Slim Style Computer User's Guide

PC 286M

(For C-2121)

This product and its manual may contain technical flaws or typesetting errors. Information contained herein is frequently updated. Changes will be incorporated into subsequent editions.

All specifications subject to change without notice.

VERSION **1.00**

P/C:CEN891013

FCC Notice:

Warning:

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with manufacturer's instruction, 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 turing the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- 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 two devices are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to identify and Resolve Radio-TV interference problems."

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4

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CHAPTER 1
GENERAL INTRODUCTION

1.1 OVERVIEW

The powerful PC 286M is an 80286-based (16-bit) personal computer, which is fully compatible with an IBM PC/AT, its peripherals and softwares. It provides two selectable CPU processing speeds at either 0 or 1 wait state, which gives its user a wide variety of application.

IMPORTANT:

The contents of this manual pertains to both the PC 286M-10 (10/5 MHz) and the PC 286M-12 (12/6 MHz) models. Both models will be mentioned as PC 286M in the whole manual.

1.2 HARDWARE SPECIFICATIONS

The PC 286M's hardware can be fundamentally devided into three major parts:

- System Unit
- Monitor
- Keyboard

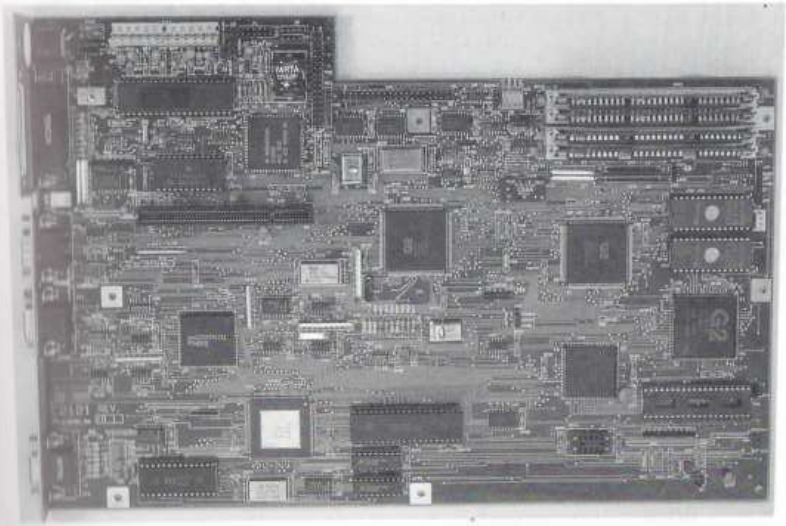
To familarize you further with your PC 286M, we shall introduce these parts in the following sections. Before starting to access other chapters, study this chapter first to obtain some basic concepts.

1.2.1 SYSTEM UNIT FEATURES

The system unit is the main part of the PC 286M personal computer system. It briefly contains one all-in-one mainboard, one floppy disk drive and hard disk drive to control the PC 286M's main operation. All encased devices are used to receive/process data or commands entered from the keyboard and issue signals to activate the printer, monitor, or other peripheral devices.

INTERIOR DEVICES:

ALL-IN-ONE MAINBOARD



CPU

- 16-bit 80286 microprocessor; 12/6 or 10/5 MHz at either 0 or 1 wait state
- 80287 math coprocessor socket

BIOS

- PHOENIX, 64K ROM with built-in Setup program

I/O slot

- One 112-pin (90-pin + 22-pin)

Memory

- 512K, 640K, 1MB, 2MB, or 4MB RAM modules, optional

Display

- Monochrome (MCGA) compatible; software switchable

I/O Ports

- One parallel
- Two serial

Floppy Disk Drive Controller

- Supports available up to two FDDs under four different formats

Hard Disk Drive Controller

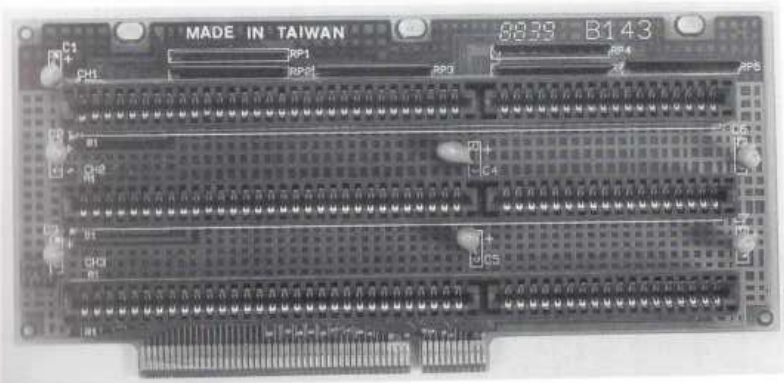
- Supports for connecting the embedded hard disk drive

RTC

- Real-time clock/calendar, with rechargeable battery back-up

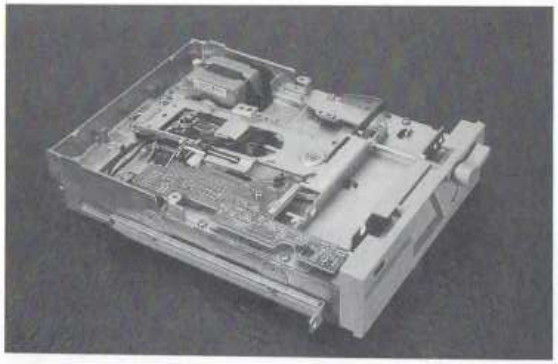
I/O SLOT CARD

- 4-layer design
- Three 16-bit (62-pin and 36-pin) expansion slots
- Facilitates network functions, optional



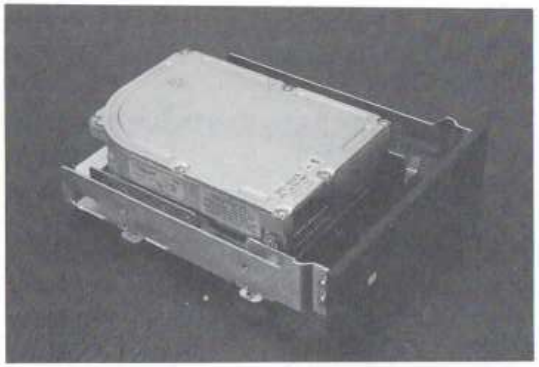
FLOPPY DISK DRIVES

- Supports any two 5 1/4" (360K, 1.2MB) or 3 1/2" (720K, 1.44MB) half-height FDDs.
  Usually drive A is set as a standard device and B as an optional device which could be installed below drive A or as an external device mentioned in section 5.3.



HARD DISK DRIVE

- Supports one embedded hard disk drive, mentioned in section 5.2.

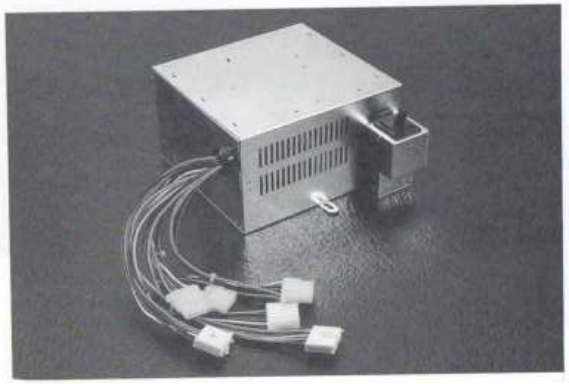


SWITCHING POWER SUPPLY

The PC 286M is equipped with a small type switching power supply which is located in the rear-right side of the system unit. It receives AC power and transforms it into DC power to support the whole system's operation.

The power supply, with fan and overload protection, has five cords extending out from it; two of them are plugged into the mainboard, while the others are attached to the disk drives.

- 115/230 VAC, 50/60 Hz

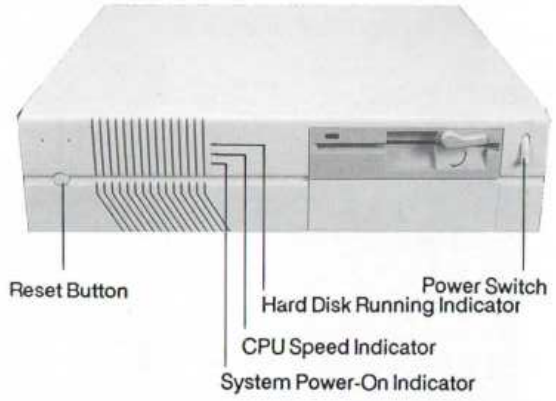


CASE

- Measurement: 400mm(D)x100mm(H)x405mm(W) [equivalent to 15-3/4"(D)x4"(H)x16"(W)]
- Weight: 9.5kg; 20.9 lbs

EXTERIOR FOUR-SIDE PANELS

FRONT PANEL



POWER SWITCH

The power switch on the upper right corner is mechanically connected with the power supply's ON(1)/OFF(0) control switch.

SYSTEM POWER-ON INDICATOR

This indicator lights up when the system's power is turned "ON".

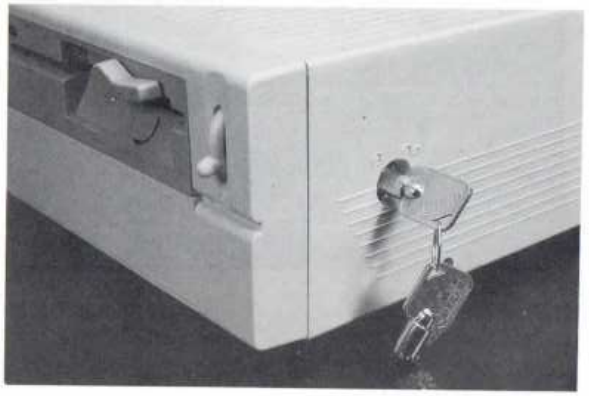
HARD DISK RUNNING INDICATOR

This indicator lights up while the hard disk is reading or writing.

CPU SPEED INDICATOR
This indicator lights up when the system is on TURBO mode.

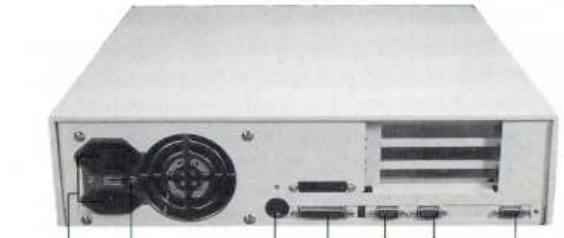
RESET BUTTON
This round reset button on the left side is pressed to reboot your system, if necessary.

RIGHT PANEL



KEY LOCK
The KEYLOCK is located near the front panel. When it is turned to left, the keyboard and case are locked. All keys will be disabled and no data transmission is allowed. Also, the case cannot be opened until the keylock is turned to right.

REAR PANEL



POWER OUTLET
On the left-hand side are a 3-pin female (upper) and a 3-pin male (lower) power outlet. They are used to connect the power cord with power center for operating the system.

CURRENT SWITCH
It is located between the two power outlets. The selection (115V or 230V) depends on the local electrical current used.

CONNECTORS
These connectors are one 25-pin parallel printer ports, two 9-pin serial printer ports, one display and one 5-pin keyboard connector.

NOTE:

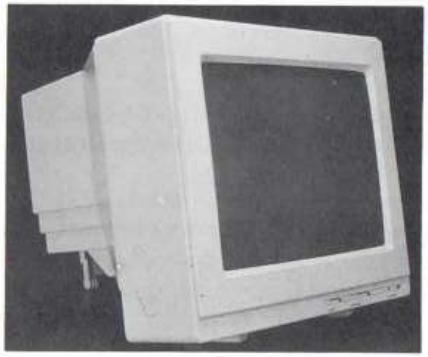
If removing the power supply from the system case is absolutely necessary, just remove four screws on the rear panel. Remember to save these screws for later use.

1.2.2 MONITOR FEATURES

The monitor is a visual aids used to display the messages that the user has entered into the computer and the responses emitted from the computer.

One of the following types of monitors will be supported:

- 12" or 14" screen
- Monochrome or color



1.2.3 KEYBOARD FEATURES

The keyboard is a communicator between the user and the system unit. By typing in all the necessary commands, the user can smoothly and successfully operate the computer to finish his job.

The main features of the PC 286M's keyboard are:

- One hundred-one or one hundred-two sculpted keys
- Twelve programmable function keys
- Low profile, adjustable legs
- Available in different language versions

1.3 TERMS

By using advanced technology chips, the PC 286M's mainboard provides amazing power all neatly compacted into one slim case. It has a variety of chips, integrated circuits, sockets, jumpers and connectors on it. Moreover, it also provides two serial ports for connecting serial peripherals, one parallel port for a parallel printer, one floppy disk connector for two floppy disk drives and one special AT bus for an embedded hard disk.

-- Microprocessor

The microprocessor can manage all of the computer's activities, as well as perform general arithmetic calculations.

The PC 286M uses Intel's 80286-10/12 microprocessor; its processing speed is hardware/software changeable between low and high. (Please refer to Appendix A to change the speed.)

In addition, there is a socket reserved for mounting an 80287 math coprocessor and another socket for an optional oscillator which would provide a clock source to the 80287, if necessry. For more detailed information, you should refer to chapter 3.

-- Erasable Programmable Read Only Memory (EPROM)

Depending on your need, the EPROM chips could be a 32KB or 64KB Basic Input-Output System; all the programs are stored in the EPROM and will not be lost even you power OFF the machine. The PC 286M utilizes 64KB Phoenix ROM BIOS (versions above 3.10 21).

-- Random Access Memory (RAM)

The PC 286M has two banks' RAM modules with four onboard SIMM (Single-in-line-memory-module) slots. Users can install 64KB, 256KB, or 1MB RAM modules to reach the memory capacity you require. The RAM temporarily stores information during processing; all information in the RAM will be lost when the system's power is turned OFF.

-- Built-in Floppy Disk Drive Connector

A 34-pin floppy disk drive connector, which supports two 3-1/2" 720KB/1.44MB or 5-1/4" 360KB/1.2MB floppy disk drives, is provided on the mainboard.

-- Built-in Hard Disk Drive Connector

A 40-pin hard disk drive connector, which supports an embedded hard disk drive, is provided on the mainboard.

NOTE:

You can disable these built-in disk drive ports to use a normal HDC/FDC card. Chapter 3 will have a detail description.

-- Built-in Serial Ports

There are two serial ports (COM1, COM2) on the mainboard for connecting serial printers, modems or other serial communication devices. They can be disabled to accommodate other serial devices, such as a modem card.

-- Built-in Parallel Port

There is a parallel port on the mainboard for connecting a parallel printer.

-- Jumpers and DIP Switch

On the mainboard there are several jumpers and two DIP switches which should be correctly set according to the system's configuration.

-- Display Section

It is fully compatible with one of these display cards: color/graphic, Hercules graphics or monochrome.

1.4 SOFTWARE SPECIFICATIONS

There are two types of software, operating system software and application software. The operating system software is used to configure and control the functions of the computer's hardware system. Whereas, application software are programs designed for many different usages.

(A) Operating System Softwares:

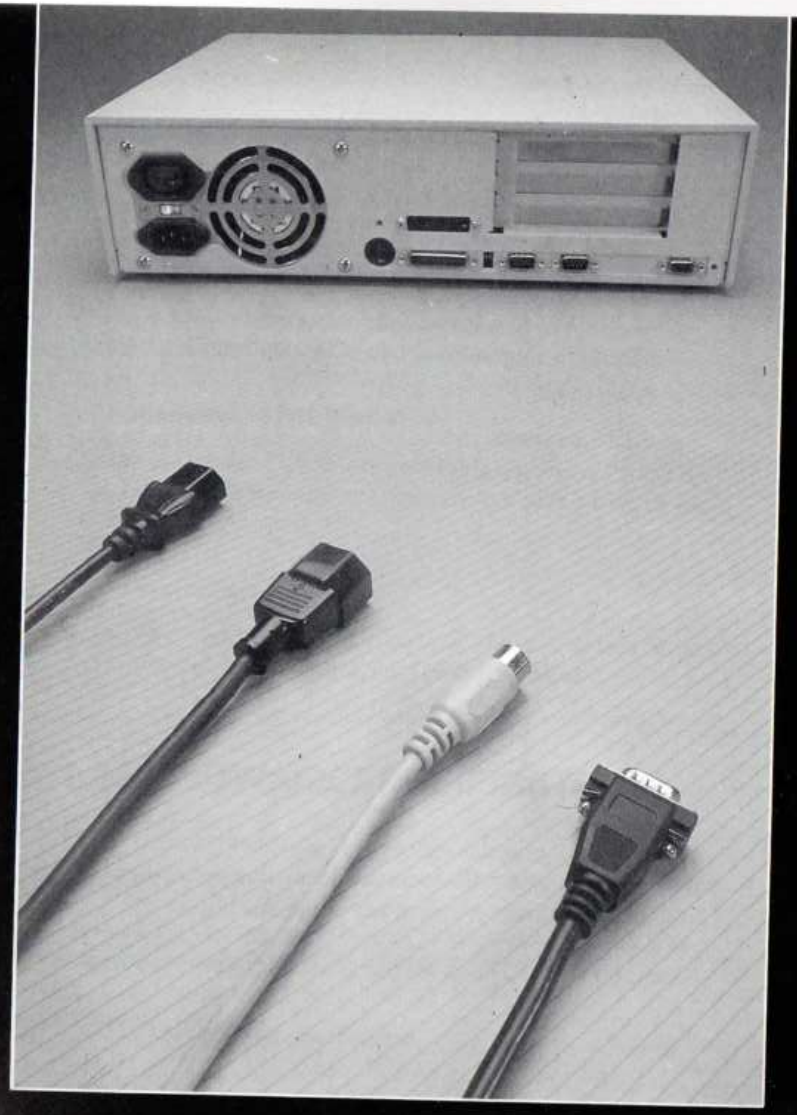
The operating system softwares used by the PC 286M are MS-DOS (versions above 3.30A)/PC-DOS/XENIX.

(B) Application Software:

Most IBM PC/XT, AT compatible software packages are suitable to the PC 286M.

The software diskettes available with your PC 286M are the:

- MS-DOS (Versions above 3.30A, optional)
- GW BASIC
- GEM, optional



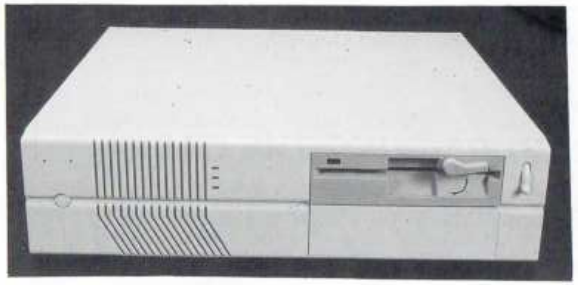
CHAPTER 2
START UP

The PC 286M's simplified design retains its high technology PC/AT quality without eliminating any industry standards or optional features, yet it remains easy for a first-time user. To begin operating your machine, follow the required procedures explained in this chapter.

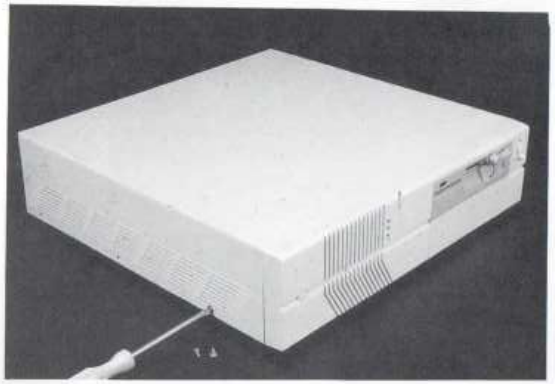
2.1 UNPACKING THE CASE

1. Carefully remove the following parts from it's carton:
   - System unit
   - Power cord
   - Manual
   - Keyboard
   - Monitor

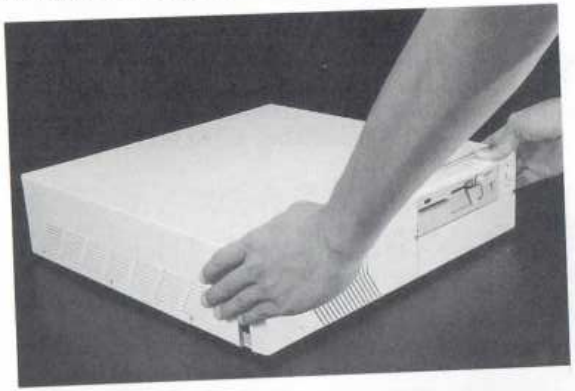
2. Put the system unit on a table or any convenient place.



3. Use a big philip screwdriver to remove the six screws on the sides of the machine (each side has three) and save them for later use.



4. Slowly push the cover backwards, vertically pull it up and put it aside. You can now see the devices inside the case.



5 Refer to Section 1.2 to ensure that there are not any internal devices missing.

Note

If there are any devices missing, please contact your dealer.

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6. Check the optional jumpers and DIP switches according to your system's configuration and reset them if they are incorrect. Refer to CHAPTER 3.

7. Replace your cover.

2.2 CONNECTING ALL THE PERIPHERALS TO THE SYSTEM UNIT

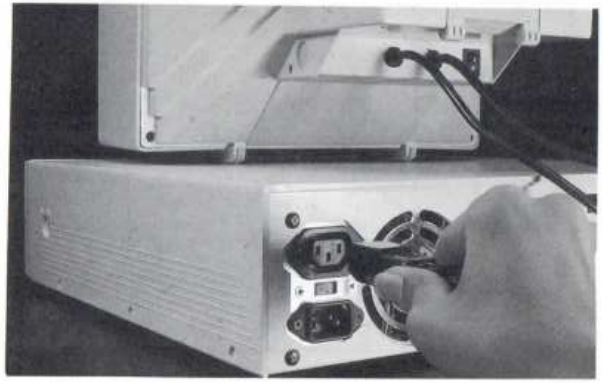
After completing the procedures for preparation, you should connect all the peripherals to your PC 286M.

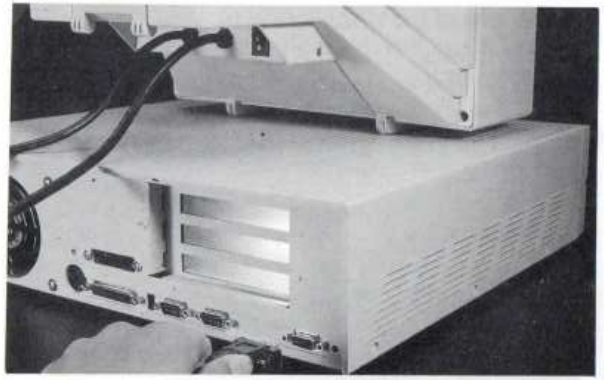
2.2.1 CONNECTING THE MONITOR

1. Position the monitor on top of the system unit, or any convenient place.

2. Locate the two cables at the rear of the monitor. One has a 3-pin male power connector and another has a 9-pin D-type male connector.

3. Attach the power connector to the 3-pin female connector located at the rear of the system unit, or to the nearest power outlet and the D-type cable to the connector (J15), located at the rear of the system unit.

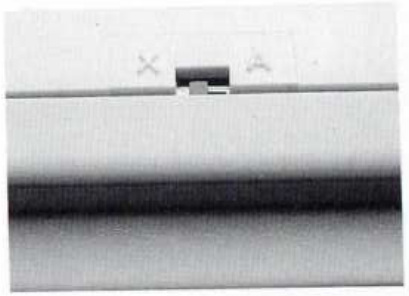




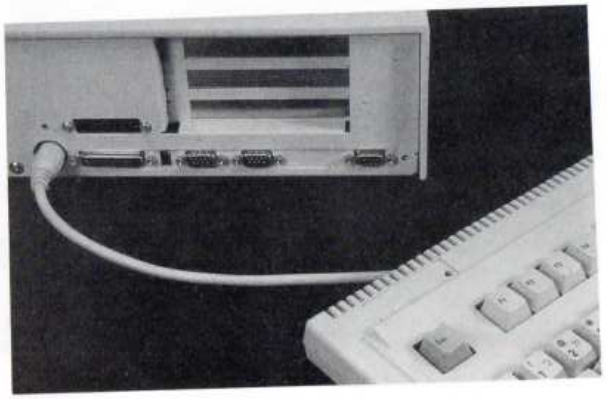
2.2.2 CONNECTING THE KEYBOARD

IMPORTANT

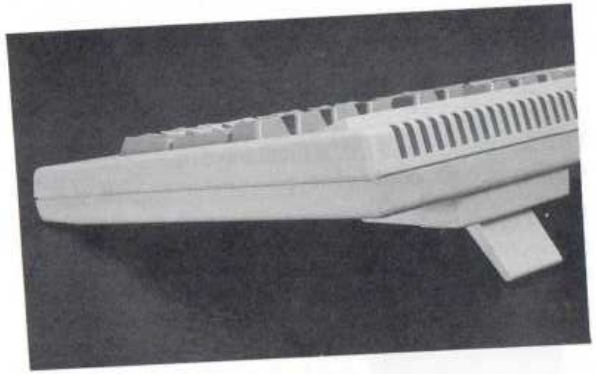
At the rear of the keyboard, you can find a switch marked with "A" and "X". Its position adjustment is judged from the machine in use; "A" for AT and "X" for XT. Before connecting the keyboard, make sure the switch is stayed on the "A".



1. Insert the 5-pin male connector into the female connector on the rear of the system unit. Be sure that the evident chute of this connector is aligned on top before horizontally inserting it.



2. To your convenience, adjust the keyboard's angle to be tilted or flat by pulling its legs in or out.



IMPORTANT:

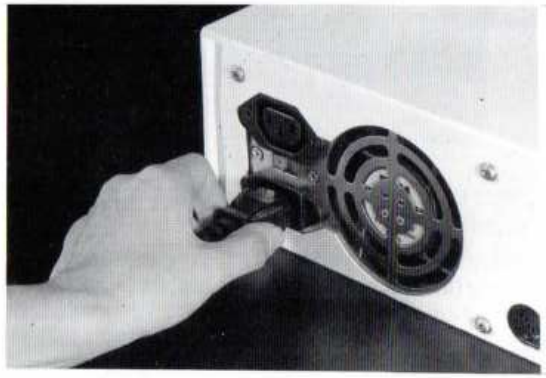
Ensure that the keyboard is securely connected before turning the machine ON. If it is not, or if there is a poor connection, the PC 286M will note a keyboard failure message on the screen after system boot up. Such being the case, you will have to power OFF your system, repeat the connecting procedures and then switch the power ON again.

2.2.3 CONNECTING THE POWER CORD

IMPORTANT:

Before connecting the power cord, make sure the current switch is on its local electric current position (115V or 230V) and the power switch is "OFF".

1. Uncoil the power cord. It must have one 3-pin female and one 3-pin male connectors on its extreme ends.
2. Insert the female connector into the power-input connector located at the rear of the system unit, and the male connector into a nearest power outlet.



2.2.4 CONNECTING OPTIONAL DEVICES

If there are any devices that require connection, like a mouse, serial printer or parallel printer, then connect them to their appropriate connector. Please refer to section 1.2.1 to know where the connectors are located.

2.3 OPERATING THE PC 286M

If the previous steps were executed properly, the PC 286M is now ready for operation. To boot up your PC 286M system, a DOS (Disk Operating System) diskette is required. Booting up is simply the act of starting up your machine.

Before booting up the PC 286M, be sure that all connections are firm enough.

2.3.1 BOOTING FROM YOUR FLOPPY DISK DRIVE

The PC 286M uses both 5-1/4" or 3-1/2" diskettes to store information.

1. Remove the MS-DOS diskette from the manual box.

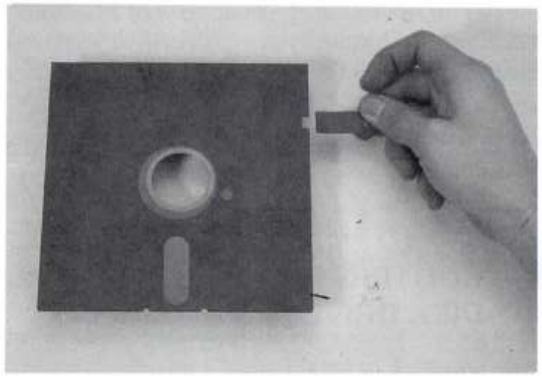
   ***** BACKUP YOUR PROGRAM DISKETTE(S) *****

   The importance of the MS-DOS diskette(s) cannot be overemphasized. Without a usable copy of the DOS diskette there isn't any other way to boot your machine.

   Because of its importance and because diskettes are fragile, it is imperative that you make a copy of the MS-DOS diskette(s) as soon as possible. Make it your first important task. Refer to the MS-DOS manual for the correct usage of the "DISKCOPY" command.

   It is suggested that you use the backup diskettes to operate the machine and keep the original diskettes in a safe place. In case the backup diskettes are ruined, you can copy the original diskettes again.

2. Move the switch on the bottom right corner (3-1/2") up or cover the write-protect notch (5-1/4") with a tab to avoid any program erasure on the diskette.



3. Remove the protective paper disk from its floppy disk drive.

4. Horizontally insert the diskette into the floppy disk drive, with its face up.

5. Gently push the diskette forward.

   For a 3-1/2" diskette, a click sound heard means that the insertion is correctly completed.

   For a 5-1/4" diskette, a click sound heard after you close the drive door means that the insertion is correctly completed.

6. Turn ON the computer's power switch and the MS-DOS programs will be loaded into the system unit automatically.

NOTE:

1. When the power is turned ON, the PC 286M produces an audible hum and the disk drive whirs and clicks while in use; these sounds are normal.

2. The indicator on each disk drive will light up whenever the drive is reading or writing data. **DO NOT remove a diskette when the light is "ON".**

2.3.2 BOOTING FROM YOUR HARD DISK DRIVE

Usually the hard disk drive installed in your computer has already been formatted and the MS-DOS programs have been copied onto it by the dealer, but when a hard disk is installed for the first time, you must complete several steps to format it. Refer to your MS-DOS user's manual to format your hard disk.

Listed below is the booting up process:

a. Ensure that all connections are secure and have been correctly set.

b. Remove the FDD's protective paper disk.

c. Turn ON the monitor's power switch.

d. Power ON the system with the floppy disk drive doors open and then the hard disk drive will boot your system.

e. An audible hum will indicate that the self- test is being automatically executed. If not, you should use the MS-DOS diskette and execute the floppy disk drive booting up procedures (section 2.3.1) for your hard disk. Then format your hard disk and copy the MS- DOS programs onto it, please refer to your MS-DOS user's manual to format your hard disk.

2.4 BOOTING UP SCREEN DISPLAY

When the machine is powered ON, a self-test is automatically executed to check its memory and peripheral devices. If everything is OK, the screen will display the following:

```
Phoenix 80286 ROM BIOS PLUS Version 3.10 xx
copyright © 1985-1989 Phoenix Technologies Ltd.
All Right reserved

CEC286

xxxK Base Memory, xxxxxK Extended

The XXXXX personal computer DOS Ver. x.xxx
Current dates is Wed xx-xx-xxxx
Enter new date (mm-dd-yy):
```

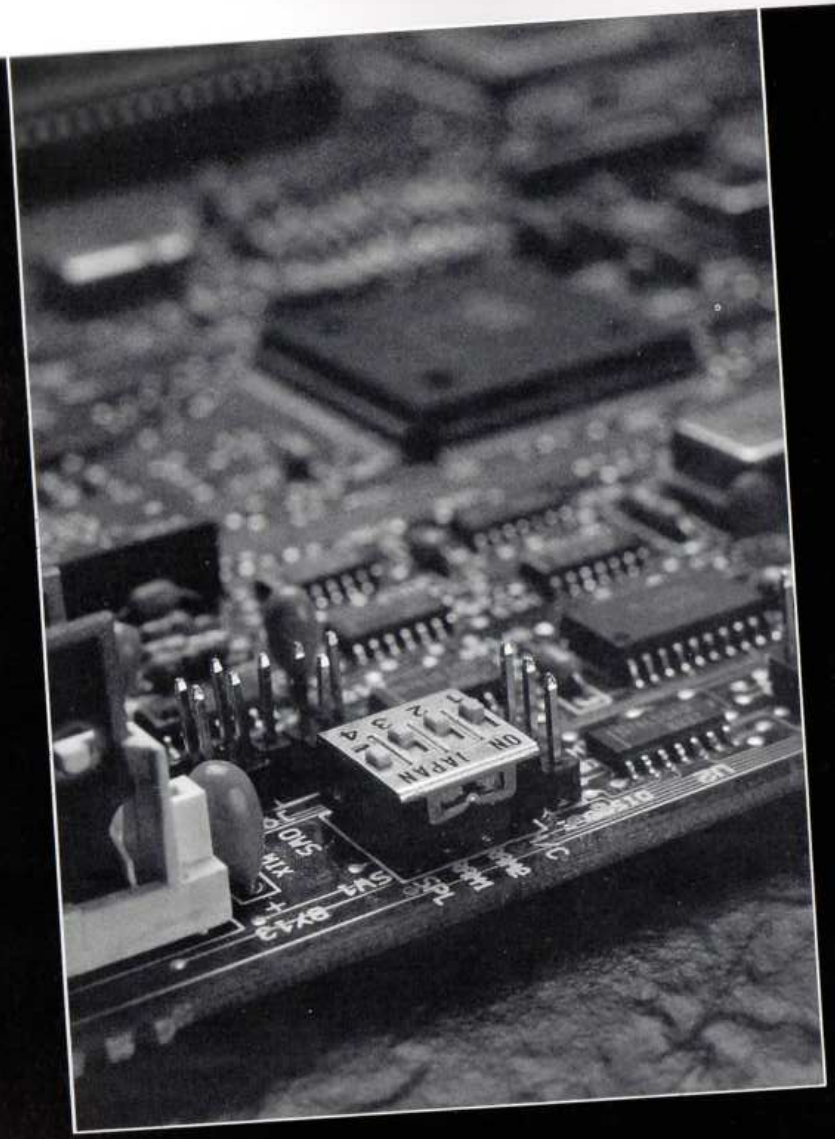
If the current date is correct or a skip over the date entry is necessary, strike the "Enter" key immediately and you will see the following message appear on the screen.

```
Current time is 20:11:12
Enter new time:
```

If the current time is correct or a skip over the time entry is necessary, strike the "Enter" key again. Then the [A>] prompt will appear. Now your screen's display should look similar to this:

```
Phoenix 80286 ROM BIOS PLUS Version 3.10 xx
copyright © 1985-1989 Phoenix Technologies Ltd.
All Right reserved

CEC286

xxxK Base Memory, xxxxxK Extended

The XXXXX personal computer DOS Ver. x.xxx
Current date is Wed xx-xx-xxxx
Enter new date (mm-dd-yy):

Microsoft(R) MS-DOS          Version x.xx
          (C) Copyright Microsoft Corp 1981-1987

A>
```

The A prompt is produced only when the system is successfully booting up. Under the A prompt, it is the time to use application software programs.



CHAPTER 3
JUMPER AND SWITCH SETTINGS

This chapter guides you to reconfigure your system with a correct jumper and switch settings. There are always several jumpers and/or switches on the mainboard. They are designed to adjust the mainboard's operation under different system configurations. Therefore, any change to your system should have you a recheck and reset to each corresponding jumper and switch. The change may be an augmentation or deletions of expansion cards/optional devices. If there is nothing changed, then skip this chapter.

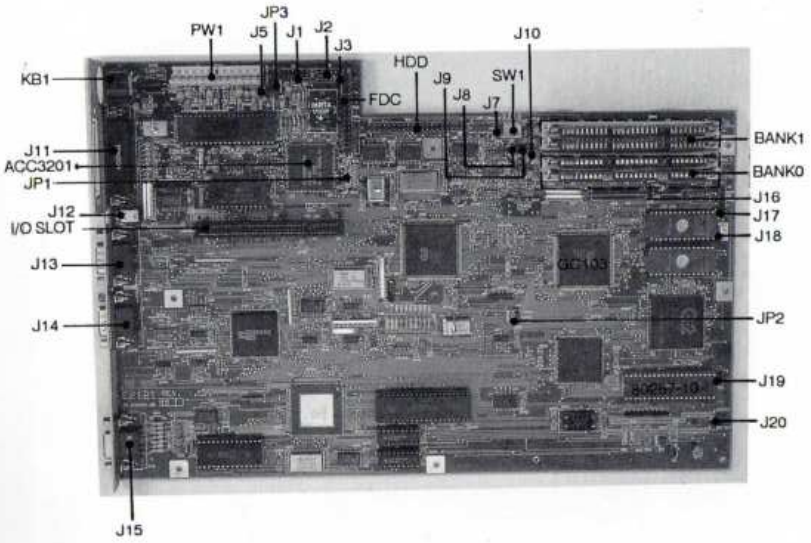
WARNING:

- The switches/jumpers must be set correctly before you turn on your system. An incorrect setting may seriously damage your system. Do not power on your system without a reconfiguration after any change is happened.
- Installing any component or resetting the DIP switches/jumpers while the power is ON may permanently damage your computer and its existing components.
- Whenever you change the switches/jumpers settings in your computer, record its current settings. If you run into any difficulties, you can restore your system to its previous operational status.
- If the jumpers/switches mounted on the board are not mentioned in this chapter, do not change their default settings to prevent any accidental damage.

If you want to add an optional card, you should refer to that card's manual to set its jumper(s) or switch(es) properly, if necessary.

3.1 MAINBOARD SETTING

Refer to the following diagram to immediately know where the jumpers/switches/connectors on the mainboard are located.



Connectors, such as FDD and HDD's, are connected with a thin cable wire from their corresponding devices; while jumpers are closed with a plastic cover called "jumper hat". Different settings of the "jumper hat" will have different system configurations. A unproper setting will result in a serious damage to your system.

3.1.1 CPU Section:

JUMPERS:

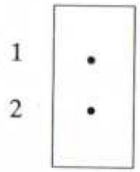
- **SETTING THE PROCESSING SPEED (JP3)**

The PC 286M offers dual speeds: high or low. If the hardware setting of JP3 is stayed on high, then you can utilize a keyboard control method to change your system processing speed to low. Whereas, the high speed will not be validated with the keyboard control method while the JP3's setting is stayed on low.

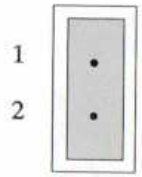
There are three methods to control the system processing speeds: hardware jumper setting, SETUP and keyboard control. Whatever the speed is set, hardware setting decides the execution speed at the power-on RAM test. When the system start detecting the diskette or hard disk, the speed is judged according to the setting on the SETUP program (refer to Appendix A for a speed setting option). While you are executing any program besides SETUP, the speed can be switching between low and high with the keyboard control keys in a high speed hardware setting.

When you select the CPU's speed by using the keyboard method (see Appendix A), the 8242 keyboard controller chip will emit a signal to change the speed. If Phoenix BIOS is in use, the signal will be dispatched by pin 24 of 8242 chip. When other EPROM chips are used, the signal may be dispatched by pin 23 of 8242 chip.

This jumper should be set as below:



High Speed
(Factory Default)

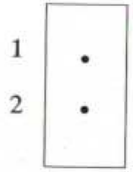


Low Speed

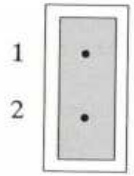
- **SETTING WAIT STATE (J9)**

You can select a one or zero wait state by setting J9. The system's processing speed will be more slower when one wait state is set.

This jumper should be set as below:



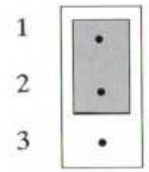
1 Wait State



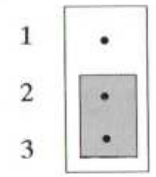
0 Wait State
(Factory Default)

- **SETTING THE EPROM CAPACITY (J16)**

Depending on the different BIOS size of ROM (27256 or 27128) you use on the PC 286M, set jumper J16 as follows:



27256 (32K * 2)
(Factory Default)



27128 (16K * 2)

The factory default capacity of the EPROM is 64KB. (You may need to use another type of EPROM with smaller memory capacity)

- **SETTING THE 80287'S CLOCK INPUT (J19 & J20)**

Note:

If you enable the mainboard for a math coprocessor and there isn't any 80287 inserted, your system will be seriously damaged.

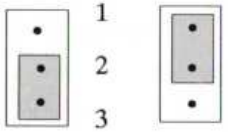
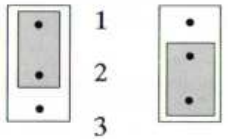
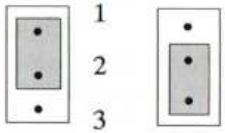
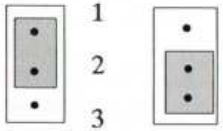
Asking your dealer to insert the 80287 math coprocessor for you is recommended.

The PC 286M supports dual processor clocks: 24MHz and 20MHz. Normally, the original processor clock value or its value devided by 3 should be identical to the installed 80287's speed. In case the original value of processor clock

or its clock value devided by 3 can not be identical with that of the installed 80287, then you should insert an appropriate oscillator and further adjust J19 and J20's setting to match the clock number of the 80287 math coprocessor.

Usually the speed of the 80287 is 6, 8, or 10MHz, therefore not every system clock input is suitable for the 80287.

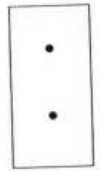
Listed below is the available combinations for the PC 286M.

Math Coprocessor	System Clock	Jumper Setting J19	J20	Oscillator
80287-8	24MHz			None
80287-8	20MHz			8MHz
80287-10	24MHz			10MHz
80287-6	24MHz (20MHz)			6MHz

· 80287 MATH COPROCESSOR'S SETTING (J21)

While running some earlier versions, like versions 2.xx, of LOTUS 1-2-3 or Symphony on certain AT-compatible mainboards, a cease to your system operation will occur at finding that there is no existence of an 80287 math-coprocessor but the J21 jumper is set as an 80287 is inserted. Such being a case, close J21 to have LOTUS operate as an 80287 is installed.

When you insert an 80287, this jumper should be definitely left "close" to extend the 80287's life; if there is no 80287 inserted, then leave J21 "open".



Without 80287 math coprocessor installed (Factory Default)

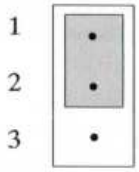
With 80287 math coprocessor installed

· MANUFACTURING TEST JUMPER (J6)

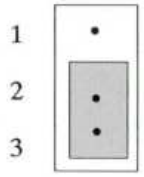
It is used for the manufacturing test. When it is close and system is powered on, the BIOS will notice keyboard controller to disable one of its signal pins and then automatically start a burn-in test for checking out whether any chips are going to burn down. Within the test, keyboard and monitor is automatically disabled. A user should not change its setting because it should always be left "open".

· SETTING FOR USING DIFFERENT KEYBOARD CONTROLLERS (J5)

To enable the keyboard control function with different BIOSs inserted, you should adjust this jumper as below:



Using Phoenix keyboard controller (8242) (Factory Default)

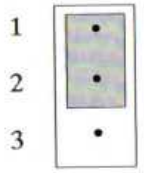


Using other keyboard controllers (8242)

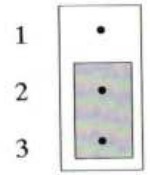
· SETTING FOR DIFFERENT BIOS INSTALLED (J7)

When the system is powered on, the PHOENIX BIOS will initialize the installed hard disk drive. If an embedded hard disk drive is installed, this jumper should be set as a PHOENIX BIOS is in use. Otherwise, change your BIOS and adjust this jumper to use other BIOSs.

Even the SETUP program is correctly set and there is still a error message shown up on the screen, then go directly to change your BIOS and reset your jumper (J7).



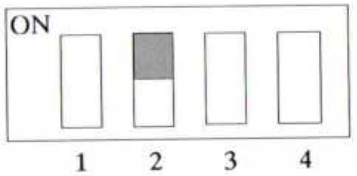
With other BIOSs inserted



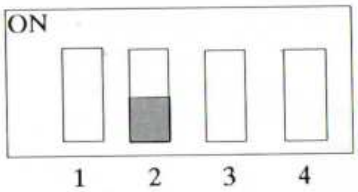
With Phoenix BIOS inserted (Factory Default)

· MEMORY BANK(S) SETTING (lever 2 of DIP switch 1- SW1)

Depending on the total number of memory banks installed on the mainboard, lever 2 of DIP switch 1 could be adjusted to ON (2 banks) or OFF (1 bank).



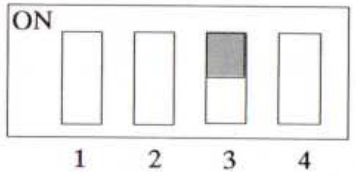
Two memory banks are installed with RAM modules



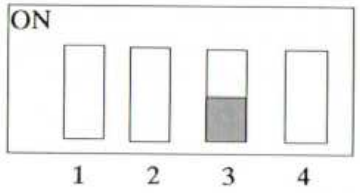
Only one memory bank is installed with RAM modules

- **RAM TYPE SETTING (lever 3 of DIP switches 1-SW1)**

You can use 64KB, 256KB or 1MB RAM modules on your memory banks. Set lever 3 on SW1 to ON/OFF depending to the sizes of installed RAM modules.



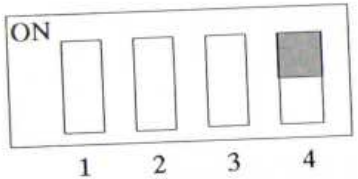
While installing 1MB RAM modules



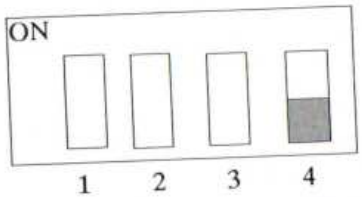
While installing 256KB or 64KB RAM modules

- **ENABLING/DISABLING THE RELOCATION OF EXTRA 384KB MEMORY (lever 4 of DIP switches 1- SW1)**

When you have 1MB or more on-board memory, you can relocate the unused 384KB memory, beyond the base 640KB , to the address above 1MB as an extended memory. If there is no on-board memory more than 640KB, you should disable relocation option on the SETUP program (Refer to Appendix A for details)



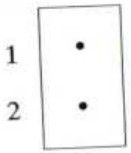
Disable the relocation of extra 384KB Memory



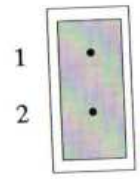
Enable the relocation of extra 384KB Memory

- **SETTING FOR DIFFERENT RAM CAPACITY CONFIGURATIONS (J10)**

This jumper is especially used for setting a 640KB RAM while one bank is inserted with two 256KB RAM modules and the other with 64KB.



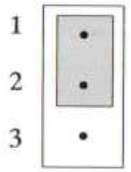
For other RAM capacity configurations



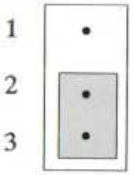
For 640KB RAM capacity configuration

· ENABLING/DISABLING QUITE BUS (JP2)

Do not casually reset this jumper. It should be always left "Enable".



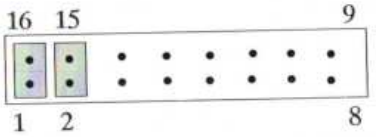
Enable (Factory Default)



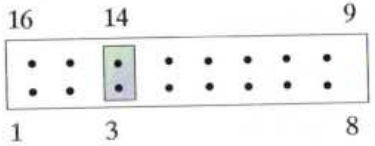
Disable

· DISABLING/ENABLING ON-BOARD FUNCTIONS (J1)

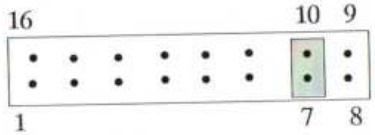
This jumper with sixteen pins is simply separated into eight pairs. Each pair can be individually set to either enable or disable its corresponding on-board function. It can be set as follows:



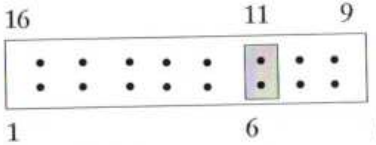
Enable On-board Display



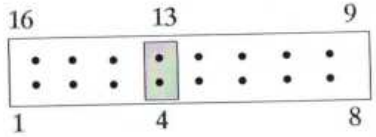
Disable On-board FDC



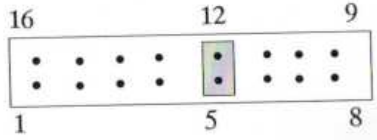
Disable On-board HDC



Disable On-board COM1



Disable On-board COM2



Disable On-board Paralle Printer Port

NOTE: Pins (9.8) of J1 are no use in PC 286M.

3.1.2 I/O Section:

CONNECTORS:

KB1 Keyboard controller

J11 25-pin parallel printer port

J13 1st serial port (COM 1)

J14 2nd serial port (COM 2)

J17 Power LED connector

Pin	Assignment
1	+5V
2	RESET
3	HDD
4	TURBO
5	SP/Buzzer
6	
7	GND

PW1 Connects the power supply

Pin	Assignment
1	Power Good
2	+ 5VDC
3	+ 12VDC
4	- 12VDC
5	GND 5
6	GND 6

J18 Connects the optional speaker

Pin	Assignment
1	Speaker/Buzzer
2	
3	GND
4	+5VDC

J3 Connects the external battery

Pin	Assignment
1	+5VDC
2	
3	GND
4	GND

J2 Connects the keylock

Pin	Assignment
1	8242's pin 34
2	GND

3.1.3 Floppy Disk Controller Section:

JUMPER:

- **ON-BOARD FDC SETTING**

There is a floppy disk drive connector on the mainboard. When you have an optional FDC card installed, you should close pins (14, 3) of J1 to disable the on-board FDC function.

- **SETTING THE SERIAL AND PARALLEL PORTS**

There are two built-in serial ports (COM1 and COM2) and one built-in parallel port (LPT1) on the mainboard. The user can disable them by closing pins (11,6), (13,4) and (12,5) of J1.

3.1.4 Hard Disk Controller Section

JUMPER

- **ON-BOARD HDD PORT SETTING**

A hard disk drive interface port is provided on the mainboard to connect with an embedded hard disk drive. When you power ON the system, the BIOS will check the on-board HDD's AT bus. Pins (10,7) of J1 should be set according to the BIOS used. If you have an optional HDC card installed, you should disable the on-board HDD port by closing pins(10,7) of J1.

3.1.5 Display Section:

CONNECTORS:

J15 9-pin Video Display Connector

SWITCH:

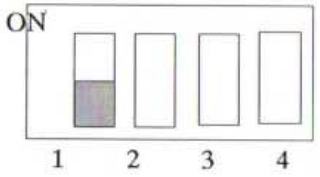
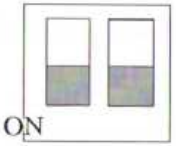
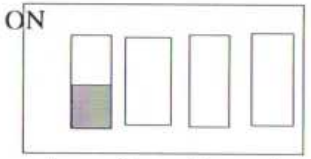
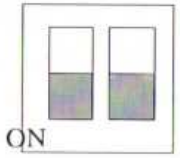
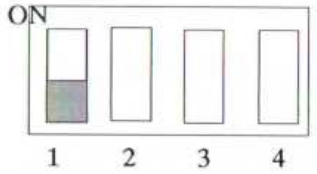
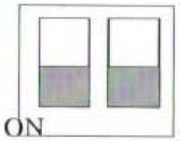
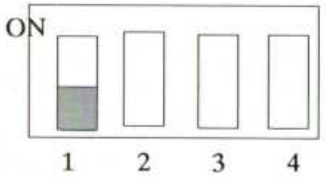
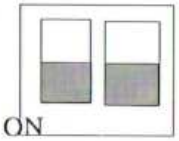
- **DISPLAY MODE SETTING**

The DIP switch (SW1)'s lever 1 and J12 on the mainboard also sets the system's display configuration. They determine the PC 286M will operate as a color/graphics adapter or as a monochrome display adapter. Whenever you change the on-board display mode, you must reconfigure the system by setting them appropriately.

To your convenience, the PC 286M provides a special design to decide the display mode by setting J12 which is located on the rear side, no more opening system case.

Note:

When the SW1 has been set to match the setting of the mode selection switch(J12), the system will operate as the display mode setting. Whereas, there will be no display or some error messages shown on the screen.

SW1		J12	Display Mode
Lever 1 of SW1:	Off↔mono	On↔color	
J12:	Off↔mono	On↔color	
			Mono (Factory Default)
			Color (Graphics)
			Color (Graphics)
			Color (Graphics)

Note:

1. When the lever 1 of SW1 is set to mono, then the display mode can be judged as either mono or color mode with the setting of J12.
   When the lever 1 of SW1 is set to color, then the display mode only can be judged as color mode whatever the setting of J12 is.

Your system uses its mainboard's DIP switches/jumpers and a program called SETUP to configure the type of monitor used. The SETUP program is the programs built in the BIOS. Make sure that your system's mainboard is appropriately configured to the type of monitor in use.

WARNINGS:

If the mode of operation is altered from color to mono or vice versa, then the DIP switches (J12 and SW1) must be reset to match the mode in use.

3.1.5.1 SETTING THE MONITOR MODE BY SW COMMAND

If you want to temporarily change your monitor mode for executing some programs, insert the **DOS** diskette that is enclosed with your PC 286M and then type:

```
C>SW[Enter]
```

After the [Enter] key is pressed, the mode will be automatically changed as your need, the screen is cleared and the cursor is displayed on the topmost left-hand corner of the screen. It means that the monitor is set to the mode as your need, whether the DIP switch (SW1 and J12) has been set to.

This SW command is not available for a single frequency monitor but only available for dual frequency and multi-sync monitors.

Note:

1. This program is included in your DOS diskette.

2. Whenever a dual-frequency monitor is in use, there is no need to change the type of monitor in use. The monitor's display will automatically change when the SW command is entered.

3. If there is an additional display card installed on your system and set to the mode different from your on-board display mode, then when you type:

```
C>MODE CO80
```

your display mode will be changed to color.

```
C>MODE MONO
```

your display mode will be changed to monochrome.

After configuring the switches and jumpers to fit with your system, you are now ready to operating your system.

CHAPTER 4
MORE ABOUT THE DISKETTE AND DISK DRIVES

As previously mentioned, data can be stored on a diskette or a hard disk. Your personal computer can read or write data in a floppy disk drive or hard disk drive.

4.1 DISKETTE

A diskette is a thin, flexible platter coated with magnetic material and has a protective jacket. Data is recorded onto the diskette through a magnetizing method. The floppy disk drive is a peripheral unit, installed in the PC, which rotates the diskette transferring data from the diskette to the PC and vice versa. Unless the diskette is accidentally ruined or there is an intentional delete, all saved data on the diskette remains intact after the power is turned OFF.

4.1.1 Anatomy of a Diskette

A diskette can be divided into three basic parts: tracks, sectors, and bytes.

A track is a physically defined circular path which is concentric with the hole in the center of the diskette. Each track is divided into several sectors, each containing 512 bytes.

	tracks	(outmost track)	sector
360K	40 (0-39)	0	9
720K	80(0-79)	0	9
1.2MB	80(0-79)	0	15
1.44MB	80(0-79)	0	18

A byte is the basic memory unit, yet it can be further divided into eight bits. Each byte can store one character. As such, a

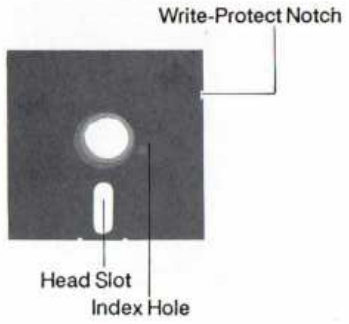
standard 5-1/4" double side, double density diskette can contain a maximum of 362,496 characters.

4.1.2 5-1/4" Diskette:

Data is both read and written through an oblong hole, called "head slot", on the diskette.

There is a little round hole beside the center circle of the diskette called "index hole". Based on this, the diskette can retreive data quickly and accurately while searching on.

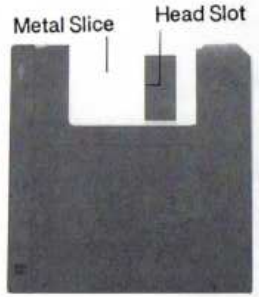
The "write-protecting notch" is located on the right hand side of the diskette and is used to prevent the saved data on the diskette from being accidentally erased. When the notch is covered by a tab, the diskette is protected. You connot write data onto this diskette nor copy any data, unless the tab is removed. A write-protecting tab is included with the PC 286M's MS-DOS diskette.

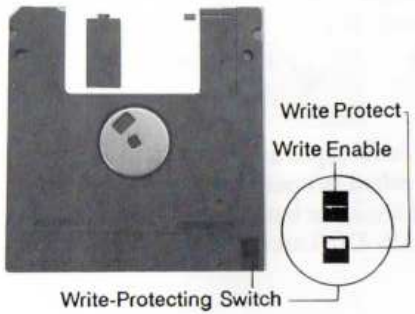


4.1.3 3-1/2" Diskette:

Data is both read and written through a rectangular hole called "head slot" on the top center of the diskette. The head slot is protected by a metal slice and is opened automatically when the diskette is inserted into the disk drive smoothly.

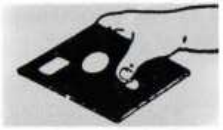
On the back of the diskette the "write-protecting switch" is located on the lower right-hand side. It is used to prevent the data saved on the diskette from being accidentally erased. When the switch is pushed up, the diskette is protected. You can no longer write data onto this diskette until you push this switch down.

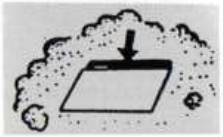




4.1.4 HANDLE WITH CARE

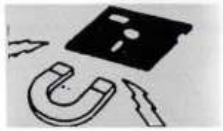
You should exercise care when handling diskettes. Keep the following rules in mind when using them.

1.  Do not touch the exposed recording surface.

2.  Protect from dust by replacing it in its envelope after use.

3.  Never place under heavy objects.

4.  Write on the labels before affixing them.

5.  Keep clear of other magnetic fields including televisions, telephones, etc.

6.  Do not bend.

Like audio tapes and records, diskettes eventually wear out, even when properly cared for. As such, it is important to make copies or back-ups of all important diskettes. Refer to your MS-DOS user's guide for copy commands.

4.2 DISK DRIVES

The PC 286M can utilize up to two hard disk drive and two floppy disk drive.

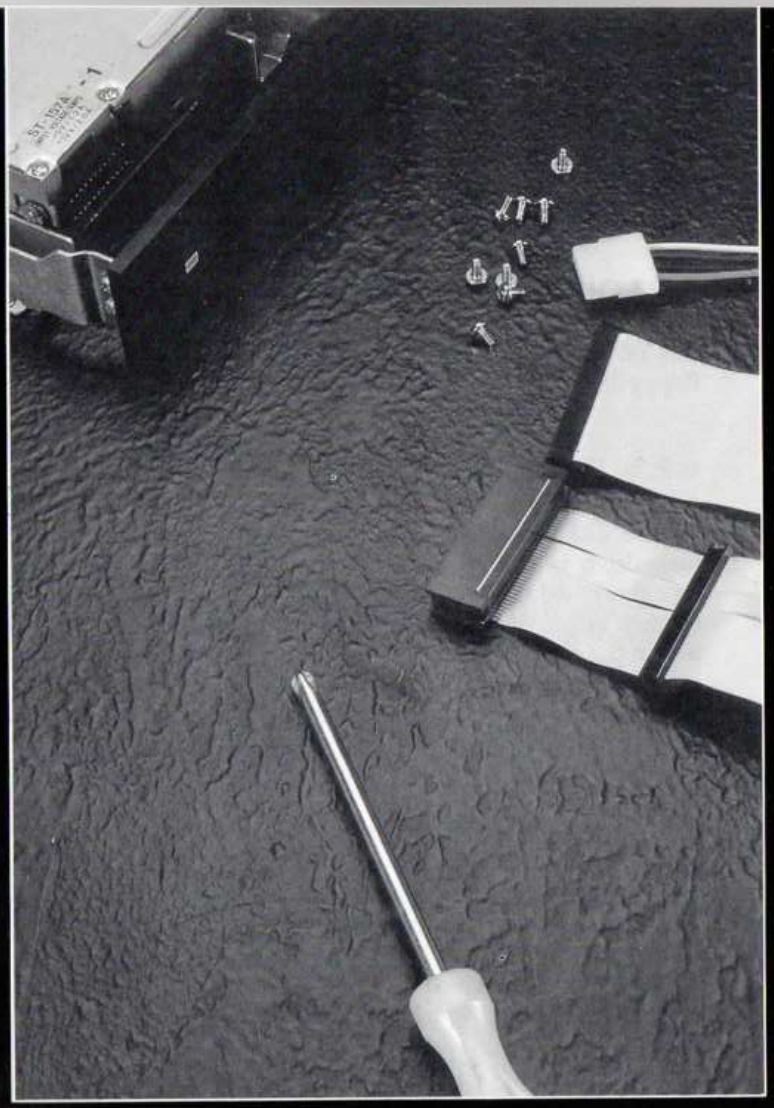
4.2.1 HARD DISK DRIVE

A hard disk drive is much more convenient than a floppy disk drive in using a computer, especially when large amounts of data need to be stored and recalled. It does not require auxiliary storage diskettes; information is stored within the system and is retained, even when the power is turned OFF. Since the hard disk stores much more information than the floppy disk, it can greatly increase the memory storage capacity of the computer.

4.2.2 FLOPPY DISK DRIVE

The floppy disk drive is the means for the user to communicate with the computer. Information is stored on magnetic disks, and can be loaded into the computer either automatically, when the machine is turned on, or with the aids of the keyboard commands which are entered in by the user.

A 1.2MB 5-1/4" and 1.44 MB 3-1/2" double- sided, high-density floppy disk drive also can read and write a standard 360KB and 720KB floppy diskettes.



CHAPTER 5
OPTIONAL INSTALLATION

The PC 286M allows you to enhance its functions and performance by installing optional devices or any IBM PC/XT/AT compatible expansion cards. Follow the procedures below to install.

5.1 OPTIONAL CARDS

5.1.1 PREPARATION

Since you must open the system unit to install an optional card, position your computer in a convenient working area, whereas, both the front and back of the system unit are easy to reach. For example, a wall corner is a terribly inconvenient position, while a desk top, offering free space around it, is an ideal place.

STEP 1: Park your system for move

Movement of any distance could possibly destory the delicate disk drives. Therefore, the user may refer to the following instructions to protect the disk drives.

*** FLOPPY DISK SYSTEM**

- Reinsert the protection paper disk, packaged with your floppy disk drive when purchased, into the disk drive.
- Close its door.

*** HARD DISK SYSTEM**

- Change the present drive to the drive with MS-

DOS. (Example, drive C)

```
A>C:[ENTER]
```

- Type "PARK" command.

```
C>PARK [Enter]
```

STEP 2: Power OFF

- Power OFF your system.
- Power OFF all peripherals connected to the system.
- Unplug the power cord from its power outlet.

IMPORTANT

Failure to disconnect the computer from all power sources can cause dangerous voltages in the power supply and the video display unit. Even when the ON/OFF switch is set to the OFF position, any electrically conductive material inside these areas still can cause an electrical shock.

STEP 3: Detachment

- Disconnect all the cables attached to the computer.
- Remove the monitor, keyboard and other devices away from the computer working area.

STEP 4: Open your system unit

- Use a big philip screwdriver to remove the six screws on both sides of the case and save them for later use. (If the KEYLOCK is enabled, use the key to unlock it first)
- Horizontally pull the cover up with a backwards

motion and put it aside.

STEP 5: Jumper/switch setting adjustment

When an expansion card has been installed, recheck the jumper and DIP switch settings to match the card's configuration. Refer to CHAPTER 3 for jumper and switch setting descriptions.

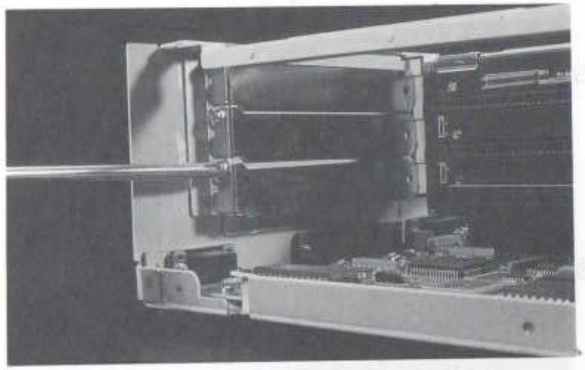
5.1.2 INSTALLATION

STEP 1: Select a vacant slot

- Find an appropriate vacant slot for installation.

STEP 2: Remove the slot cover

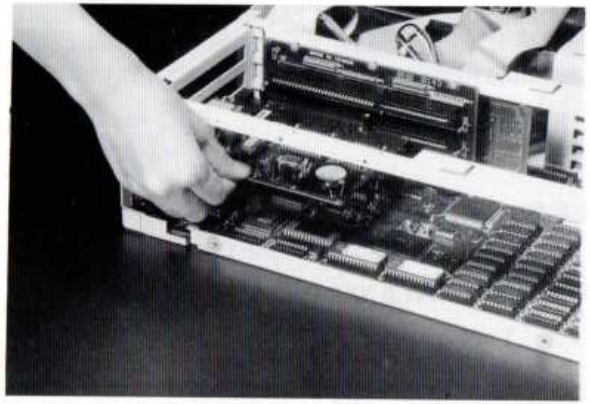
- Use a small philip screwdriver to remove the bracket-retaining screw and save it for later use.



- Remove the expansion slot cover and save it.

STEP 3: Insert the expansion card

- Horizontally insert the bracket end of the card and align its gold fingers with the selected vacant slot.



- Carefully push the card until it firmly slides into the slot.
- Secure the card with the bracket-retaing screws .

STEP 4: Replace cover

- Replace the system unit cover.
- Reinstall the screws to secure the cover.
- Reconnect all external cables.

STEP 5: Run the SETUP program

- If the installed expansion card changes some specifications, run the SETUP program to recognize the system's new configuration. Refer to APPENDIX A for a detailed description of the SETUP program.

5.2 OPTIONAL HARD DISK DRIVE INSTALLATION

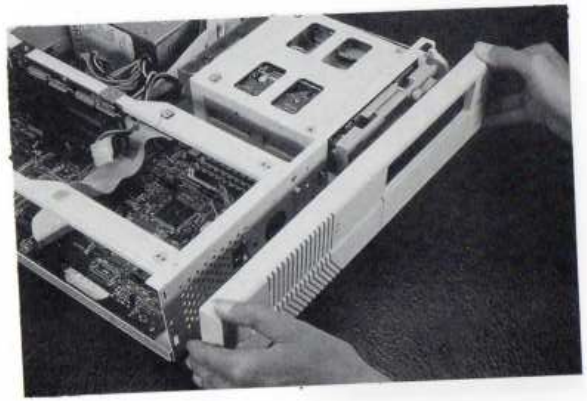
The PC 286M offers you an option to install a hard disk drive into two spaces, one is above the mainboard with its up-side down and the other below the floppy disk drive A. Complete the following steps to install a hard disk drive.

NOTE:

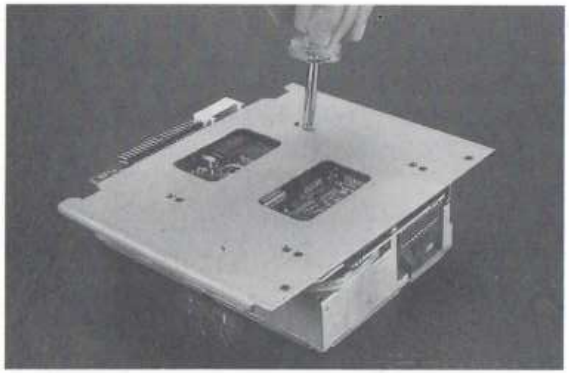
Three commands (prefor, fdisk, format) should be used to enable a new hard disk. Refer to your MS-DOS manuals for details.

5.2.1 ABOVE MAINBOARD

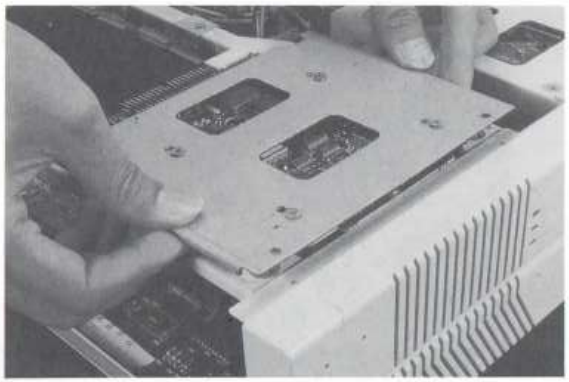
- Open the system unit. (Refer to Section 2.1)
- Use your hands to remove the front panel of the PC 286M by pulling it forward.



- Use four screws to secure a steel bracket panel with the hard disk drive .

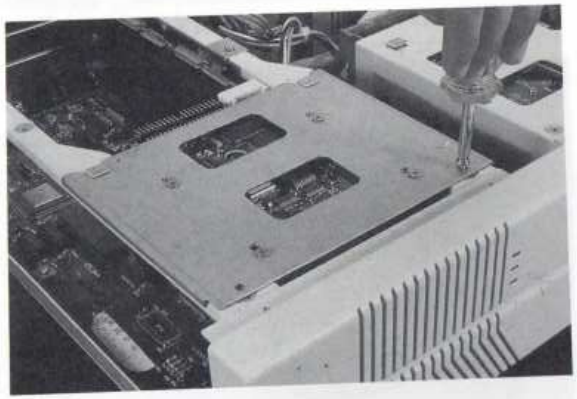


- Gently slide the hard disk into the hard disk drive's slot with a backwards motion.

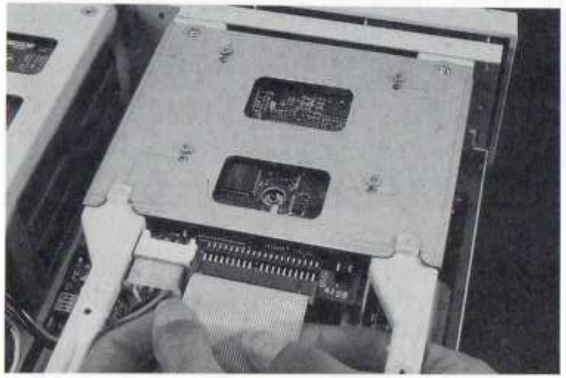


- Use your hands to push the edge of the steel bracket panel until the other edge firmly fits into the hard disk drive's metal clip and the screws hole is correctly aligned.

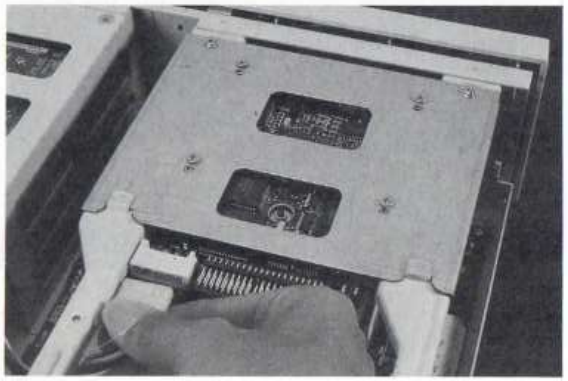
- Secure the hard disk to the two metal guides on the case with two screws.



- Connect the two interface cables packaged with your hard disk drive to the hard disk interface port and enable the on-board HDD by opening pins (13,4) of J1. Usually the color edge (red or blue) of each cable should be connected to the connector's pin 1.
- Attach the other end to the gold fingers at the rear of the hard disk drive. Be sure that the color edge (red or blue) of each cable is connected to the end of the hard disk's gold finger that has a notch near it.

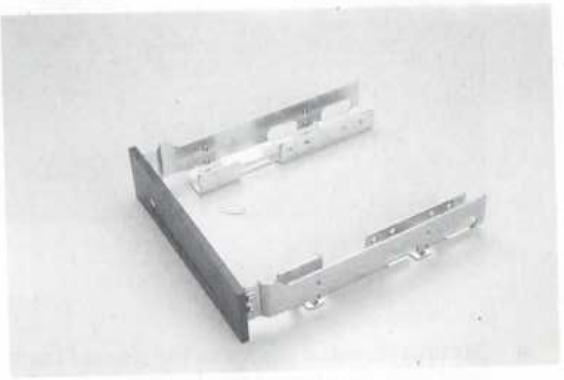


- Connect a 4-pin female power cord extending out from the power supply to the 4-pin male connector at the rear of the drive.

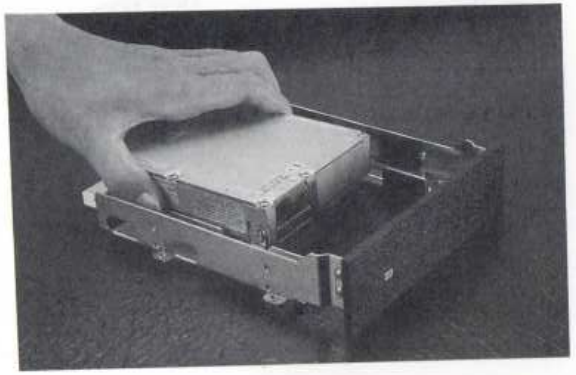


5.2.2 BELOW THE FLOPPY DISK DRIVE A

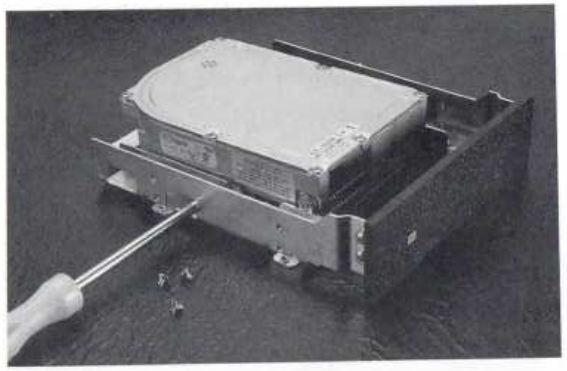
- Open the system unit. (Refer to Section 2.1)
- Use your hands to remove the front panel of the PC 286M by pulling it forward.
- Prepare a hard disk drive's metal bracket.



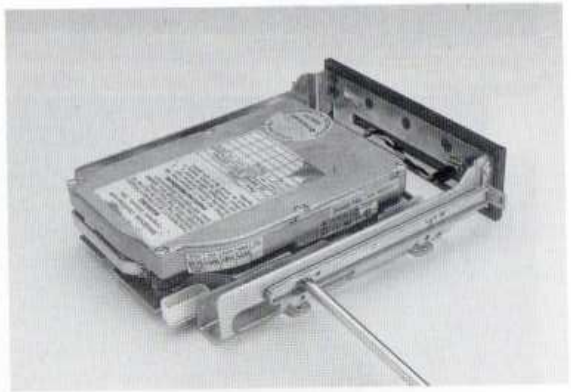
- Position the hard disk drive inside the metal bracket at the proper place.



- Secure the hard disk drive to the metal bracket with two screws on the sides of the bracket.

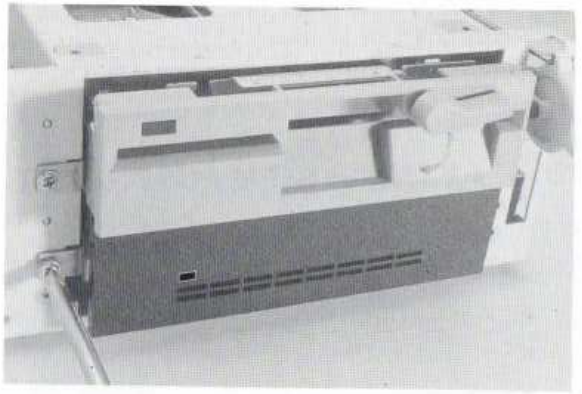


- Secure two metal guides on the sides of the secured hard disk drive for easing the installation .



- Gently slide the hard disk into the solt below the floppy disk drive A.

- Connect the hard disk drive to the system case with two screws.



- Connect the two interface cables packaged with your hard disk drive to the hard disk interface port and enable the on-board HDD by opening pins (3,14) of J1. Usually the color edge (red or blue) of each cable should be connected to the connector's pin 1.
- Attach the other end to the gold fingers at the rear of the hard disk drive. Be sure that the color edge (red or blue) of each cable is connected to the end of the hard disk's gold finger that has a notch near it.
- Connect a 4-pin female power cord extending out from the power supply to the 4-pin male connector at the rear of the drive.

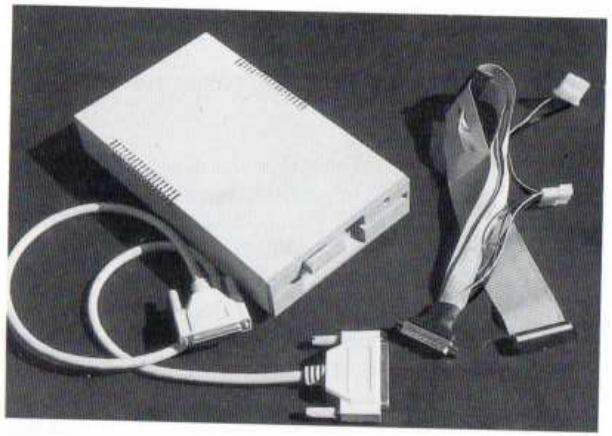
5.3 EXTERNAL FLOPPY DISK DRIVE INSTALLATION

Two different procedures should be executed when connecting an external floppy disk drive. If you purchased your external floppy drive at the time you bought your PC, then refer to section 5.3.1. Section 5.3.2 regards the procedures to install an external floppy disk drive that is purchased later.

5.3.1 AT THE SYSTEM PURCHASE TIME

If you decide to connect an external floppy disk drive when you buy your PC, then you will need the following:

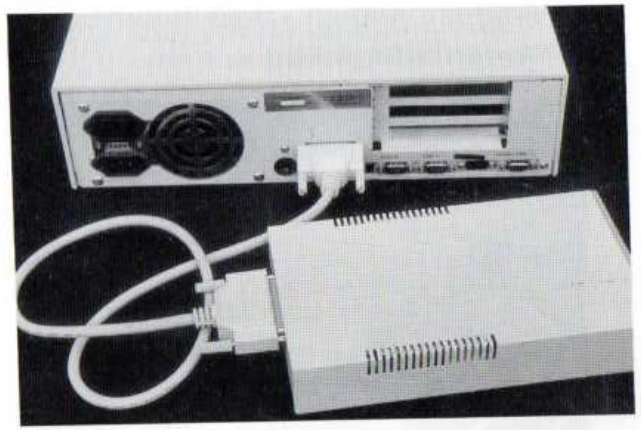
- A round cable with a 25-pin and 37-pin connectors.
- An external floppy disk drive



To connect your external floppy drive, follow the steps listed below:

STEP 1: Connect the round cable's 25-pin female connector to the 25-pin male connector at the rear of the system.

STEP 2: Connect the 37-pin male connector (the other end) to the rear side of the floppy disk drive.



5.3.2 AFTER THE SYSTEM PURCHASE TIME

If you should require an external floppy disk drive after purchasing your PC, then you will require the following:

- A round cable with a 25-pin and 37-pin connector.
- A flat cable with two power connectors.
- A new rear panel with a 25-pin connector opening.
- An external floppy disk drive.

Now follow the steps below to install your external floppy disk drive.

STEP 1: Replace the old rear panel with the new one.

STEP 2: Disconnect the original disk drive flat cable from the floppy disk drive connector.

STEP 3: Connect the female connector of the new disk drive cable to the floppy disk drive connector.

STEP 4: Disconnect the power cable from the original disk drive.

STEP 5: Connect the flat cable's female power connector to the floppy disk drive's power connector and its male connector to power supply connector.

STEP 6: Secure the flat cable 25-pin male connector onto the unused open hole of rear panel.

STEP 7: Connect the round cable's 25-pin female connector of the disk drive to the flat cable's male connector.

STEP 8: Connect the round cable's 37-pin female connector to the disk drive's connector.

STEP 9: After all connector have been attached, run the SETUP program again to reconfigure the system.

After all the optional installations have been fully completed, replace the system cover and reinstall the screws on the sides of the PC 286M.

IMPORTANT

If there are any system specification changed, run the SETUP program to identify the system's new configuration. Refer to Appendix A for a detailed description.

No display on monochrome or RGB monitor

"keyboard failure" message appear on the screen

No sound produced when the system is ready.

More than one beep sound is produced

Large type (40 columns) on an RGB monitor when small type (80 columns) is desired or vice versa

CHAPTER 6
TROUBLESHOOTING

Here are some typical installation problems and solutions:

Symptom: More than one beep sound is produced

Solution: Check the system unit accordingly.

Symptom: A display problem happens in your machine

Solution: Make sure that the jumper settings are correct and the monitor cables are properly connected.

Symptom: "keyboard failure" message appear on the screen

Solution: Reconnect the keyboard.

Symptom: No sound produced when the system is ready.

Solution

a. Check to see if the speaker connector is firmly attached.

b. Have your speaker checked by an authorized repair dealer.

Symptom: One long beep & two short beeps when the system is powered on

Solution: Reseat or clean the "gold fingers". A pencil eraser works well.

Symptom: **No display on monochrome or RGB monitor**

Solutions:

a. System's setting is configured appropriately for the display mode in use.
b. Turn on the monitor and its brightness and/or contrast control is properly adjusted.
d. Monitor's connector has attached to the system.
e. The mode selection switch SW1 and J12's configuration are correctly set.

Symptom: **Large type (40 columns) on an RGB monitor when small type (80 columns) is desired or vice versa**

Solutions:

a. Run the SETUP program and reset the mainboard's jumpers/switches to reconfigure your system.
b. For temporary use, type the SW command to configure the monitor's operation. (See Section 3.3 for more description.)

Sympton: **After completing all the installation procedures, the printer does not work**

Solution:

a. Correctly set the jumper.
b. Make sure the printer power cable is attached properly.

Symptom: **A "No boot device available" message appears on the screen**

Solution

Insert a MS-DOS system diskette in your floppy disk drive or copy it into your hard disk.

Symptom: **A "Hard disk failure" message appears on the screen**

Solution:

First check if all the cable connections are correct. Re-connect if necessary. If there is no problem with the connecting cable, run the SETUP program and check whether the hard disk type is set properly.

Symptom: **The whole system ceases to operate while executing a RAM test**

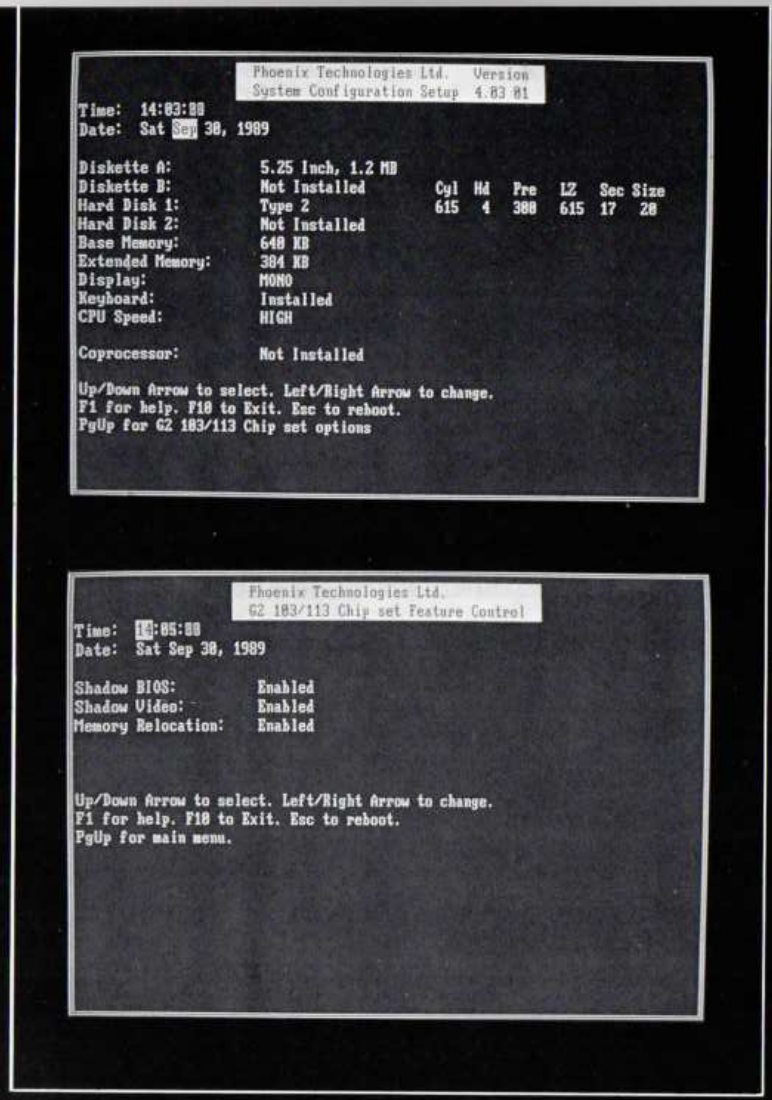
Solution:

Replace the bad RAM chip.

Symptom: **An "Invalid configuration information" message displays on the screen after the self-test.**

Solution:

Run the SETUP program to change the system's configuration.



APPENDIX A
MORE DETAILS ON THE SETUP PROGRAM AND EMS

This appendix describes the customized options available in the Phoenix AT SETUP utility. Each customized option is added to the SETUP menu through the use of optional commands that are built into the AT SETUP utility.

Normally, when your system is under either the DOS prompt or any application software system, you can directly enter the SETUP utility to reconfigure your system by simultaneously pressing "Ctrl" + " Alt" + "S". If there are any application softwares which will automatically replace your BIOS INT 9's address value, then you should execute the SETUP.EXE file under the DOS prompt. This is because the "Ctrl" + " Alt" + "S" function is destroyed when the BIOS INT 9's value is replaced.

Please contact your dealer to know which application softwares will replace your BIOS INT 9's address value during operating and select the correct method to reconfigure your system's specifications.

A.1 PHOENIX SETUP PROGRAM

In every AT-compatible or 80386-based computer, there is a small chunk of battery-backup RAM, or so called "non-volatile RAM", which function as a normal DRAM to store information about your computer and peripheral device configurations. Unlike normal DRAM, it keeps the informations even you power OFF our computer, because a separate DC battery supplies its necessary energy.

Due to the complexity of design, the machine needs to know something about itself to operate correctly when powered ON. A canned software, located in two Read-only memory chips (BIOS), obtain these information from the non-volatile RAM everytime you power ON the computer. It then dictates the CPU and other devices to prepare themselves to work for

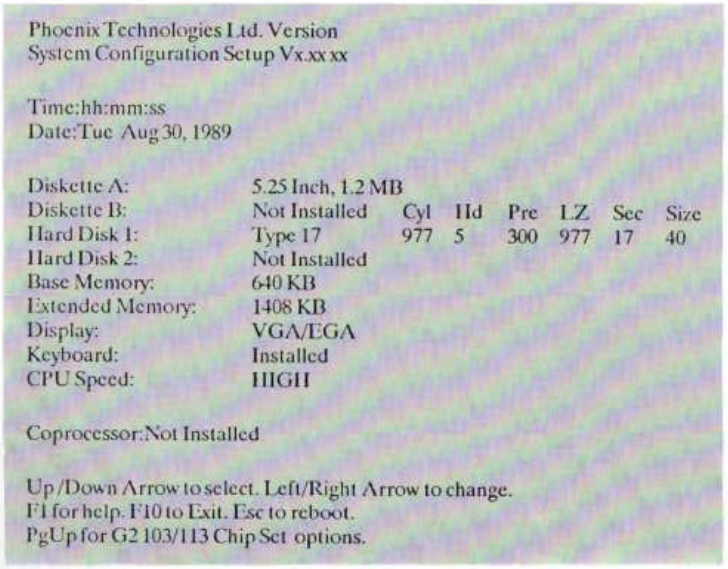
you according to those information. If the informations it gets are incorrect or insufficient, the system will refuse to work.

To enter the Phoenix AT Setup Menu, type and enter "SETUP.EXE" at the DOS prompt or press "Ctrl" + "Alt" + "S" simultaneously.

A.1.1 MAIN MENU SETUP

Follow the instructions shown on the bottom of each screen to reconfigure your system.

The first displayed menu is the System Configuration Setup Options Menu:



** TIME & DATE

TIME is formed as: hours, minutes, seconds
DATE is formed as: day of the week, month, day, year.

All the selectable values have been fully set. Press the up, down, left and right arrow keys to obtain the right time and date.

Note:

Even your computer is powered OFF, the Real-Time-Clock keeps running in the computer. Because it works like a general clock and would run into error, the user should set the clock by the standard time after a certain period of time.

** DISKETTE A & B

Their selectable types are 5.25 inch, 360K; 5.25 inch, 1.2MB; 3.50 inch, 720K; and 3.50 inch, 1.44MB

** HARD DISK 1 & 2

At the end of the entries, the different specifications of the hard disk drive, such as Cylinders, Heads, Write Precomp, Landing Zone, Sectors and Sizes, are shown up with the selected drive type option.

By pressing F1 key, the entire list of the available hard disk drive is displayed as follows:

Hard Disk Drive List

Drive Type	Cylinders	Heads	Write Precomp	Landing Zone	Sectors	MB
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	30
4	940	8	512	940	17	62
5	940	6	512	940	17	46
6	615	4	-1	615	17	20
7	462	8	256	511	17	30
8	733	5	-1	733	17	30
9	900	15	-1	901	17	112
10	820	3	-1	820	17	20
11	855	5	-1	855	17	35
12	855	7	-1	855	17	49
13	306	8	128	319	17	20
14	733	7	-1	733	17	42
16	612	4	0	663	17	20
17	977	5	300	977	17	40
18	977	7	-1	977	17	56
19	1024	7	512	1023	17	59
20	733	5	300	732	17	30
21	733	7	300	732	17	42
22	733	5	300	733	17	30
23	306	4	0	336	17	10
24	615	4	300	615	17	20
25	615	4	0	615	17	20
26	1024	4	-1	1023	17	34
27	1024	5	-1	1023	17	42
28	1024	8	-1	1023	17	68
29	512	8	256	512	17	34
30	615	2	615	615	17	10
31	989	5	0	989	17	41
32	1020	15	-1	1024	17	127
33	615	8	128	686	17	40
34	615	6	300	615	34	61
35	1024	9	1024	1024	17	76
36	1024	5	512	1024	17	42
37	830	10	830	830	17	68
38	823	10	256	824	17	68
39	615	4	128	664	17	20
40	615	8	128	664	17	40
41	917	15	-1	918	17	114
42	1023	15	-1	1024	17	127
43	823	10	512	823	17	68
44	820	6	-1	820	17	40
45	1024	8	-1	1024	17	68
46	925	9	-1	925	17	69
47	699	7	256	700	17	40

Except above existing hard disk drive, there are two blank entries, Type 48 and 49, available for users to set new types in the SETUP program.

Set in the way of:

Selecting either Type 48 or 49 and pressing Down arrow key, then the cursor will move onto the first column of the latter part of the entries. Enter the specifications.

Notice:

An incorrect setting will result in a failure booting and further demage your hard disk drive or floppy disk drive. So, make sure that you have set a correct type before booting by simultaneously pressing "Ctrl" + "Alt" + "S" under the DOS prompt. After a correct type is set, press F10 to return to DOS, power OFF, and then power ON.

** BASE MEMORY:

Base memory is the memory between 0 and 640KB. It refers to the basic RAM capacity that the computer uses for operating system, application program execution, as well as data storage and must be set by keying in numeric symbols.

** EXTENDED MEMORY:

Extended memory is the memory above 1-megabyte boundary which is normally accessed by MS-DOS applications. Some special software, such as VDISK, RAMDISK have been designed to make use of this memory. Its size depends on the number of RAM bank(s) used.

** DISPLAY:

The selectable modes are EGA/VGA, CGA40, CGA80, and MONO.

**** KEYBOARD:**

It shows whether the keyboard is connected (Installed) or not (Not Installed). Normallly, it is set to "Installed".

**** CPU SPEED:**

It is selectable between TURBO and NORMAL. The selected speed will be set by the BIOS at the warm or cold boot.

HIGH means 12 MHz (PC 286M-12)/10MHz (PC 286M-10) at either zero or one wait state.
LOW means 6 MHz (PC 286M-12)/5MHz (PC 286M-10) at either zero or one wait state.

Three methods can be used to set the CPU's processing speed between high and low. The hardware jumper setting sets the RAM test speed when you power on the system. The SETUP method sets the default speed after RAM test is finished and allows you to change the default setting. A keyboard setting to the CPU speed for current usage can be achieved by: pressing "Ctrl", "Alt", and " + "/"-" simultaneously.

**** COPROCESSOR:**

The system will automatically detect and configure itself when an 80287 is inserted.

A.1.2 G2 103/113 CHIP SET SETUP

When you press the PgUp key after completing the main setup menu's setting, the screen display should be similar to the following:

Phoenix Technologies Ltd.
G2 103/113 Chip Set Feature Control

Time:hh:mm:ss
Date:Tue Aug 30, 1989

Shadow BIOS: Disabled
Shadow Video: Disabled
Memory Relocation: Enabled

Up/Down Arrow to select. Left/Right Arrow to change.
F1 for help. F10 to Exit. Esc to reboot.
PgUp for Main Menu

SHADOW VIDEO AND BIOS

Because of the hardware design of the PC/XT/AT, the memory range of 640KB to 1MB could not be directly accessed by any softwares. Therefore, when you have more than 640KB memory on-board, you should map it to the location beyond 1MB address. But the ST 286M's high-tech design leads you to use the extra 384KB as a "shadow RAM" instead of mapping it to another location. The system duplicates the contents of the ROM BIOS into this 384KB shadow RAM, thereafter, all BIOS accessings can be executed in this RAM area. The RAM's processing speed is faster than ROM's, therefore system performance would be greatly improved by moving the ROM's contents to the unused 384K RAM space. Normally, you can operate the shadow function for two kinds of ROM:

A. Shadow BIOS:

This field shadows the system BIOS located at 964KB - 1MB (F0000H - FFFFFH).

B. Shadow Video:

This field enables the shadow feature for video BIOS ROM on some display adapters (EGA/VGA). It shadows the adapter's ROM BIOS residing on the memory space from C0000H to C8000H.

You should be cautious when using this feature. For some auto-switching EGA or VGA display cards, the shadowing may hinder their operations.

NOTE:

1. The shadow RAM uses totally 96KB memory.
2. Shadow RAM and memory relocation can not be used at the same time. In case the memory relocation is enabled, the shadow RAM will be disabled automatically.

MEMORY RELOCATION

The relocation ability only functions when the On-board memory size is just 1MB. With this relocation setting, the 384KB memory size between the 640K and 1024K can be utilized for executing the shadow RAM or the extended memory. Do not use both of them at the same time.

The things that you should briefly pay attention to are both the shadow RAM and relocation ability utilize the same 384K memory and the shadow RAM has the relocation priority on using the 384KB memory. So, if both of them are set, the shadow RAM is executed.

NOTE:

As all the settings in this section will influence the "Base Memory" or "Extended Memory" amounts, the values in these two fields may be incorrect after you made these settings. If you have not corrected them before exiting the SETUP program, an "invalid configuration" message will appear at the next time you boot up the system. You can revise them before exiting the SETUP program, or correct them at your next booting according to the memory test results.

After completing the system configuration, press "ESC" to reboot the system. Then all the change will be identified and valid.

If you did not run the SETUP program before changing some critical configuration, the screen will look similar to the following when you turn the power ON:

```
Phoenix 80286 ROM BIOS PLUS Version 3.xx xx
Copyright (C) 1985-1989 Phoenix Technologies Ltd.
All rights Reserved

CEC286

xxxK Base Memory, xxxxxK Extended
Invalid configuration information-please run SETUP program
Strike the F1 key to continue, F2 to run the setup utility
```

Press F2 to continue. The screen will look like below:

Errors have been found during the power on self test in your computer. The errors were:

Incorrect configuration data in CMOS
SETUP will attempt to correct these errors through auto-configuration.
Hit any key to continue:

The statement at the middle of the screen provides you a more specific description of the detected error.

Press any key to continue and the SETUP options menu will appear on the screen. Correct the entries accordingly.

If you just press "F10", then all the change will be identified and will be valid after a rebooting.

When to setup:

1. When you work on your computer for the first time, though your dealer or some experts in your company may have set up the system for you, you may have to make some changes for the system to fit your needs. It will by no means do any harm to your computer if only you carefully and strictly follow our instructions.
2. Whenever you change some components of your system, for example, adding a hard disk or adding some more memory, you must setup your system once more. The computer will be smart enough to ask you to do so if you don't.
3. The last and most unlikely thing to happen, the informations in the non-volatile memory may be lost or destroyed. Maybe you will never encounter this unfortunateness; but if you do, you can face it.

How to setup:

1. **When it asks you to use it:**

When the canned software detects something wrong in the configuration informations, it will not carry on. It will then ask you to run the SETUP program by giving you the following message:

F2 to run setup, or F1 to continue

It means that you should press F2 key on your keyboard to run the SETUP program, or if you insist, press F1 key to go on. But it is better not to refuse such a request.

2. **You can run the SETUP program anytime you like:**

By pressing [Ctrl], [Alt], and [s] keys simultaneously, you can call up the SETUP program any time you like.

For example, when you are running a word-processing software, you can call up the SETUP program. After you made the necessary change(s) or inspection, pressing F10 key will return you to the previous word-processor. Here are some guide lines for you:

A. Do not use this method when you are running application programs:

a. The SETUP program is not powerful enough to manifest itself under every application program, especially when a graphic image is shown on your screen, you may run into a mess.

b. If you accidently press the Esc key when you mean to leave the SETUP program to return to your application, that will temporarily shut off your computer and re-boot it, which means all the work you have done before you called up the SETUP program will be lost permanently.

Therefore, when you need to run the SETUP program, quit the application you are currently running and return to DOS first.

B. If your operating system is something other than MS-DOS, for example, under OS/2, UNIX, or XENIX, then you cannot use this method to run the SETUP program. In this condition, you have two ways to do it:

a. Use a MS-DOS diskette to boot your system.

b. Power ON the machine, when the memory test is over, press the [Ctrl], [Alt], and [s] keys continuously until the SETUP menu pops up.

What to setup:

Everytime you run the SETUP program, the message displayed in the screen should be the same as that of in page A-2.

You can see a square block sign placed on the first column of the "Time" field; that is the "cursor".

Use the Up (↑) and Down (↓) arrow keys to move the cursor to the item(s) you want to change, and use the Left (←) and Right (→) arrow keys to change the entries or directly type in the value(s) (for the "Base Memory" and "Extended Memory" entries).

When finished your setting, press F10 key to record all your changes, and return to where you left; or press the Esc key to record the changes and reboot the system. However, if you press the F10 key to exit, the changes you have made will not be effected until the next time you reboot the machine.

A.1.3 What is EMS

In order to satisfy the requirements of some popular program, the user should acknowledge the function of EMS and aware of the method of setting EMS entries.

Some popular software programs which need large amounts of memory for program code and data storage, the memory space above 1MB can be mapped as memory paging to be accessed. This page memory is called "expanded memory".

The paging technique used in PC expanded memory specifications is to access the logical and physical memory in 16KB blocks. In the logical memory address space, these 16KB blocks are called "windows", and the 16KB blocks of physical memory beyond 1MB are called "pages". Through these windows, the CPU can read the physical pages of expanded memory by mapping them in and out of the window space.

EMS allows the logical memory to be divided into sixty-four 16KB windows (64 x 16KB = 1MB). Through which, up to 2048 16KB pages of expanded physical memory (up to 32MB) can be accessed.

When any application needs to access data that is physically stored in the expanded memory, it accesses that data through a window. Page Registers temporarily store information regarding which page (or 16KB block) of memory is active and to which window that page is mapped.

When the application and EMS require a different page in the expanded memory, the window's register must be changed to activate the new 16KB page or a new window accessed. Updating the page registers and moving to different physical pages of memory is called "context switching". Basically, in multitasking, the context is the information that con-

stitutes the identification and running environment of a specific task (or program).

The context for one program may be such that several logical windows are mapped to several physical addresses (pages) and are uniquely associated with that program. Each program that runs must be assigned a "Handle" which is the unique identifier of that program. Whenever a context switch is made, the current information is saved or stored so that when that context is to be restored, the information is intact.

The expanded memory can be used in two mutually exclusive ways - for RAM disks and print spoolers or for applications software.

RAM Disks and Print Spoolers - Paged memory can easily be used for a RAM disk or print spooler (leaving the 640KB user area free for other uses). In this case, the expanded memory functions just like any other RAM disk drive or print spooler storage area. An applications program, for example, does not need to be aware of the extra memory at all.

Applications Software - Applications programs that are specifically written to use paged memory are able to manipulate larger amounts of data. With programs that use the paging capability, the system can accommodate larger spreadsheets and data base, and have more memory-resident data. Also, with appropriate EMS hardware and software, multiple large applications programs can be executed concurrently.

A.1.4 EMS Device Driver (EMM)

To enable the EMS function, an EMS device driver should be installed in your system. The EMS Memory Manager Version 4.00, which should be included in one of the attached diskettes when you purchase your computer, will work with a G2 GC103/GC113 memory controller. This memory controller supports both stan-dard EMS and the Enhanced EMS (EEMS) types of expanded memory to allow multi-tasking.

The memory manager should be installed in the CONFIG.SYS file on your booting diskette or drive as the first driver. This allows other device drivers, such as the ramdisk, to make use of the memory manager's services. After being loaded, the memory manager will determine the amount of expanded memory in the system and perform any required initialization. The syntax for installation of the memory manager is shown below.

```
device = [\subdirectory\] G2MMC.SYS [/Handles = nnn]
[/Contexts = nnn] [/Depth = nn] [/Start = xxxx] [/Xclude = xxxx-xxxx]
[/L = xxxx-xxxx] [/Address = xxx] [/M = nnnn] [/Test]
```

The numeric parameters for the memory manager should be specified in decimal except where specifically noted otherwise. Memory sizes should be specified in K (1024) bytes without the K on the end of the number, i.e. 32,767 bytes should be specified as 32. Only the first character of the parameter is significant, i.e. "/D =" may be substituted for "/DEPTH =".

All of the parameters noted above are optional. Default values for each will be selected if the parameter is not specified. Below is a description of each of the memory manager's parameters.

Handles = nnnn

This parameter specifies the number of handles that will be available for programs which use EMS memory. The default number is 255. This is the maximum number allowed by the LIM EMS specification. The minimum number of handles which can be allocated is 3.

NOTE:

The EMS driver uses the handle 0.

Contexts = nn

This parameter specifies the number of context which can be saved by processes using EMS memory. The default number of context is equal to that of handles which are allocated. The maximum number of contexts is 255, and the minimum 3.

Depth = nn

This parameter specifies the number of consecutive context that can be saved for a given handle before a restore must be initiated. The default depth is 1, but it can be set to any value from 1 to 32.

Start = xxxx

This parameter specifies the starting address for the standard 64KB EMS window. Normally, the start for the EMS window is selected automatically by the memory manager software. This parameter allows you to choose the address explicitly.

The EMS starting address can be set from C0000 to D0000, every 4000H byte (16KB) address space for one range. Specify only the first four digits of the address.

Please note that the address space you set for the EMS windows should not be in conflict with any on-board ROM BIOS (for example, the EGA display occupies addresses C0000H-C4000H, VGA C0000H-C80000H). Also, all the 64KB windows should be consecutive (not separated by other ROM BIOS address space). Otherwise, their functions may not be executed completely (some applications may not even be able to operate with uncontiguous windows).

NOTE:

The system handle (used by the driver) automatically maps the memory ranges 40000H ~ A0000H as EMS memory and use it.

Xclude = xxxx-xxxx

This parameter specifies a range of addresses which should not be used for EMS mapping. The memory manager will automatically exclude areas known to contain ROMS or video RAM. This parameter allows you to exclude a range of addresses which might be included by the automatic selection process of the memory manager. The address range selected should be hexidecimal segment addresses. You may specify as many excluded ranges as necessary and they may also overlap.

L = xxxx-xxxx

This parameter specifies a range of addresses which should always be used for EMS mapping. The memory manager will automatically exclude areas known to contain ROMS or video RAM. This parameter allows you to include a range of

addresses which might be excluded by the automatic selection process of the memory manager. The address range selected should be hexidecimal segment addresses. You may specify as many include ranges as necessary and these may overlap.

Address = xxx

This parameter is used to select the base I/O address for the EMS function. The default value is 1EC.

Memory = nnnn

This parameter specifies the amount of extended memory which should be used as EMS memory. If the value 00 is used or if the Memory parameter is not specified, then all extended memory will be used as EMS memory.

NOTE:

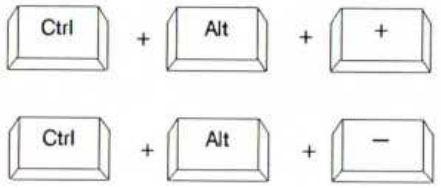
1. Since the driver maps a portion of the EMS memory into the 40000 ~ A0000 space, the EMS memory available will be decreased.
2. With the memory relocation disabled, up to 384KB memory (except those used for shadowing) will be utilized as EMS memory automatically.

Test

This parameter specifies that memory should be tested on power ON. Normally this is unnecessary since memory is tested by the BIOS.

A.2 CPU SPEED SETTING

A.2.1 KEYBOARD CONTROL METHOD



"+" means one must press the keys simultaneously.

Sometimes, the keyboard section in the BIOS would be replaced by some softwares, so that these key combinations cannot control the CPU speed setting. In this condition, you can only set the CPU speed by setting relative jumpers or DIP switch.

A.2.2 "SPEED" COMMAND SETTING

The file "SPEED.COM", included in your DOS diskettes, can change the CPU processing speed. When the [A >] appears, you can type in the speed syntax as:

```
speed/X
```

X means high speed and this command sets the speed to high.

```
speed/Y
```

Y means low speed and this command sets the speed to low.

1. A "speed" command displays...

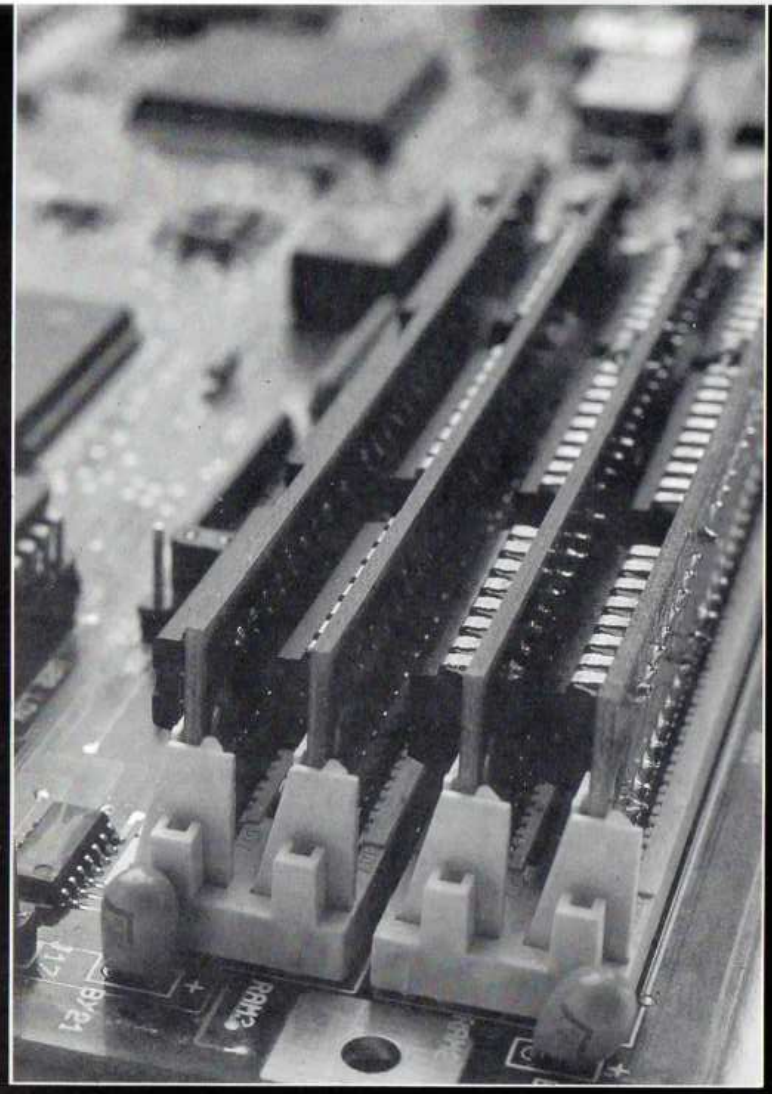
```
Speed verison x.xx
This program is for Turbo Personal Computer Only.

Usage:
      Format: SPEED [/speed]
      Speed option: "L" means xMHz
                    "H" means xx MHz
```

2. A correct command setting according to the speed you want will result in the screen similar to the following:

```
Speed verison x.xx
This program is for Turbo Personal Computer Only.
```

3. An incorrect parameter setting will result a display as:

```
Speed verison x.xx
This program is for Turbo Personal Computer Only.

Invalid parameter

Usage:
      Format: SPEED [/speed]
      Speed option: "L" means xMHz
                    "H" means xx MHz
```

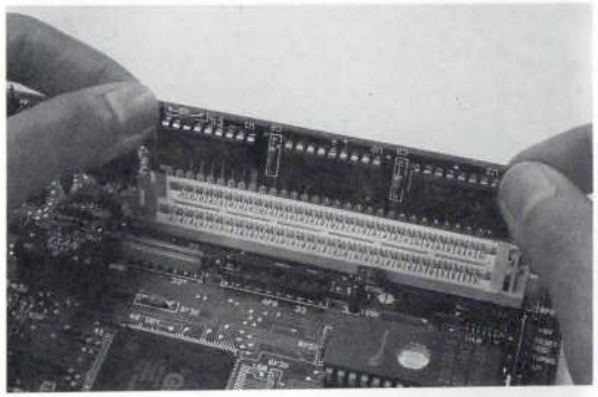


APPENDIX B
RAM MODULES INSTALLATION

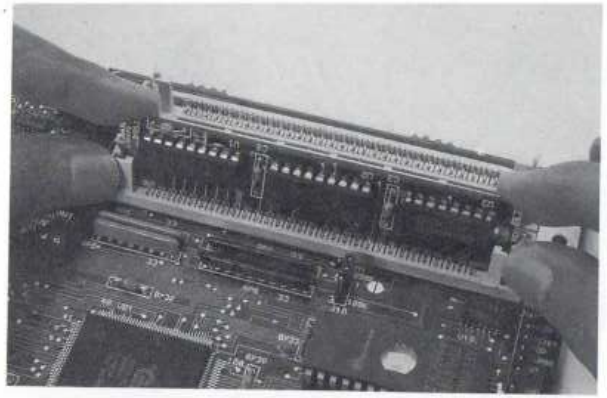
Before operating your PC 286M, you should familize with the skills of inserting and releasing the RAM modules. If you are not an experienced user, it is quite easy to install until you have the knack of it. The detailed instructions on the RAM modules installation procedures are listed below:

How to insert:

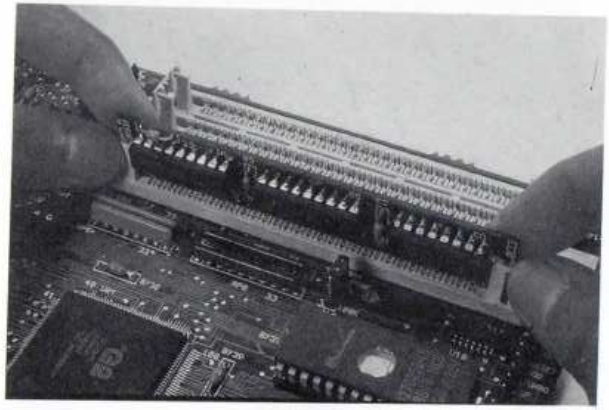
1. At a 45-degree angle sloping position, place the RAM module board on the RAM socket with its chips face up and the concave side on the left side.



2. Insert the RAM board into the RAM socket and then carefully press its top until its golden-pin butts the socket buttom.

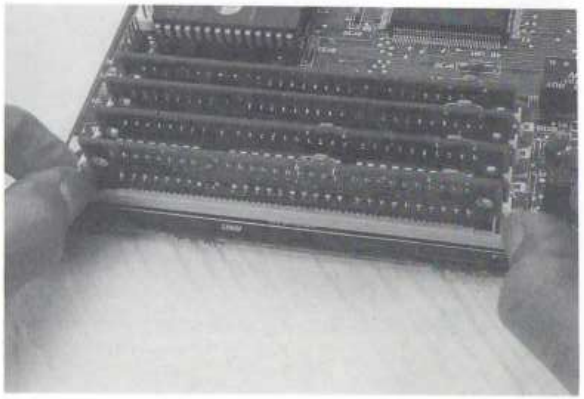


3. Push it until the plastic clamps work and a "clip" sound is heard.

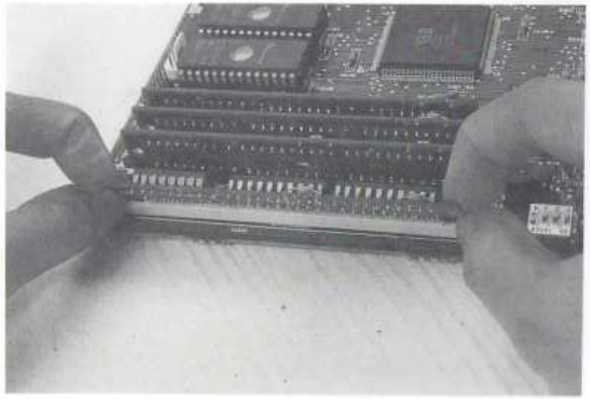


How to release:

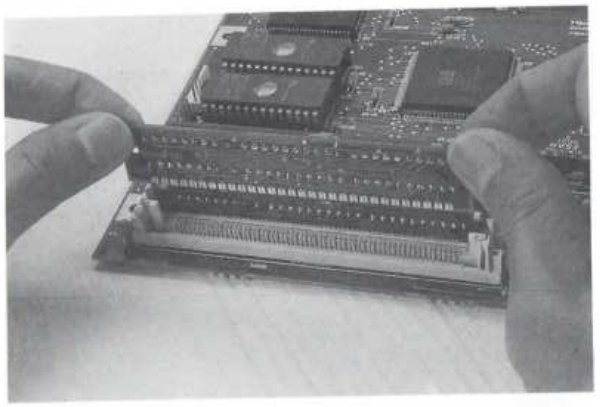
1. Carefully use your thumbs to bend outwards the plastic clamps end on the sides.



2. Use your forefingers to cause the RAM module board a forward movement by pushing its upper corners.



3. Take it out of the socket.



470.08061
Version 1.00