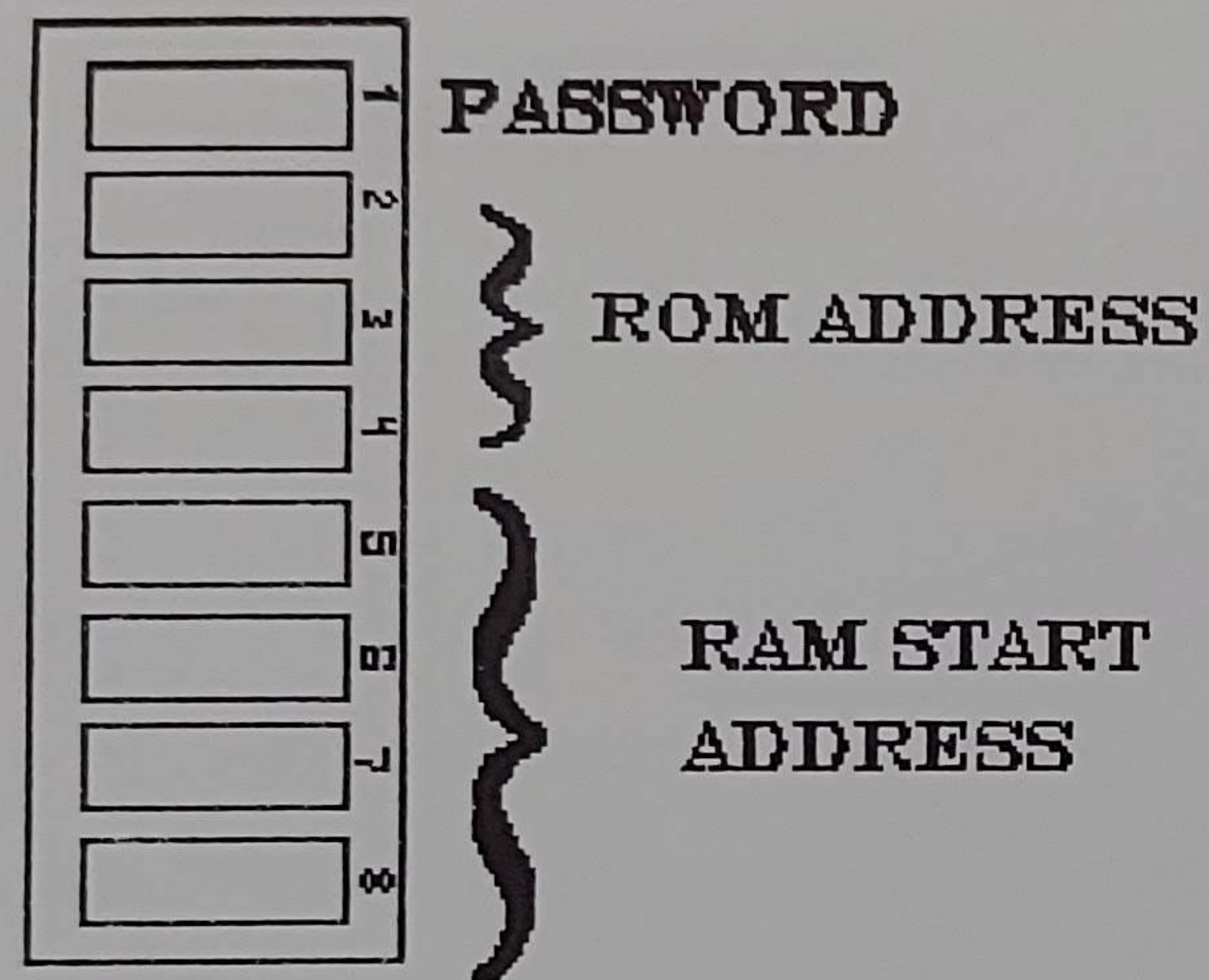
The word "OPEN" is printed on top of the switch. To turn the switch on, press *down* (with a pin or a small screwdriver) on the side of the switch *opposite* the side that says "OPEN".



ROCKER TYPE SWITCHES SET IN "ON" POSITION

SETTING THE FASTCARD IV DIP SWITCHES

See the illustration at the beginning of this section for the location of the DIP switches. The following diagram shows the functions of the switches:



FUNCTIONS OF DIP SWITCHES

Switch 1 - Password Enable

Switch 1 is the password enable switch; Off is password disabled, On is password enabled. See "Fastmenu Options" for more information on setting the password.

Switches 2 through 4 - ROM Address Select

These switches are used to select the address for FASTCARD IV's ROM, which contains, among other things, the built-in diagnostics. The switch settings are:

SW 2	SW 3	SW 4	Address
Off	Off	Off	Disabled
Off	Off	On	A000H
Off	On	On	C800H
On	Off	Off	D000H
On	Off	On	D800H
On	On	Off	E000H
On	On	On	E800H

Switches 5 through 8 - System RAM Start Address

FASTCARD IV's RAM must be assigned a starting address; this address is based upon the amount of memory you already have in your computer before installing FASTCARD IV. The switch settings are:

Memory already in computer	(Hex)	SW 5	SW 6	SW 7	SW 8
64K	(1000H)	Off	Off	Off	On
128K	(2000H)	Off	Off	On	Off
192K	(3000H)	Off	Off	On	On
256K	(4000H)	Off	On	Off	Off
320K	(5000H)	Off	On	Off	On
384K	(6000H)	Off	On	On	Off
448K	(7000H)	Off	On	On	On
512K	(8000H)	On	Off	Off	Off
576K	(9000H)	On	Off	Off	On
640K		Off	Off	Off	Off

SETTING THE "FASTCARD IV NUMBER"

Each time you install a FASTCARD III or IV in your computer, you must assign it its own number, 1 through 4.

For instance, if you have a FASTCARD IV installed and install a FASTCARD III, then the FASTCARD IV would be board number 1 and the FASTCARD III would be board number 2.

However, *FASTCARD IV must always be set as FASTCARD number one.* Therefore, if you already have a FASTCARD III installed and are adding a FASTCARD IV, you must change the FASTCARD III to board number 2 and make the FASTCARD IV board number 1. See "Installing FASTCARD IV in a Computer with FASTCARD III."

The FASTCARD III and IV numbers are set using the Board/Port Select jumpers marked "BS 0" and "BS 1". The shorting plug settings are as follows:

<u>BS 0</u>	<u>BS 1</u>	<u>FASTCARD NUMBER</u>
Plug off	Plug off	1
Plug on	Plug off	2
Plug off	Plug on	3
Plug on	Plug on	4

SETTING UP THE FASTCARD IV PORTS

This section presents the directions for setting up the FASTCARD IV serial port, parallel port, and game port interface. (Detailed information about the ports is included in "Technical Information Regarding FASTCARD IV Ports.")

SETTING UP THE FASTCARD IV SERIAL PORT

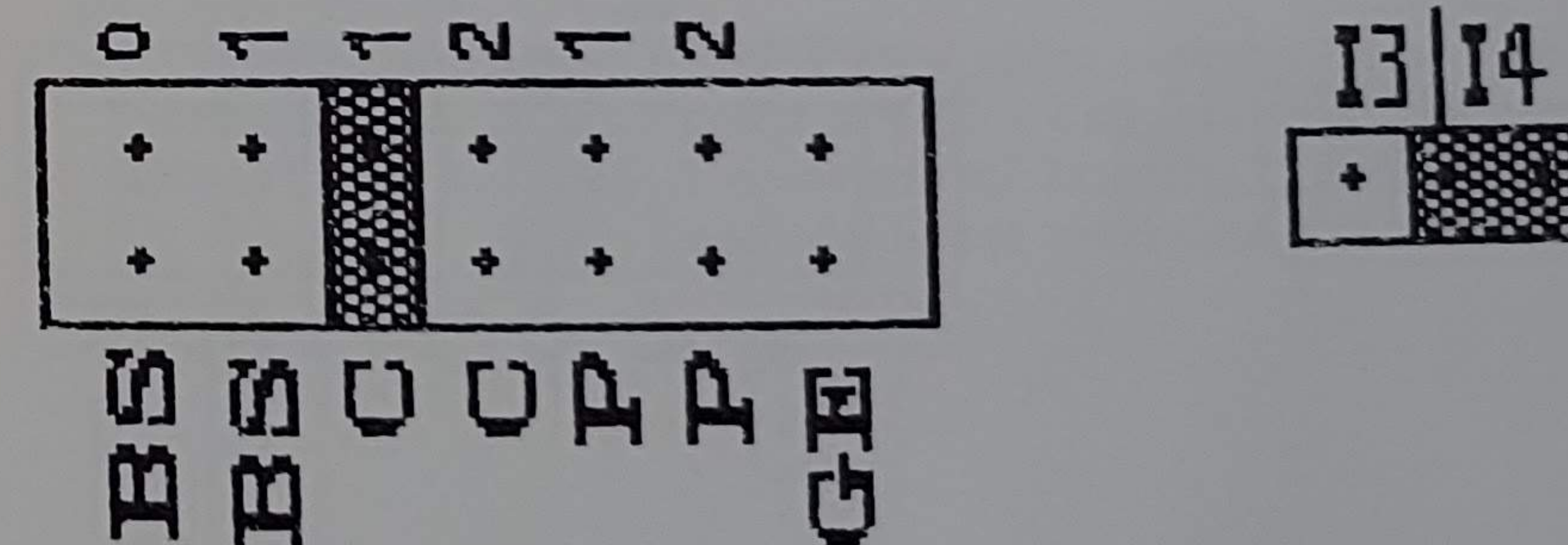
FASTCARD IV has one serial port which can be used for a serial printer, modem, mouse, or other device which uses an RS-232C interface.

PCs allow up to two serial ports, COM1 and COM2. FASTCARD IV's port is factory set as COM1, but it can be set as COM2, or disabled.

The "Board/Port Select" and the "Serial Interrupt" jumpers are used to select the COM1 or COM2 setting. (See the illustration at the beginning of this section.)

Serial Port Setting for COM1

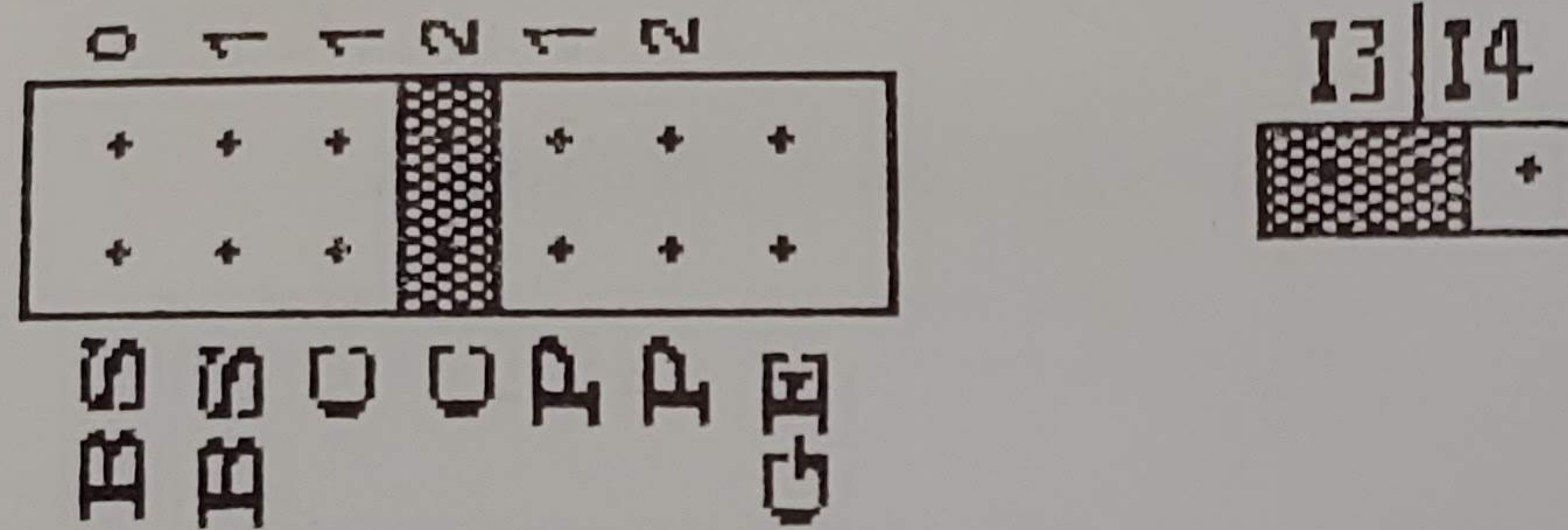
The COM1 (factory default) setting is illustrated below.



COM1 JUMPER SETTING

Serial Port Setting for COM2

If your PC already has one serial port, move the shorting plugs from their factory settings and set them to COM2, as shown below.



COM2 JUMPER SETTING

Disabling the Serial Port

If the serial port is to be disabled, remove the shorting plugs from the serial port jumpers. (Attach one side of each shorting plug to one of the pins, so it will be there when you need it.)

Serial Port Cable

Use a serial adapter cable with a 9-Pin communications connector (female) and a 25-Pin communications connector (male). (See "Technical Information Regarding FASTCARD IV Ports" for connector specifications.)

SETTING UP THE FASTCARD IV PARALLEL PORT

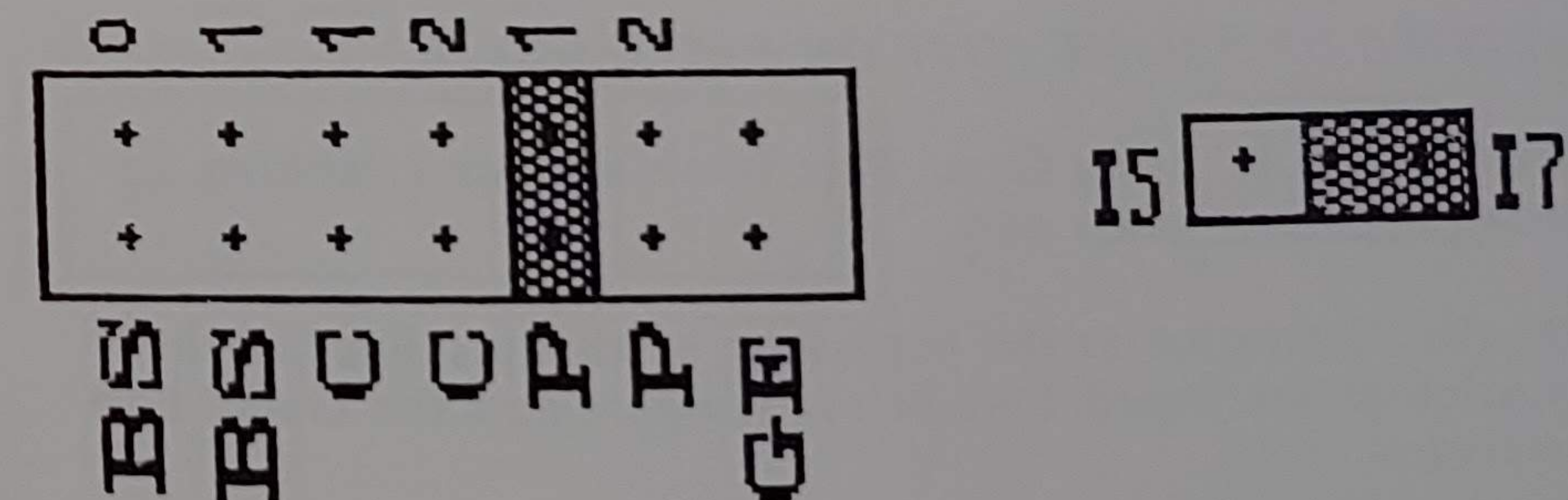
FASTCARD IV has one parallel port for a parallel printer. The parallel port on FASTCARD IV is factory set to respond as LPT1. It may also be set to LPT2.

The Board/Port Select and Parallel Interrupt jumpers are used to select the LPT1 or LPT2 setting. (See the illustration at the beginning of this section for the locations of these jumpers.)

The settings shown in this section are for computers which do not already have multiple parallel ports. If you have any trouble getting your FASTCARD IV parallel port to respond, run the FCSETUP program on the FASTCARD diskette. (See "Hardware Installation.") It will determine whether your parallel port addresses are occupied. If so, you will have to disable the FASTCARD parallel port (leave the shorting plug off the P1/P2 pins) or rearrange your computer's setup. (For technically oriented users: the parallel port addresses on FASTCARD IV are: 378 [LPT1] and 278 [LPT2]).

Parallel Port Setting for LPT1

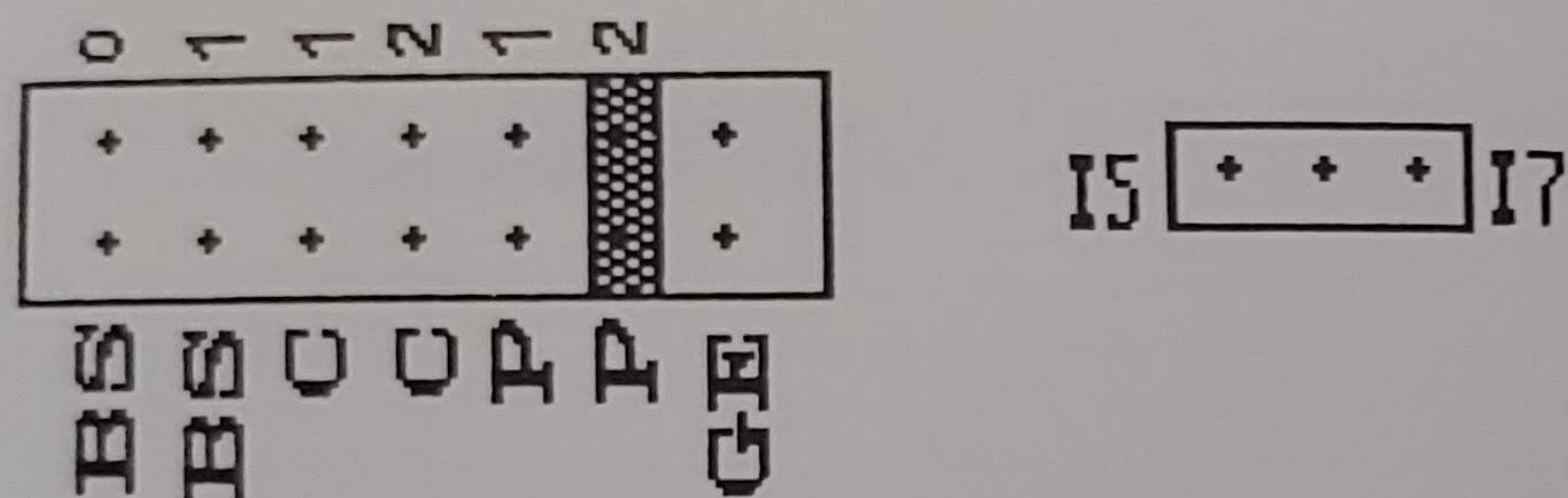
The parallel port LPT1 settings are illustrated below.



LPT1 JUMPER SETTING

Parallel Port Setting for LPT2

If the PC already has one parallel port for LPT1, set the shorting plugs for LPT2, as shown below.



LPT2 JUMPER SETTING

Disabling the Parallel Port

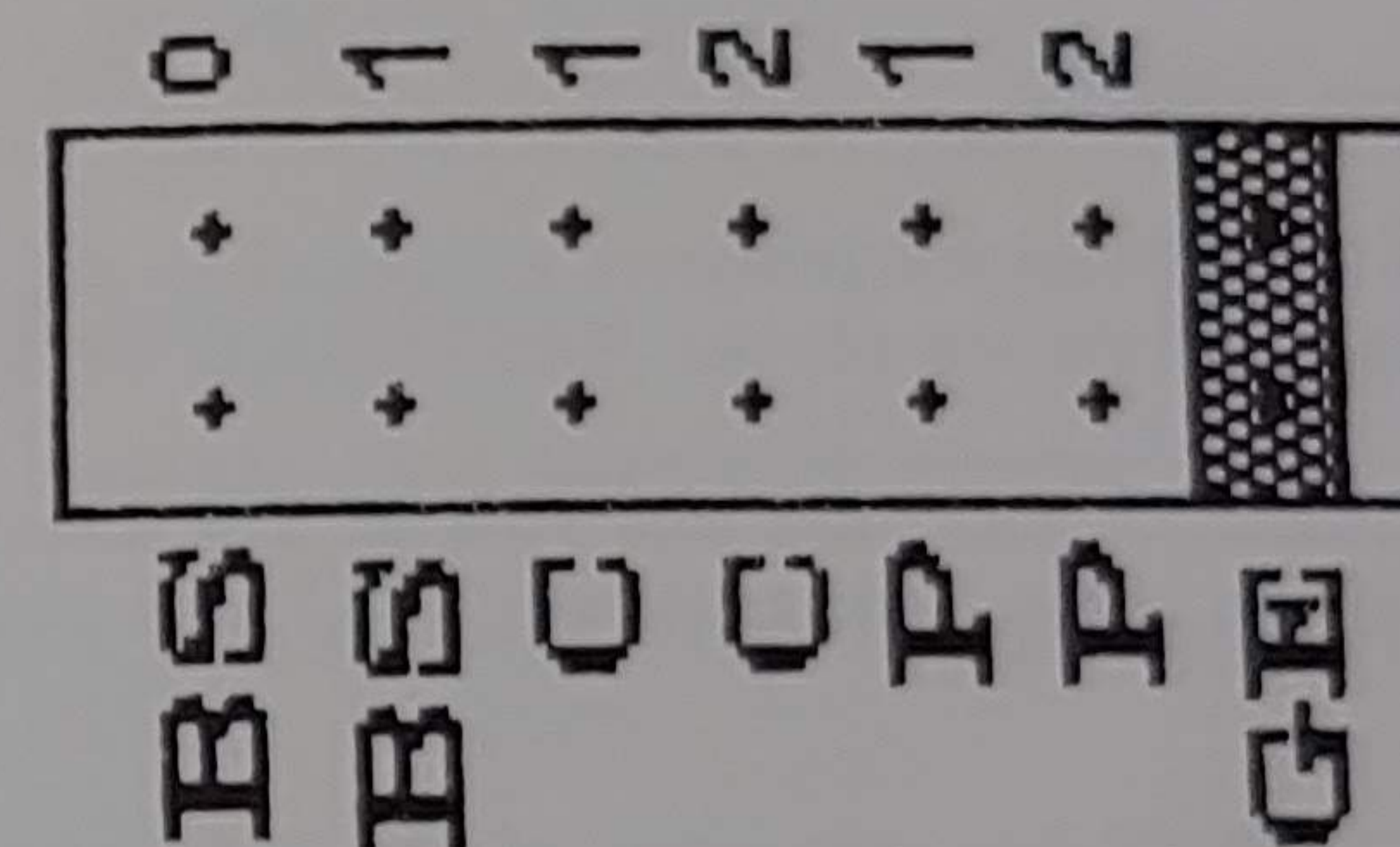
If the parallel port is to be disabled, remove the FASTCARD IV shorting plugs. (Attach one side of each shorting plug to one of the pins, so it will be there when you need it.)

SETTING UP A GAME PORT ON FASTCARD IV

FASTCARD IV has a Game Port Interface for attaching an IBM compatible game port.

See the illustration at the beginning of this section for the location of the Board/Port Select jumpers and the Game Port Interface.

To use the game port interface, place a shorting plug on the pins marked "GE" on the Board/Port Select jumpers, as illustrated below.



JUMPER SETTING TO ENABLE GAME PORT

Then, plug the game port cable (obtained from your local dealer) onto the game port interface connector.

USING THE RS-232C CONFIGURATION JUMPERS

See "Technical Information Regarding FASTCARD IV Ports" for instructions on using these jumpers.

FASTCARD IV MEMORY JUMPERS

See the illustration at the beginning of this section for the location of these jumpers.

The FASTCARD IV Memory jumpers are used to set the amount of memory installed on the FASTCARD IV board.

If your FASTCARD IV has only one row of DRAMs, place a shorting plug on the lower pin, marked "256," and the center pin.

If your FASTCARD IV has two rows of DRAMs, place a shorting plug on the upper pin, marked "512," and the center pin.

If your FASTCARD IV has more than two rows of memory installed, do not place any shorting plug on these pins.

PARITY JUMPERS

See the illustration at the beginning of this section for the location of these pins.

If you wish parity errors to be detected, place a shorting plug on these pins.

If you do not wish parity errors to be detected, do not place a shorting plug on these pins.■

INSTALLING RAM DISKS USING EMDISK.DRV

The FASTCARD diskette contains software for installing RAM (or "EM" for Expanded Memory) disks on your FASTCARD: EMDISK.DRV.

With the EMDISK.DRV program, you can set up many EM disks of virtually any size. The only limitation is the amount of Expanded Memory available on your FASTCARD(s).

HARD DISK SYSTEM

To use this feature on a hard disk system:

1. Copy EMDISK.DRV from the diskette to the hard drive's root directory.

2. Add EM disks to your system by adding

`DEVICE=EMDISK.DRV [# of kilobytes]`

to the root directory's CONFIG.SYS file for each EM disk you wish to add to your system. (Be certain that the `DEVICE=FASTIV.DRV` instruction is listed in the CONFIG.SYS file *before* the `DEVICE=EMDISK.DRV` instruction[s].)

For example, if you wish to add one EM disk of 320K and one EM disk of 1024K (1 megabyte), your CONFIG.SYS file should read:

```
DEVICE=FASTIV.DRV
DEVICE=EMDISK.DRV 320
DEVICE=EMDISK.DRV 1024
```

The default size of the EM disk is 512K.

If the number entered is not a multiple of 16K, FASTCARD will round the number up to the nearest 16K.

INSTALLING RAM DISKS

The EM disk drive designations will begin one letter after your hard drive(s). For instance, if you have a floppy drive A: and a hard drive C:, the first EM disk will be D:.

For further information, see "Installing FASTCARD Software on a Hard Disk System" in "Software Installation."

APPLICATIONS DISKETTES

If you have no hard drive, you may install this feature on any applications diskette used to boot your system.

1. Copy EMDISK.DRV from the diskette to the application diskette's root directory.
2. Add EM disks to your system by adding

```
DEVICE=EMDISK.DRV [# of kilobytes]
```

to the diskette's CONFIG.SYS file for each EM disk you wish to add. (Be certain that the DEVICE=FASTIV instruction is listed in the CONFIG.SYS file *before* the DEVICE=EMDISK.DRV instruction[s].)

For example, if you wish to add one EM disk of 320K and one EM disk of 1024K, the CONFIG.SYS file should read:

```
DEVICE=FASTIV
DEVICE=EMDISK.DRV 320
DEVICE=EMDISK.DRV 1024
```

The default size of the EM disk is 512K. If the number entered is not a multiple of 16K, FASTCARD will round the number up to the nearest 16K.

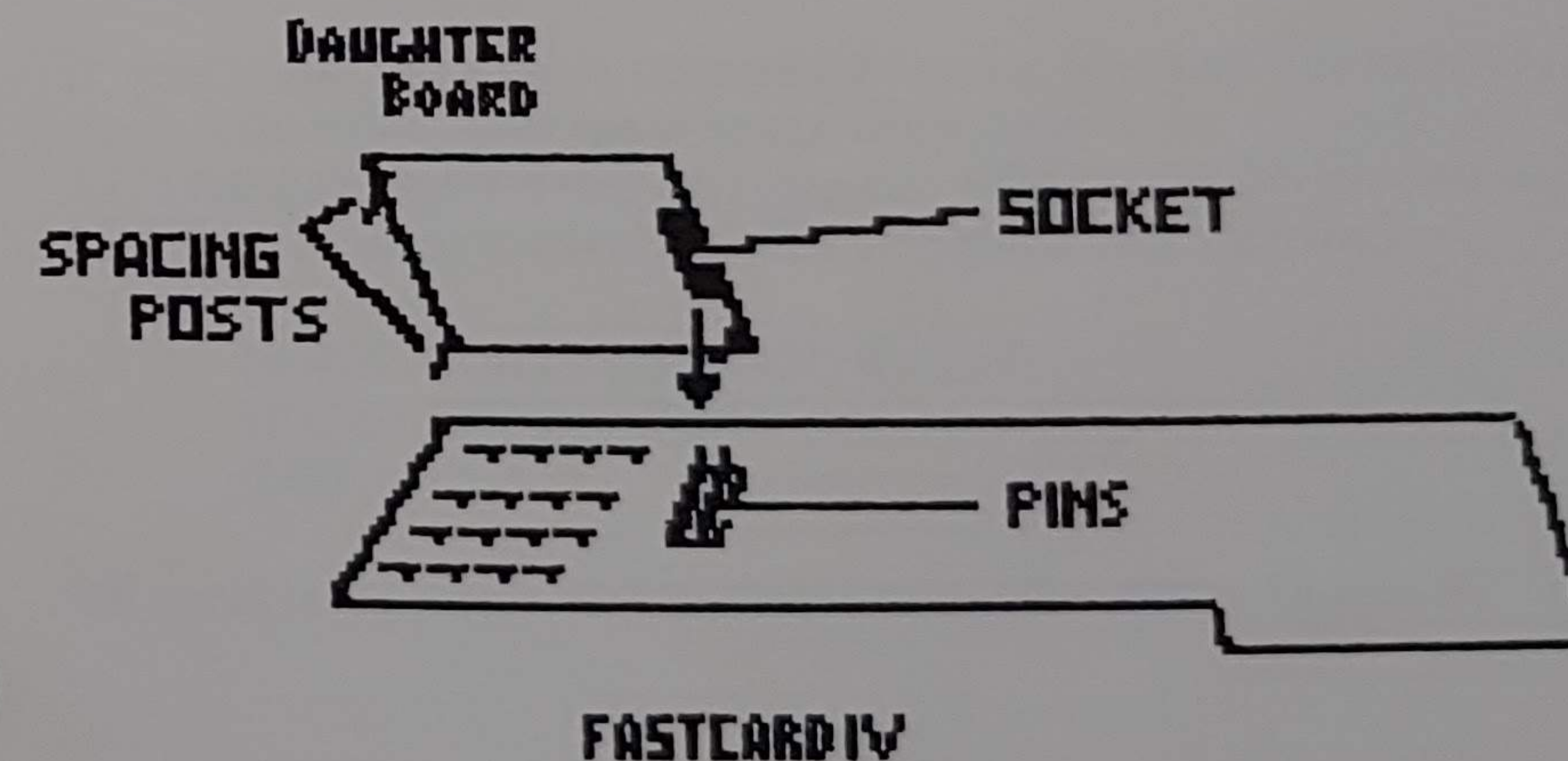
The EM disk drive designations will begin one letter after your floppy drive(s). For instance, if you have floppy drives A: and B:, the first EM disk will be C:.

For further information, see "Installing FASTCARD driver on Applications Diskettes" in "Software Installation."■

INSTALLING THE FASTCARD IV DAUGHTER BOARD

To install the FASTCARD IV daughter board:

1. Turn the computer off.
2. Remove FASTCARD IV from the computer and lay it flat on a table top.
3. Align the 34-pin socket on the back of the daughter board with the corresponding pins on FASTCARD IV.
4. Gently press the socket onto the pins, making certain that all the pins are seated properly.
5. Snap the spacer posts on the daughter board into the corresponding holes on FASTCARD IV.
6. Reinstall FASTCARD IV into the computer.■



SETTING UP FASTCARD IV TO BUFFER SERIAL PRINTERS

USING THE MODE AND FASTMENU COMMANDS

To set up FASTCARD IV to buffer serial printers (e.g., the Hewlett-Packard^R LaserJetTM), use the following method:

1. Before installing IMS, use the DOS MODE command to configure the serial port for your printer (for example `MODE COM1:9600,N,8,1,P`). (See your DOS manual for a complete explanation of the MODE command. See your printer's user manual for the exact entries.)
2. Use the DOS MODE command again to redirect the parallel port to the serial port (for example, `MODE LPT1:=COM1`).
3. Install IMS.

USING THE AUTOEXEC FILE

If you wish the above commands to be invoked automatically when you boot, you may enter them into your AUTOEXEC.BAT file, as follows. (*This is an illustration only.* See your printer's user manual for the exact entries.)

```
MODE COM1:9600,N,8,1,P
MODE LPT1:=COM1
IMS
```

Be certain to enter the commands in the order shown.■

INSTALLING DRAM'S ON FASTCARD IV

PRECAUTIONS AGAINST STATIC ELECTRICITY

Before beginning, please familiarize yourself with the following precautions against static electricity:

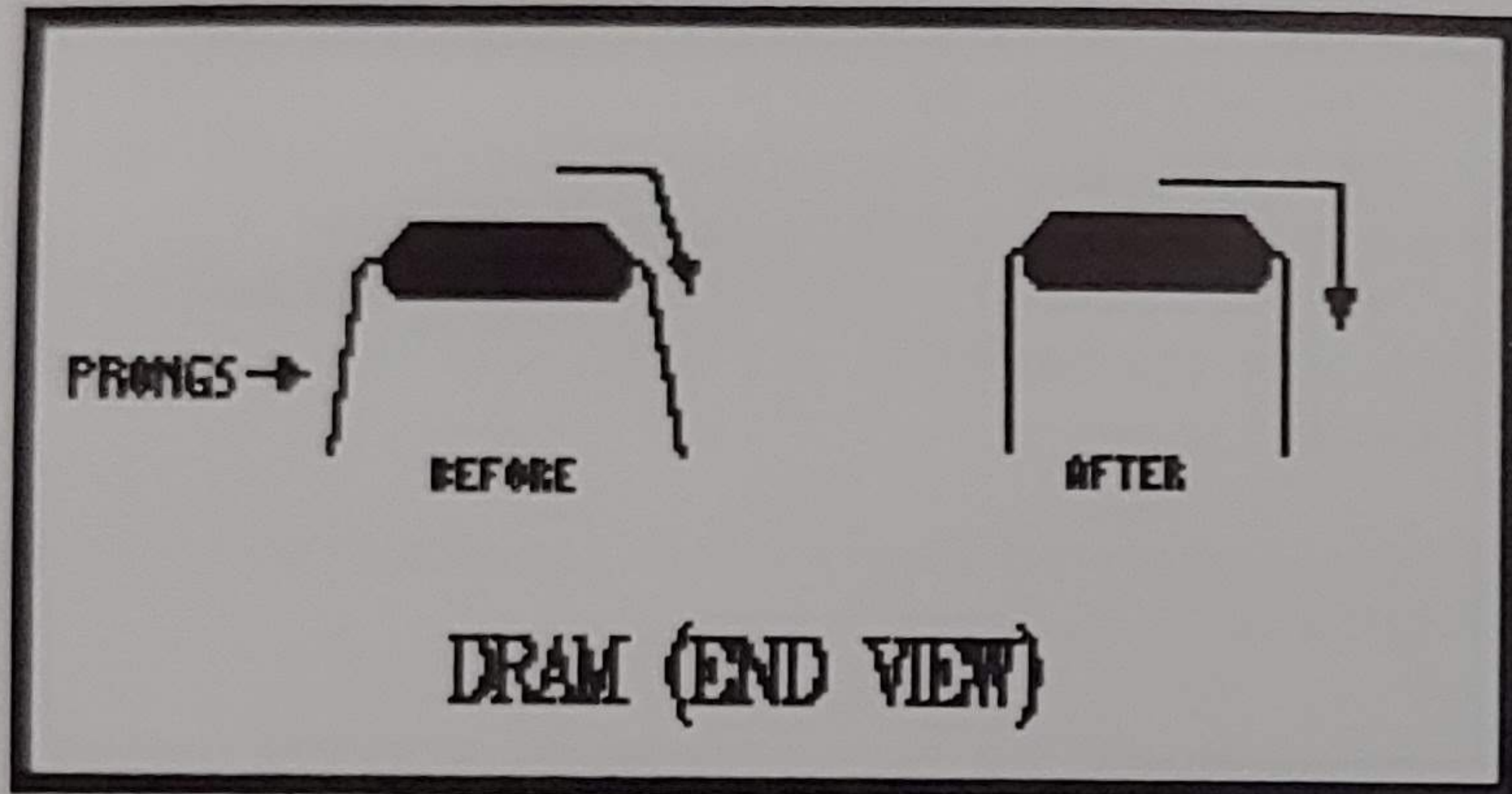
- Handle the board by the edges and the metal bracket only.
- Avoid carpeted floors while handling the board or the DRAMs.
- Avoid shuffling your feet while working on the board.
- After you are seated and ready to begin installing the DRAMs, discharge static electricity by touching the metal bracket on the board with one hand and a large metal grounded object (e.g., the metal chassis of your computer) with the other hand. Also, do this from time to time while installing the DRAMs.

INSTALLING THE DRAM'S

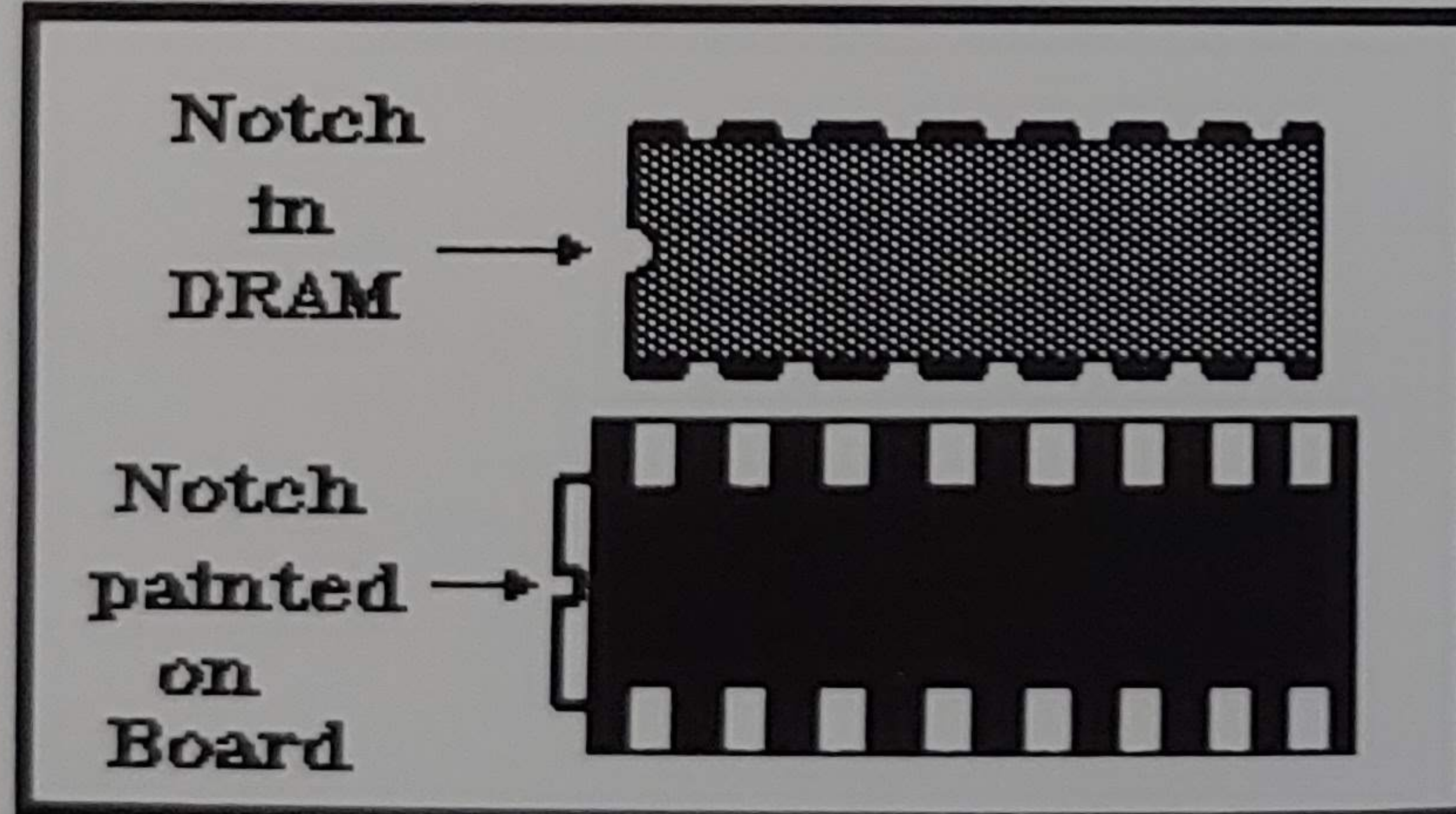
To install the DRAM chips on your FASTCARD IV (or your daughterboard), use the following guidelines:

1. Use only 200-nanosecond (or faster), 256K DRAMs.
2. Place the board face up on a flat surface, with the mounting bracket to your right.

- The DRAMs come with the prongs slightly splayed (see diagram below). Place the prongs against a flat surface and *gently* bend them until they are perpendicular to the top of the DRAM.



- Starting with the socket at the top of the leftmost empty vertical row, line up the DRAM so the notch (or dot) at the end of the DRAM is at the same end as the notch painted on the board at the end of the socket. (See diagram below.)



- Making certain *all* the prongs on the DRAM are lined up in the corresponding holes in the socket, press the DRAM into the socket. *Be careful.* The prongs can be bent *very* easily.

- After the DRAM is inserted, make certain that the prongs are all properly in place and that none are bent.
- If you find any prongs which are bent or improperly inserted, remove the DRAM by using a small screwdriver to *gently* lift it from the socket.
- Fill only entire rows of sockets. Do not partially fill a vertical row. ■

IBM INSTALLATION NOTES

IBM PC USERS

(If you are using a 64K IBM PC, you must upgrade your ROM BIOS before using FASTCARD IV to fill system memory. See your dealer. In addition, you will not be able to run the FCSETUP program, which requires 128K. Refer to the chapter "FASTCARD IV Switch and Jumper Settings" for the correct settings for your board, or call THESYS User Assistance.)

If FASTCARD IV is being used to fill system memory to 640K, set DIP switch 2 on your PC motherboard to the following:

<u>Switch</u>	<u>Setting</u>
1	On
2	Off
3	On
4	On
5	Off

System memory on the motherboard should be fully populated to 256K before installing FASTCARD IV.

IBM XT USERS

System memory on the XT motherboard should be fully populated to 256K before installing FASTCARD IV. (No motherboard switch settings are required.)

IBM AT USERS

(Note: This section is for those IBM AT users who wish to use FASTCARD IV's memory to fill their AT's memory to 640K. If you do not wish to use FASTCARD IV's memory to fill your system memory to 640K, set switches 5, 6, 7, and 8 on the FASTCARD IV board to the "Off" position.)

If you have less than 640K of system memory installed in your IBM AT (before installing FASTCARD IV) and you wish FASTCARD IV to fill your system memory to 640K, run the FCSETUP program on the FASTCARD IV diskette. See "Hardware Installation."

Then:

IF YOU HAVE 256K OF MEMORY (BEFORE INSTALLING FASTCARD IV):

1. Set the shorting plug on jumper J18 on your AT motherboard to cross the two pins located nearest to the front of the computer. (The J18 jumper is located at the front center of the AT.)
2. Install FASTCARD IV with the settings shown in the FCSETUP program.
3. After the board is installed, run your IBM AT Diagnostics disk and set the *Base Memory Size* to 640K. (Do *not* adjust the AT's *Expansion Memory* size for FASTCARD IV.)

IF YOU HAVE 512K OF MEMORY (BEFORE INSTALLING FASTCARD IV):

1. Install FASTCARD IV with the settings shown in the FCSETUP program.
2. After the board is installed, run your IBM AT Diagnostics disk and set the *Base Memory Size* to 640K. (Do *not* adjust the AT's *Expansion Memory* size for FASTCARD IV.)■

INSTALLING FASTCARD IV IN A COMPUTER WITH FASTCARD III

If you are installing your FASTCARD IV into a computer which already has one or more FASTCARD IIIs installed, use the following procedure:

1. Run FASTMENU Option 4, Reset for Reinstallation, before installing FASTCARD IV.
2. Turn off power to your computer and remove the FASTCARD III(s) from the computer.
3. If any of the FASTCARD III memory has been used to fill system memory to 640K, reset your computer's motherboard switches back to the original amount of memory.
4. Insert the FASTCARD IV according to the procedure outlined in this manual.
5. Install your FASTCARD III(s) into the computer, just as if it were a new installation, using the procedure outlined in the FASTCARD III User Manual. Install each board separately, running the FCSETUP program each time.

When reinstalling the FASTCARD III(s), be sure to use the FCSETUP program on the FASTCARD III diskette, not the FASTCARD IV diskette. They are not the same. ■

CHANGING THE FASTCARD IV BATTERY

Your FASTCARD IV battery has a life expectancy of about two years. You'll know it needs to be replaced when the clock no longer sets the correct time.

To change the battery:

1. Turn off power to the computer.
2. Touching it only by the edges, remove FASTCARD IV from the computer.
3. Gently lift the battery retaining clip. Be careful not to bend the clip.
4. Use a small screwdriver to lift up the battery and slide it out.
5. Insert the replacement battery (RAY-O-VAC 3V BR2325, or equivalent), positive (+) side up, gently under the retaining clip.
6. Make certain the retaining clip is firmly holding the battery.
7. Reinstall FASTCARD IV in the computer.■

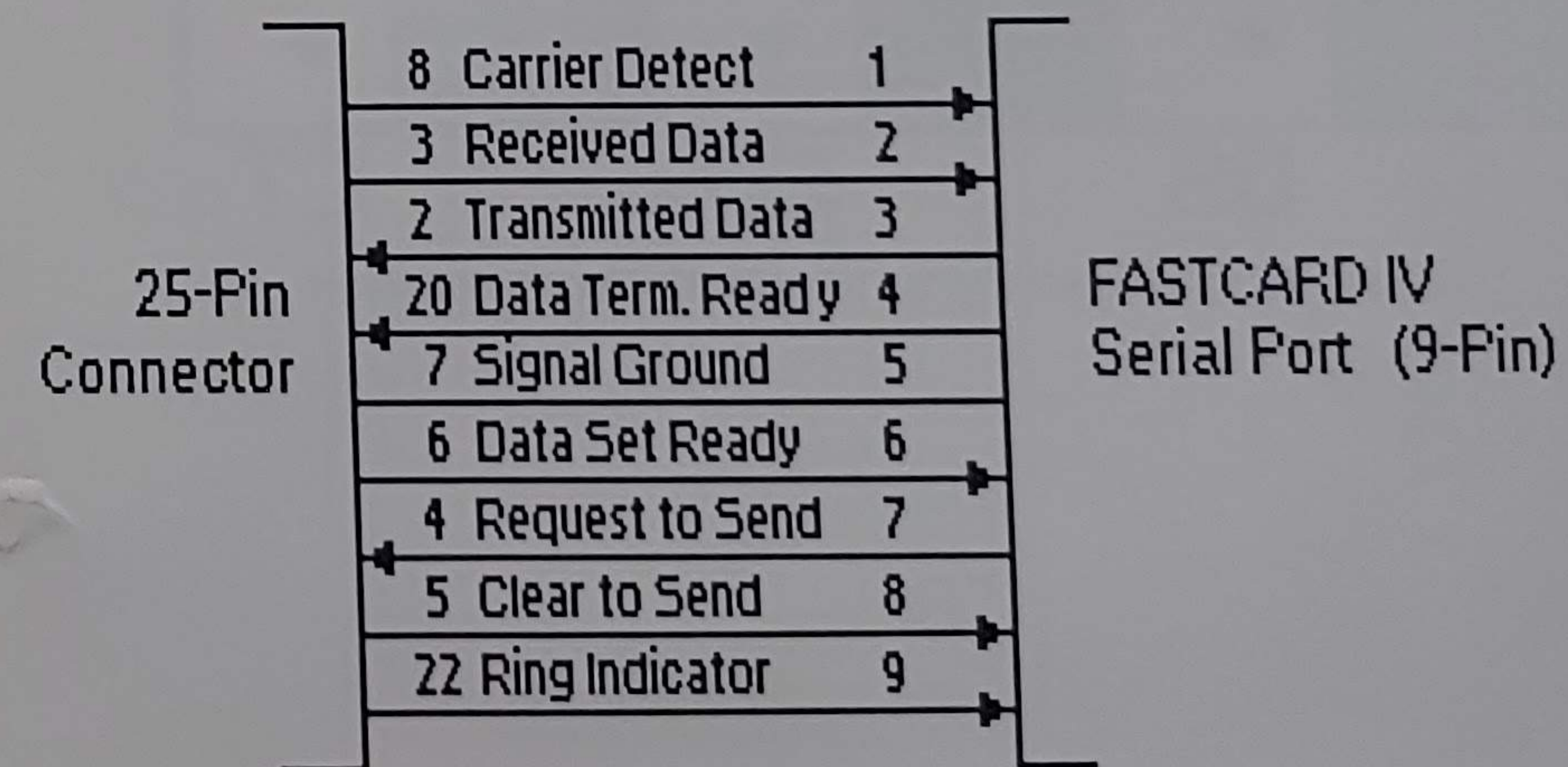
TECHNICAL INFORMATION REGARDING FASTCARD IV PORTS

SERIAL PORT PINOUTS

1. CARRIER DETECT (DCD)
2. RECEIVED DATA (RXD)
3. TRANSMITTED DATA (TXD)
4. DATA TERMINAL READY (DTR)
5. SIGNAL GROUND (GND)
6. DATA SET READY (DSR)
7. REQUEST TO SEND (RTS)
8. CLEAR TO SEND (CTS)
9. RING INDICATOR (RI)

CONVERSION TO 25-PIN CONNECTOR

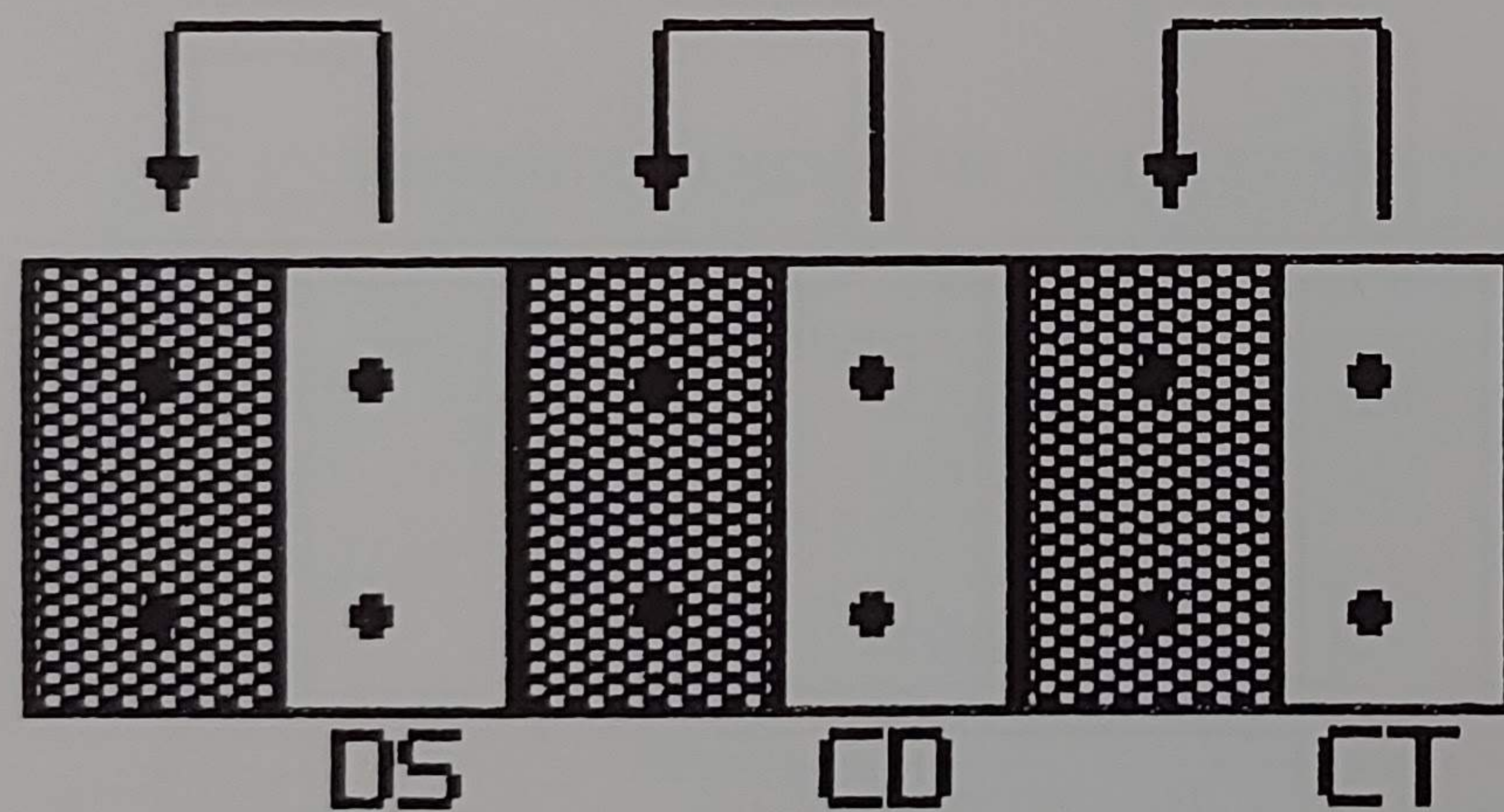
If you wish to adapt the FASTCARD IV 9-pin serial port to use a 25-pin connector, use the following connector specifications:



SERIAL PORT RS-232C CONFIGURATION BLOCK

The RS-232C Configuration Block is located along the upper edge of FASTCARD IV near the mounting bracket. In the factory-default configuration, the shorting plugs on the RS-232C Configuration Block are set at positions DS (DSR), CD (DCD), and CT (CTS). In this configuration, RS-232C inputs are *not* disturbed as they come into FASTCARD IV. Driving the inputs is left up to whatever device is being used.

If you are using a device which does not drive RS-232C inputs, you must force the DSR, DCD, and CTS inputs true. To do so, move each of the three shorting plugs to the blank position to the left of each default position.



RS-232C SHORTING PLUGS IN FORCED-TRUE POSITION

PARALLEL PORT PINOUTS

1. -STORE
2. DATA BIT 0
3. DATA BIT 1
4. DATA BIT 2
5. DATA BIT 3
6. DATA BIT 4
7. DATA BIT 5
8. DATA BIT 6
9. DATA BIT 7
10. -ACKNOWLEDGE
11. BUSY
12. PAGE END
13. SELECT
14. -AUTO FEED
15. -ERROR
16. -INITIATE
17. -SELECTION
18. GROUND
19. GROUND
20. GROUND
21. GROUND
22. GROUND
23. GROUND
24. GROUND

GAME PORT INTERFACE PINOUTS

1. +5V
2. +5V
3. BUTTON A1
4. BUTTON B1
5. X AXIS FOR A
6. X AXIS FOR B
7. GROUND
8. GROUND
9. GROUND
10. Y AXIS FOR B
11. Y AXIS FOR A
12. BUTTON B2
13. BUTTON A2
14. +5V
15. +5V■

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