

**GENERAL INFORMATION - PC and
XT**

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- PC and XT" in place of this page, then discard this page.**



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Product Description

The IBM Personal Computer and the IBM Personal Computer XT consist of a variety of systems and options to meet present and future needs.

The following are features of the IBM Personal Computer:

- 63.5-Watt Power Supply
- System Board
 - 8088 Microprocessor
 - 4.77 MHz Clock
 - Five Expansion Slots (with 62-pin card edge sockets)
 - 16K-64K base Random Access Memory (RAM).
- Speaker
- 320K or 360K Diskette Drive (Drive A)
- 83-Key Keyboard.

The following are features of the IBM Personal Computer XT:

- 130-Watt Power Supply
- System Board
 - 8088 Microprocessor
 - 4.77 MHz Clock
 - Eight Expansion Slots (with 62-pin card edge sockets)
 - 256K base Random Access Memory (RAM).
- Fixed Disk Drive (in some models)
- Asynchronous Communications Adapter (in some models)
- 83-key Keyboard.

The optional Expansion Unit has:

- Fixed Disk Drive
- Six Expansion Slots
- Receiver Card
- Data/Control Cable
- Expansion Unit Cable
- Extender Card (to be installed in the system unit).

Option Compatibility

Incompatible Adapters and Terminating Resistors

Incompatible Adapters

Certain option adapters are not compatible when used in the same system.

1. The following adapters should not be installed together in the system unit:
 - Synchronous Data Link Control (SDLC)
 - Alternate Binary Synchronous Communications (Alt BSC).
2. Possible problems may occur in the system because of adapters that share the same interrupt level. Check the adapter interrupt levels to be sure that they do not conflict. If the adapters have selectable interrupt levels, be sure their jumpers are not set for the same level.

Terminating Resistors

Terminating resistors are required on certain diskette and fixed disk drives for proper operation of the drive.

These drives always require a terminating resistor:

- Diskette Drive A
- Fixed Disk Drive C.

Always remove the terminating resistor from:

- Diskette Drive B
- Fixed Disk Drive D.

The IBM Personal Computer and IBM Personal Computer XT can have a total of only 640K of RAM installed in the system unit. This is regardless of where the memory is installed (system board or on memory expansion cards).

IBM Personal Computer

SDLC and Alternate BSC adapters share the same address and cannot be installed together in the same system.

The following may be installed only in the system unit:

- Primary Display Adapter
- Memory Expansion Options
- Diskette Drive Adapter
- PC Network Adapter
- Enhanced Graphics Adapter.

The following may be installed only in the expansion unit:

- Fixed Disk Drive Adapter
- Professional Graphics Controller.

All other adapters may be installed in either the system unit or expansion unit.

IBM Personal Computer XT

The following may be installed only in the system unit:

- Primary Display Adapter
- Memory Expansion Options
- Diskette Drive Adapter
- PC Network Adapter
- Enhanced Graphics Adapter.

All other adapters may be installed in either the system unit or expansion unit (in those models where the expansion unit is supported).

Operating Requirements

This describes the operations that take place from the time the system is turned on until the minimum operating requirements have been met.

Power Supply

There are two power supplies, 120 Vac and 220/240 Vac. Both are fused. The ac current is converted to dc outputs, which supply the system with proper operating voltages. AC current is passed through a filtered-fused circuit to the Monochrome Display receptacle. No other usage of this receptacle other than with the Monochrome Display, is supported or recommended.

Whenever the power supply has been off for a minimum of one second and then switched on, the power supply generates a 'power-good' signal. The 'power-good' signal resets system logic, indicates proper operation of the power supply, and gives the system board advance warning of voltage loss when the system is switched off.

The 'power-good' signal ranges from 0.0 to 0.4 Vdc when any output is below its minimum undervoltage (UV) sense level and increases to 2.4 to 5.5 Vdc when all power supply output voltages are present and above their minimum UV sense levels.

Output (Vdc)	Minimum UV Sense Level (Vdc)	
	PC	XT
+5 Vdc	+4.0	+4.5
-5 Vdc	-4.0	-4.3
+12 Vdc	+9.6	+10.8
-12 Vdc	-9.6	+10.2

Once the minimum UV sense levels are established and the 'power-good' signal has risen to its active level, all system board power requirements have been met.

If dc over-current or over-voltage conditions exist, the power supply automatically shuts down until the condition is corrected.

System Board

The major components of the system board are the 8088 microprocessor, dual in-line package (DIP) switch, and ROM BIOS.

Microprocessor

The microprocessor is the action center of the system. It interprets and carries out instructions. The 8088 is an 8-bit microprocessor with a clock speed of 4.77 MHz.

Dual In-Line Package (DIP) Switch

A dual in-line package (DIP) switch (PC has two DIP switches) is mounted on the board and can be read under program control. The DIP switch provides the system programs with information about the installed options, how much storage the system board has, what type of display adapter is installed, what operation modes are desired when power is switched on (color or black-and-white, 80- or 40-character lines), the number of diskette drives attached and if the Math Coprocessor is installed.

ROM BIOS

The ROM BIOS contains instructions and routines that make the system perform in a particular manner. It is responsible for the major I/O devices (such as keyboard, diskette, fixed disk drives, and video) in the system. Some adapters may have their own ROM modules that contain extended routines that work in conjunction with the system board ROM BIOS. The routines for performing the power-on self test (POST) are also contained in the ROM BIOS.

Power-On Self Test (POST)

The POST is initiated automatically with each power-on of the system. The POST can be invoked at any time by pressing the Ctrl key, the Alt key, and the Del key at the same time, then releasing them.

The POST is a series of system checks and initialization that verifies the correct operation of the base system. Two classifications of malfunctions that may be detected during the POST: critical and non-critical.

Critical malfunctions prevent the system from operating at all or could cause incorrect results that are apparent to the user. Examples of critical errors include processor or interrupt controller malfunctions.

Non-critical malfunctions are those that cause incorrect results which may not be apparent to the user. An example of a non-critical error would be a memory chip failure.

If a critical error is detected during the POST, an attempt is made to indicate the error and all testing will halt. On a non-critical error, an error code is displayed and testing will continued. On an XT a non-critical error may be bypassed by pressing the F1 key.

After a successful POST, where no critical errors were detected, a single short beep will be generated. Control is then given to the system boot strap loader.

It is important to remember that the POST does not test all areas, but only those that allow the system to be operational enough to run the "Advanced Diagnostics" program.

System Memory

The following figure shows an example of how memory is assigned on a system board. The address is an identifier for a particular part of memory. The addresses run sequentially (in hexadecimal notation) starting at 000000 and ending at FFFFFFFF.

The only difference between base memory on system boards, is how it is allocated.

Address in Hex	Memory	Function
00000 to 7FFFF	BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB	256K RAM On System Board
8000 to 9FFFF	BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB	256K RAM On System Board
A0000 to BFFFF	BBBBBBBBBBBBBBBB BBBBBBBBBBBBBBBB	128K RAM On I/O Adapter
C0000 to DFFFF	AAAAAAAAAAAAAA AAAAAAAAAAAAAA	128K Video RAM Reserved For Graphics Display Buffer
F0000 to FFFFF	AAAAAAAAAAAAAA AAAAAAAAAAAAAA	192K Reserved For ROM on I/O Adapters
	AAAAAAAAAAAAAA	Reserved
	AAAAAAAAAAAAAA	Reserved ROM on System Board

B=Base Memory

R=Reserved

Environmental Specifications

IBM Personal Computer

Size

- Length: 500 millimeters (19.6 inches)
- Depth: 407 millimeters (16.1 inches)
- Height: 140 millimeters (5.5 inches).

Weight

- 9.5 kilograms (20.9 pounds) without a diskette drive
- 11.4 kilograms (25 pounds) with a diskette drive.

Environment

- Air Temperature
 - System On: 15.6 to 32.2 degrees C (60 to 90 degrees F)
 - System Off: 10 to 43 degrees C (50 to 110 degrees F).
- Humidity
 - System On: 8% to 80%
 - System Off: 20% to 80%.

Heat Output

- 1083 British Thermal Units (BTUs) per hour

Electrical

- $V_a = -0.3175$ (maximum)
- 125V Power Supply
 - Nominal - 120 Vac
 - Minimum - 104 Vac
 - Maximum - 127 Vac.
- 220/240V Power Supply
 - Nominal - 220/240 Vac
 - Minimum - 180 Vac
 - Maximum - 259 Vac.

IBM Personal Computer XT

Size

- Length: 500 millimeters (19.6 inches)
- Depth: 407 millimeters (16.1 inches)
- Height: 140 millimeters (5.5 inches).

Weight

- 14.5 kilograms (32 pounds)

Environment

- Air Temperature
 - System On: 15.6 to 32.2 degrees C (60 to 90 degrees F)
 - System Off: 10 to 43 degrees C (50 to 110 degrees F).
- Humidity
 - System On: 8% to 80%
 - System Off: 20% to 80%.

Heat Output

- 717 British Thermal Units (BTUs) per hour

Electrical

- 125V Power Supply
 - Nominal - 120 Vac
 - Minimum - 104 Vac
 - Maximum - 127 Vac.
- 220/240V Power Supply
 - Nominal - 220/240 Vac
 - Minimum - 180 Vac
 - Maximum - 259 Vac.

IBM Personal Computer Expansion Unit

Size

- Length: 500 millimeters (19.6 inches)
- Depth: 407 millimeters (16.1 inches)
- Height: 140 millimeters (5.5 inches).

Weight

- 14.9 kilograms (33 pounds)

Environment

- Air Temperature
 - System On: 15.6 to 32.2 degrees C (60 to 90 degrees F)
 - System Off: 10 to 43 degrees C (50 to 110 degrees F).
- Humidity
 - System On: 8% to 80%
 - System Off: 20% to 80%.

Heat Output

- 717 British Thermal Units (BTUs) per hour

Electrical

- 125V Power Supply
 - Nominal - 120 Vac
 - Minimum - 104 Vac
 - Maximum - 127 Vac.
- 220/240V Power Supply
 - Nominal - 220/240 Vac
 - Minimum - 180 Vac
 - Maximum - 259 Vac.

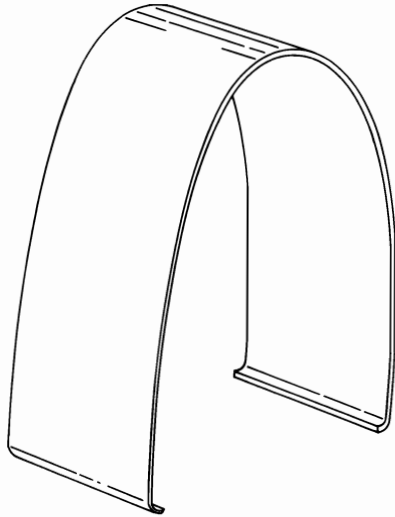
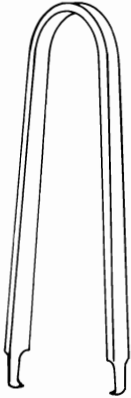
Special Tools

The following special tools are required to service the IBM Personal Computer:

A meter similar to the Triplet Model 310.¹

Module Pullers

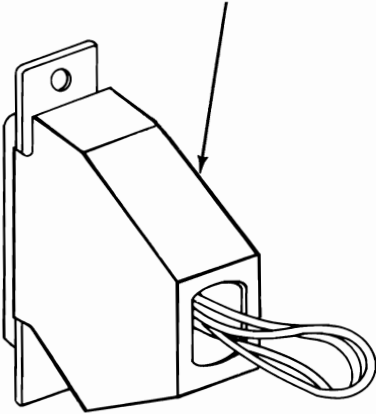
A tweezer-like module puller similar to those shown below. (Used to remove the memory modules.)



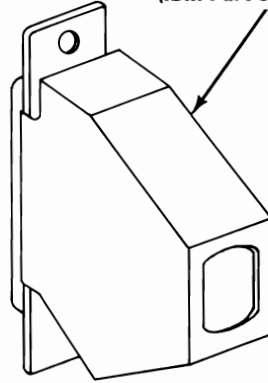
¹ Manufactured by Triplet Corporation, Bluffton, Ohio 45817

Wrap Plugs

**IBM Communications Adapter
Wrap Plug (IBM Part 8529280)**



**Printer Adapter
Wrap Plug
(IBM Part 8529228)**



**Cluster
Terminating
Plug
(IBM Part 6323481)**