KTM 3077-2 & 3011-4

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

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KTM 3077-2 & 3011-4 Installation Guide - REV C   Kingston Technology Corporation

<center>KTM 3077-2 & 3011-4</center>

Memory Expansion Boards

1.   General Description

The KTM 3077-2 (2MB memory board) and KTM 3011-4 (4MB memory board) are the memory expansion boards for upgrading the IBM PS/2 model 70 and 80 personal computers. Up to 16 MB of RAM can be installed on the board by using KTM-1000/M70 (1-MB SIMM), KTM-2000/M70 (2-MB SIMM), or KTM-4000/M70 (4-MB SIMM) modules.

There are four SIMM sockets on the board and they are numbered as P1, P2, P3, P4. If you are not using all four sockets, then you must use P1 for one SIMM, P1 and P2 for two SIMMs, and P1, P2 and P3 for three SIMMs. Futhermore, within the sockets you are using, you have to install the SIMM module in a descending sequence with 4-MB SIMM module the first, 2-MB SIMM module the second, and 1-MB SIMM module the last. Sample configurations of 1-MB, 2-MB, and 4-MB SIMM modules on the memory board are shown in Table 1 of Section 2.3.

Figure 1 shows the memory board and its SIMM sockets P1, P2, P3, and P4. This board can be installed in any 32-bit expansion slot on the PS/2 system board.

1.1. Checklist

The memory expansion board comes with this Installation Guide and a Kingston Option Diskette. If any item is missing or damaged, contact the place where you made the purchase of this board.

1.2. Precautions

The KTC memory boards are packaged in anti-static plastic bags that protect them from static electricity that could cause damage to the memory chips. Handle the memory boards carefully and keep them in the anti-static bags until you are ready to install them.

Before handling the Kingston memory board, be sure you are discharged of static electricity by touching a grounded metal object.

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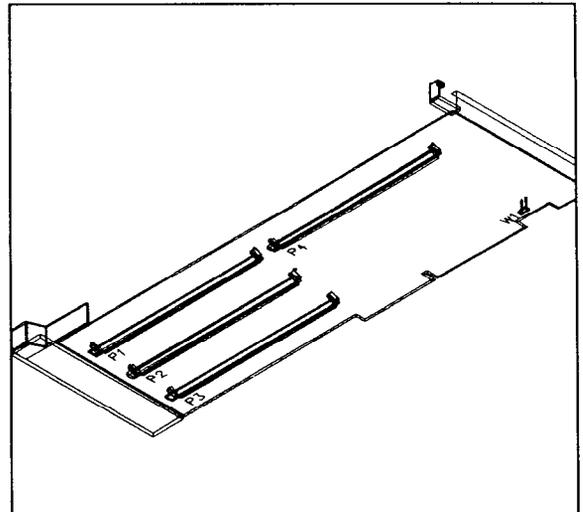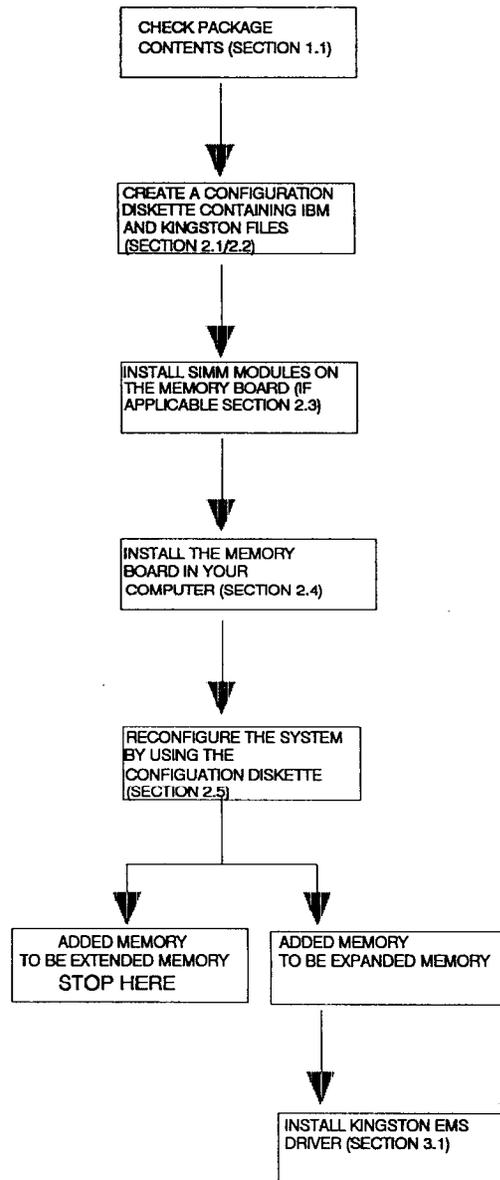

Figure 1:   KTM 3077-2 & 3011-4 Memory Expansion Boards

2.   Installation Procedure

A simple flow chart is provided below to help you better understand the installation process.

```
        ┌─────────────────────────┐
        │ CHECK PACKAGE           │
        │ CONTENTS (SECTION 1.1)  │
        └─────────────────────────┘
                    │
                    ▼
        ┌─────────────────────────┐
        │ CREATE A CONFIGURATION  │
        │ DISKETTE CONTAINING IBM │
        │ AND KINGSTON FILES      │
        │ (SECTION 2.1/2.2)       │
        └─────────────────────────┘
                    │
                    ▼
        ┌─────────────────────────┐
        │ INSTALL SIMM MODULES ON │
        │ THE MEMORY BOARD (IF    │
        │ APPLICABLE SECTION 2.3) │
        └─────────────────────────┘
                    │
                    ▼
        ┌─────────────────────────┐
        │ INSTALL THE MEMORY      │
        │ BOARD IN YOUR           │
        │ COMPUTER (SECTION 2.4)  │
        └─────────────────────────┘
                    │
                    ▼
        ┌─────────────────────────┐
        │ RECONFIGURE THE SYSTEM  │
        │ BY USING THE            │
        │ CONFIGUATION DISKETTE   │
        │ (SECTION 2.5)           │
        └─────────────────────────┘
              │             │
              ▼             ▼
    ┌──────────────────┐ ┌──────────────────┐
    │ ADDED MEMORY     │ │ ADDED MEMORY     │
    │ TO BE EXTENDED   │ │ TO BE EXPANDED   │
    │ MEMORY           │ │ MEMORY           │
    │ STOP HERE        │ │                  │
    └──────────────────┘ └──────────────────┘
                               │
                               ▼
                     ┌──────────────────┐
                     │ INSTALL KINGSTON │
                     │ EMS DRIVER       │
                     │ (SECTION 3.1)    │
                     └──────────────────┘
```

2.1. Getting Started

You need the memory expansion board, Kingston SIMM modules, the Kingston Option Diskette, and a backup copy of the IBM PS/2 Reference Diskette for the installation.

Follow the IBM PS/2 Quick Reference Manual to make a backup copy of the reference diskette if you do not have one.

2.2. Create Configuration Diskette

You need to configure the new system after the memory expansion board is installed. To configure the new system, you need to create a Configuration Diskette.This diskette should have all the neccessary files from both the IBM Reference Diskette and Kingston Option Diskette. The following steps will show you how to copy the board drivers from the Kingston Option Diskette onto your backup copy of the IBM Reference Diskette.

The Configuration Diskette is the backup copy of the IBM Reference Diskette with Kingston board drivers on it.

2.2.1.   Insert the backup copy of the IBM Reference Diskette in drive A and start the computer.

2.2.2.   When the IBM logo appears, press [ENTER] to generate the next screen display (main menu).

2.2.3.   Select "Copy an Option Diskette" from the main menu and follow the instructions from the screen. The Kingston board drivers will be copied from the Kingston Option Diskette to the backup copy of the IBM Reference Diskette. Now, you have created a Configuration Diskette that contains both IBM and Kingston files.

2.2.4.   Turn off the computer.

2.3. Installing SIMM Modules

Note: If the SIMM modules are already installed and you do not intend to remove or add any SIMM modules on the board, skip this section and go to Section 2.4.

Kingston Technology manufactures 3 SIMM modules to work with the KTM 3077-2 & 3011-4 boards. They are:

KTM-1000/M70   1-MB SIMM Module
KTM-2000/M70   2-MB SIMM Module
KTM-4000/M70   4-MB SIMM Module

The following rules must be followed when installing the SIMM modules.

- Determine how many MB is to be on the board and get the SIMM modules ready for installation.

- Use SIMM socket P1 for one SIMM, SIMM sockets P1and P2 for two SIMMs, SIMM sockets P1, P2, and P3 for three SIMMs, and SIMM sockets P1, P2, P3, and P4 for four SIMMs.

- Install the 4-MB SIMM module(s) first and start with SIMM socket P1.

- Install the 2-MB SIMM module(s) next and start with the next available SIMM socket.

- Install the 1-MB SIMM module(s) last and start with the next available SIMM socket.

Sample configurations of SIMM modules on the memory board are shown in Table 1 for your reference.

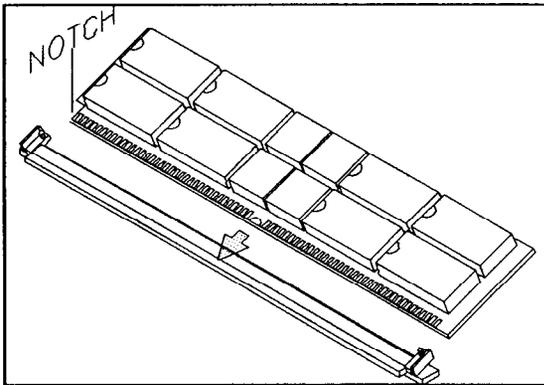Use the following figures and procedure to install SIMM modules onto the memory expansion board.

Figure 2:   Installing the SIMM Module

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

2.3.2.   Carefully push the SIMM module into the SIMM socket until it is firmly seated.

2.3.3.   Push the SIMM module toward the memory expansion board. Push downwards on the SIMM module until the flange shown in Figure 3 snaps over the module.
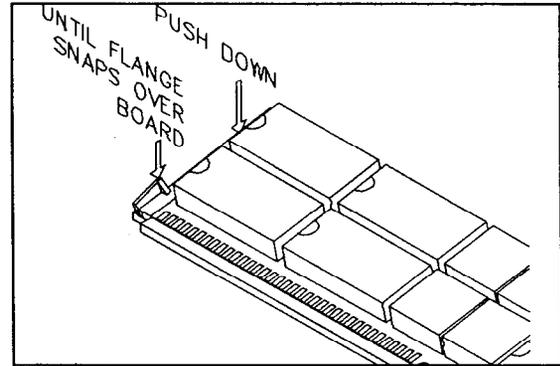
Figure 3:   Installing the SIMM Module

Total Memory on Board (MB)		SIMM Socket Locstions P1	P2	P3	P4
16		4	4	4	4
14		4	4	4	2
13		4	4	4	1
12		4	4	4	-
11		4	4	2	1
10		4	4	2	-
9		4	4	1	-
8		4	4	-	-
7		4	2	1	-
6		4	2	-	-
5		4	1	-	-
4	(KTM 3011-4)	4	-	-	-
3		2	1	-	-
2	(KTM 3077-2)	2	-	-	-
1		1	-	-	-

Table 1: Sample Configurations of SIMM Modules on KTM 3077-2 & 3011-4 boards

NOTE: This table does not represent all possible configurations.

2.4. Installing the Memory Board

2.4.1. Turn off the computer and all attached devices. Disconnect all the cables from the computer and remove the computer cover.
Refer to your IBM user's manual for detailed instructions on removing the cover.

2.4.2. The memory board must be installed in a 32-bit expansion slot on the system board. The 32-bit expansion slots are longer than other expansion slots.
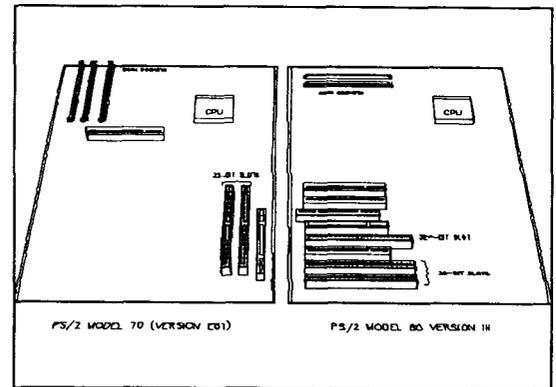
The Model 70 has two expansion slot locations. Figure 4 shows version E61. Your location may vary, depending on your version. Figure 4 also shows the three expansion slot locations for the Model 80 version III.

Figure 4:   32-bit Expansion Slots

2.4.3. Install the memory board into one of the 32-bit expansion slots. Push the board down until it seats firmly into the slot. See Figure 5.
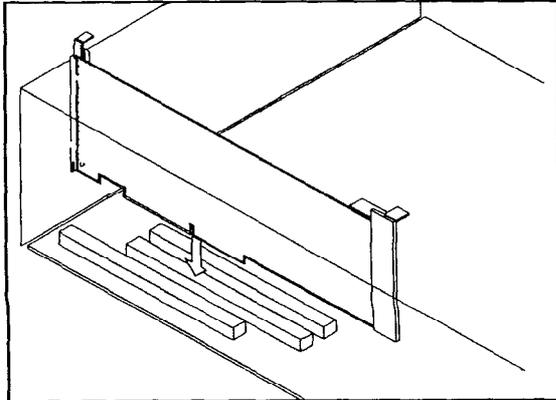

Figure 5: Installing the Memory Board

2.4.4. Reinstall the cover and reconnect all attached devices to the computer.

2.5. Configuring the System

With the memory 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 in Section 2.2 to accomplish this.

2.5.1. Insert the Configuration Diskette in drive A.

2.5.2. 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.

2.5.3. Press [ENTER] to generate the next screen display.

2.5.4. At the message "Automatically configure the system? (Y/N)", press [Y].

2.5.5. 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.

3. 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.

3.1. Installing Kingston EMS Driver

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

3.1.1. 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.

3.1.2. 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 paramemters, it will look for an available page frame segment address and use **all** available extended memory.

3.1.3. 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 applica-
         tion 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

3.1.4.   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 ap-
pear:

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!

3.2. Reconfigure Kingston EMS Driver

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

Appendix A-Extended VS. Expanded Memory

Base Memory

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

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 1625K to 16384K(FE0000h-FFFFFFh) are also reserved for system use.

Extended Memory

Memory from 1 to 16 megabyte memory address (100000h-FFFFFFh). This area can be used by the user applications 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).

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-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).

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.

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.

Order Information

Kingston P/N	IBM P/N	Description
KTM 3077-2	34F3077	2-14MB Memory Board
KTM 3011-4	34F3011	4-16MB Memory Board
KTM1000/M70	6450603	1MB SIMM
KTM2000/M70	6450604	2MB SIMM
KTM4000/M70	34F2933	4MB SIMM