

**KTM-8000/386**

**Memory Expansion Board  
for IBM PS/2 Model 70  
and Model 80**



KTM-8000/386

**Memory Expansion Board for IBM  
PS/2 Model 70 and Model 80  
Computers**

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## KTM-8000/386

# Memory Expansion Board

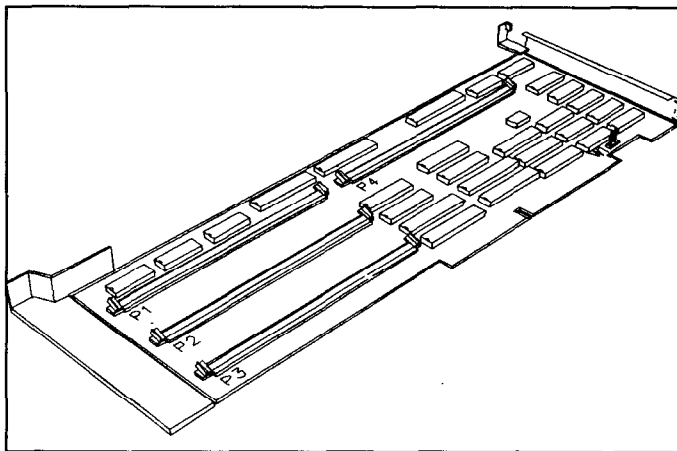
### General Description

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The Kingston Technology Corporation (KTC) memory board can expand the memory of the IBM PS/2 Model 70 or 80 personal computer. Up to four 2MB SIMM modules can be installed directly on the KTM-8000/386 32-bit system memory board.

Install two KTM-8000/386 memory expansion boards for a maximum 16MB system memory capacity.

Figure 1 shows the KTM-8000/386 memory expansion board.



**Figure 1: KTM-8000/386 Memory Expansion Board**

### Precautions

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The KTC memory boards are packaged in special static "bubble" envelopes that protect them from shock and static electricity that could cause damage to the memory chips. Handle the memory boards carefully and keep them in the protective envelope until you are ready to install them.

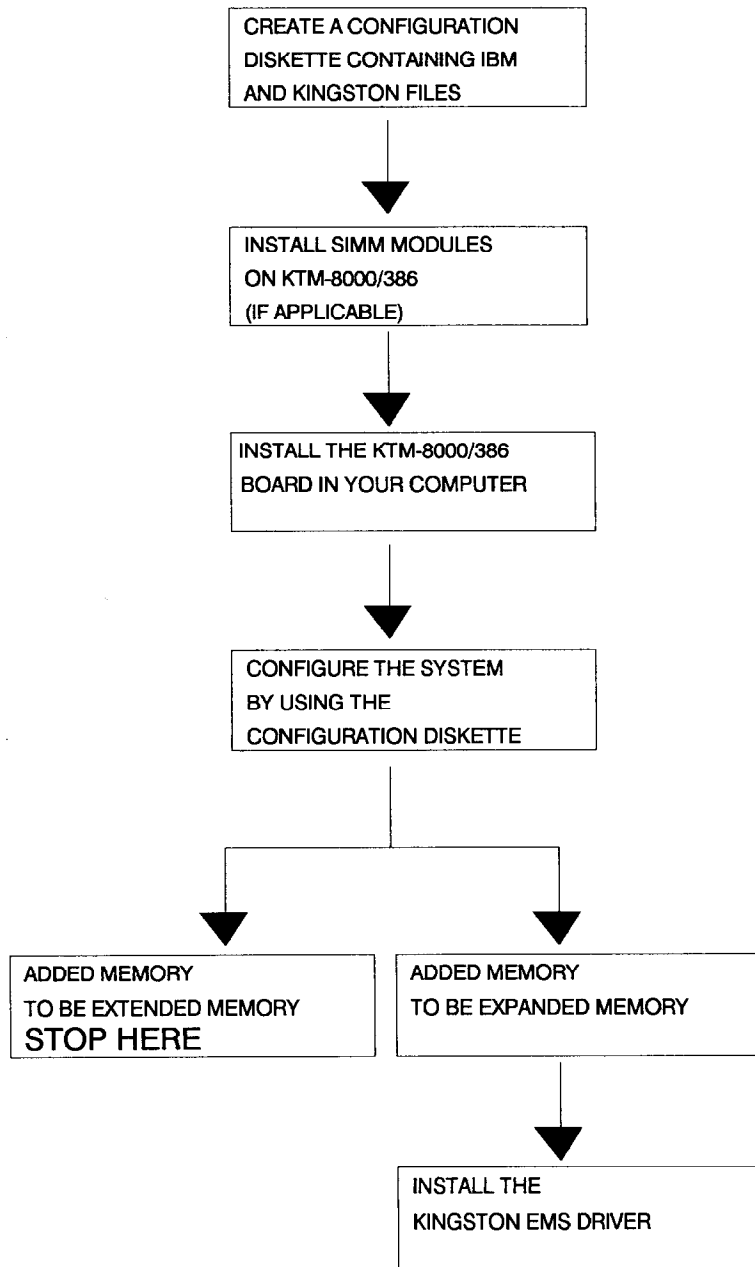
Before handling the KTC board, be sure

you are discharged of static electricity by touching a grounded metal object.

Do not use any magnetic tools for memory installation. Do not place the boards near any magnetic devices.

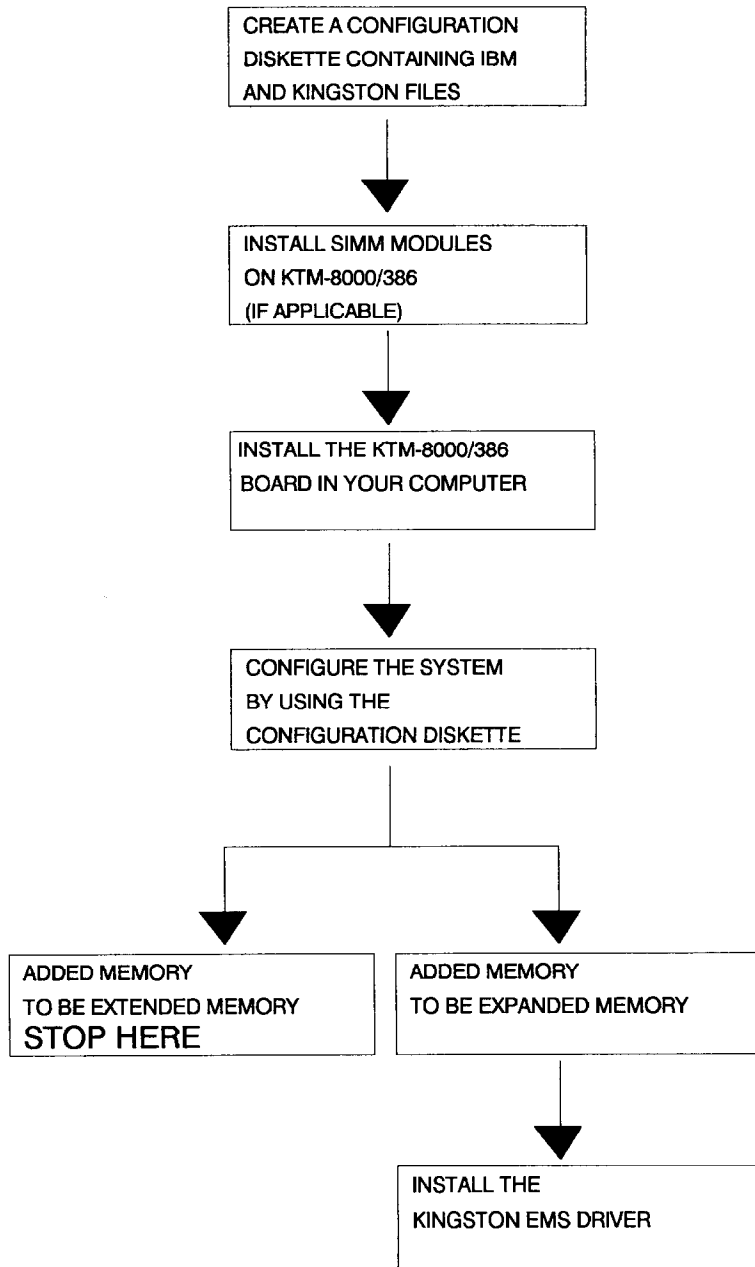
**Installation Procedure**

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### Installation Procedure

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## Installing SIMM Modules

Use Kingston's 2MB SIMM modules (KTM-2000/M70) or equivalent to plug into the KTM-8000/386 memory expansion board.

Use the following figures and procedure to install SIMM memory modules onto the KTM-8000/386 expansion memory board.

1. SIMM modules must be installed consecutively in P1, P2, P3, and then P4. Install the first SIMM module in memory bank 0 (P1) shown in Figure 1.

The second SIMM module is installed in memory bank 1 (P2). Up to four SIMM modules can be installed, where the last SIMM module occupies bank 3 (P4).

2. Install each module by plugging it into the appropriate SIMM socket. Notice that the SIMM module plugs into the socket at an angle (Figure 2).

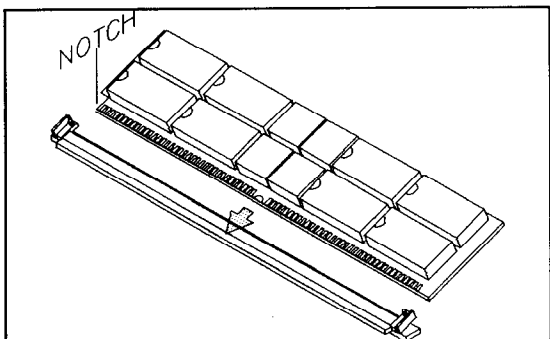


Figure 2: Installing the SIMM Modules

3. Carefully push the SIMM module into the SIMM socket until it is firmly seated.
4. Push the SIMM module towards the memory expansion board. Push downwards on the SIMM module until the flange shown in Figure 3 snaps over the module.

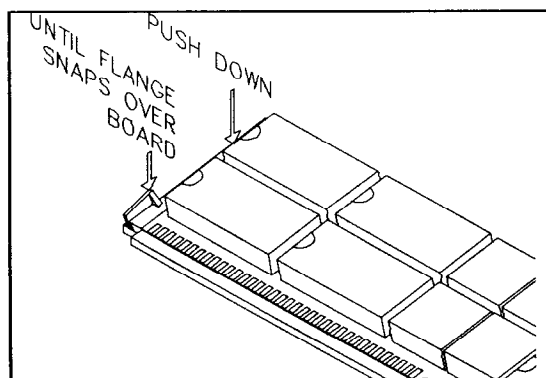


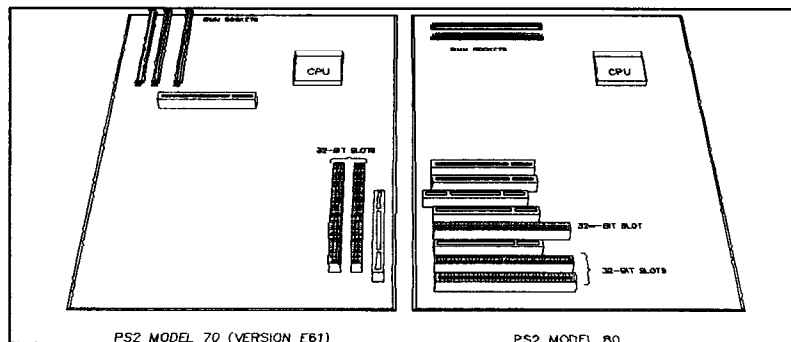
Figure 3: Installing the SIMM Module

## Installing the Memory Expansion Board

Once you plug the desired number of SIMM modules into the KTM-8000/386 memory board and you have created the Configuration Diskette, you can install the KTM-8000/386 board into the IBM PS/2 computer. Use the following procedure to install the KTM-8000/386.

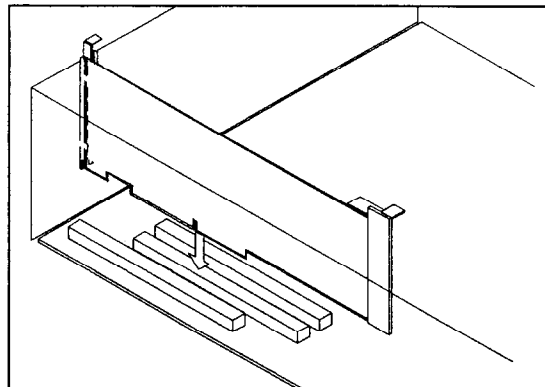
1. Turn off the PS/2 computer and disconnect the AC cord. Unlock the security lock and disconnect the keyboard and any peripheral devices.
2. Refer to your IBM user's manual for detailed instructions on removing the cover.
3. The KTM-8000/386 must be installed in a 32-bit expansion slot on the PS/2 motherboard. The 32-bit expansion slots are longer than other expansion slots. Figure 4 shows the location of the expansion slots.

The Model 70 has two expansion slot locations. Figure 4 shows version E61. Your locations may vary, depending on your version. Figure 4 also shows the three expansion slot locations for the Model 80 (version III).



**Figure 4: 32-bit Memory Expansion Slots**

4. Plug the KTM-8000/386 into one of the 32-bit expansion slots. Push the board down until it seats firmly into the slot.



**Figure 5: Installing the KTM-8000/386**

5. Reinstall the PS/2 cover and reconnect the peripheral components.

## Configuring the System

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With the KTM-8000/386 board added to the system, you have to reconfigure the system so that the system will recognize the new board. You can use the Configuration Diskette created earlier to accomplish this.

1. Insert the Configuration Diskette in drive A.
2. Turn on the computer. The screen should display the size of base memory, followed by the number 165. This indicates a new device has been installed on the system. The IBM logo will appear after 5-10 seconds.
3. Press **[ENTER]** to generate the next screen display.
4. At the message "Automatically configure the system? (Y/N)", press **[Y]**.
5. After the automatic configuration is done, remove the Configuration Diskette and press **[ENTER]** to reboot the system. The screen will display the total memory as installed during the reboot process.



## Installing Kingston EMS Driver

After you install the memory expansion board and reconfigure the system, the system will treat the added memory as extended memory. If that is what you want, stop here.

In some cases, you have to use the added memory as expanded memory, because it is required by the application program. Then you have to install the Kingston EMS Driver (on Kingston Option Diskette) onto your boot disk by using the following procedure.

**Note:** If you are not familiar with the extended or expanded memory, refer to Appendix A for details.

Before you install KEMM.SYS, copy the file KEMM.SYS to the directory of your system disk.

1. Insert the Kingston Options Diskette in floppy drive A .

Then, you should make a new directory on your system disk for EMS driver program.

At "C:\\" prompt (if you booted from hard drive) type the following:

```
CD\                                {ENTER}
MD KTCEMS                          {ENTER}
COPY A:\KTCEMS\KEMM.SYS
C:\KTCEMS\KEMM.SYS                 {ENTER}
(type all in one line)
```

Most systems have a CONFIG.SYS file for the computer to load special software device drivers each time the system is booted up.

Modify your CONFIG.SYS file to include the EMS driver in the next step.

2. After you copy the KEMM.SYS file, use a text editor to add the following line into your CONFIG.SYS file:

```
DEVICE=C:\KTCEMS\KEMM.SYS.
```

If the KEMM.SYS is installed without any special parameters, it will look for an available page frame segment address and use **all** available extended memory.

3. You can also add parameters to your KEMM.SYS command line for special needs. The extra parameters are organized in the following format:

```
DEVICE=C:\KTCEMS\KEMM.SYS
FRAME=XXXX BASE=YYYYY HAND-
LES=ZZZ
(type all in one line)
```

Where...

**XXXX** This parameter tells KEMM.SYS where to look for a valid page frame. The page frame is the first address of the EMS mapping window.

**Example**            **FRAME=C000**

**YYYYY** This parameter tells KEMM.SYS where the start of extended memory is to use. Use the following formula to specify the amount of expanded memory for the expanded mode:

**YYYYY=TOTAL MEMORY (KB)+384 - AMOUNT OF EXPANDED MEMORY (KB)**

Example, if your system has a total of 8MB (8,192KB) of memory, 640KB of base memory and 7,552KB of extended memory, and you want to have 2MB (2,048KB) of expanded memory, do the following:

**YYYYY=8192+384 - 2048=6428**

Then you can specify the BASE parameter like this:

**BASE=6428**

**ZZZ** This parameter specifies the number of handles and names available. Handles are the values the memory manager assigns to identify a block of memory requested by an application program. Each application that uses expanded memory requires at least one handle. Some need more than one, and they let you know if they run out of handles. The parameter must be in the range of 16 to 255. Note that

each handle/name increases the amount of expanded memory required and decreases the amount available for the application program. The default (32) should be adequate for most purposes.

**Example HANDLES=64**

4. After you install KEMM.SYS, the system must be re-booted to load the KEMM.SYS EMS device driver. Do this by turning off your computer and then turning it on again, or do a soft boot by pressing the {CTRL} {ALT} {DEL} keys simultaneously.

If your computer system has a total of 10MB of expanded memory and the file CONFIG.SYS has DEVICE = C:\KTCEMS \KEMM.SYS

And when the system booting up, the following messages will appear:

```
KEMM: 80386 Expanded Memory Manager V.4.0
Copyright © 1990, Kingston Technology Corp.
Page Frame Address at SEGMENT C000H
Total EMS Memory is 9472Kbyte (592 pages)
```

```
KEMM: EMS driver is successfully loaded!
```

## **Reconfigure Kingston EMS Driver**

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Any time you want to change the installation parameters, simply repeat the steps in section 3.1.3 and 3.1.4.

## Appendix- Extended VS. Expanded Memory

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### Base Memory

Memory from the 0 byte memory up to the 640K limit (00000h-9FFFFh). This memory area is usable by DOS for programs and data.

9FFFFh) memory address limit for program data.

This type of memory allows program data to be as large as 8MB in size (EMS Ver.3.2) or 32MB in size (EMS Ver.4.0).

### Memory Reserved

Memory addresses of 640K-1024K (A0000h-FFFFFh) can not be addressed by user. This area is reserved for programs used by the system in order for the computer to function. It is also used as the I/O port address area for EXPANDED MEMORY (called page frame). Also, the memory addresses of 16256K to 16384K (FE0000h-FFFFFh) are also reserved for system use.

Expanded memory did not exist when your computer and its operating system (DOS) were invented. Because of this, DOS itself cannot recognize and use any expanded memory space defined on your memory expansion adapter. In order to use expanded memory space, you need a special device driver program that must be run each time you boot up the computer system. You also need special software that can use expanded memory space.

### Extended Memory

Memory from 1 to 16 megabyte memory address (100000h-FFFFFFh). This area can be used by the user application to store data and programs. DOS does not recognize this memory space, but certain programs can use this memory space (notably the VDISK > SYS RAM disk utility and the OS/2 disk operating system).

On the KINGSTON Option Diskette that accompanies your Memory Expansion Adapter, there is a file called KEMM.SYS (under subdirectory \KTCEMS) that allows you to access expanded memory space. Regardless of how much of extended memory you have installed that are capable of defining expanded memory space (up to a maximum of 15MB of expanded memory space). You only need to define the number of expanded memory space that you think is enough for your purpose.

### Expanded Memory

Memory (specification developed by a joint project of LOTUS, INTEL, and MICROSOFT) that can be accessed by specially-modified software in order to overcome the DOS-imposed 0K-640K (00000h-

**Notes:**