FRONT

PICTURE 1

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EDITION Edition Notice
Safety Information

Refer to the *Hardware Maintenance Reference General Information pamphlet in this manual for the following safety information:*

- *General Safety*
- *Electrical Safety.*

First Edition (March 1990)

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IBM
Personal System/2.

CONTENTS Table of Contents

1.0 Product Description

The features of the IBM (*) Personal System/2 (*) Model 30 are:

- Security: keylock on models with fixed disk drives
- System board:
  - 8-MHz 8086 Microprocessor
  - Math-coprocessor socket
  - 640KB (KB=1024 bytes) random access memory (RAM)
  - Three expansion slots
  - Serial port
  - Parallel port
  - Keyboard connector
  - Pointing-device connector
  - Display connector
  - Fixed-disk-drive connector
  - Diskette-drive connector.
- Power supply:
  - Automatically switches to the 100-125 Vac or the 200-240 Vac range
  - 50 or 60 Hz
  - 70 watts.
- Battery
- 101/102-key keyboard
- Fixed disk drives supported (see "Fixed Disk Drives" in topic 2.3).

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Subtopics
1.1 Security
1.2 System-Board Features

1.1 Security

Subtopics
1.1.1 Keylock
1.1.2 Power-On Password

1.1.1 Keylock

If a keylock is installed, it is on the right of the system unit and can be unlocked with the user's key.

If the keys for the keylock are lost, a new keylock assembly can be ordered (see the parts section in the *Hardware Maintenance Service* pamphlet for the system you are servicing). The new keylock assembly contains two keys.

1.1.2 Power-On Password

A power-on password is not used in the Model 30.

1.2 System-Board Features

The major features of the system board are:

- 8086 Microprocessor
- Serial port
- Parallel port
- Keyboard connector
- Pointing-device connector
- Display connector.

Subtopics
1.2.1 Microprocessor
1.2.2 Serial Port
1.2.3 Parallel Port
1.2.4 Keyboard Connector and Pointing-Device Connector
1.2.5 Display Connector

1.2.1 Microprocessor

The microprocessor interprets and carries out instructions. The 8086 Microprocessor is a 16-bit microprocessor with a 16-bit external bus. The microprocessor speed is 8 MHz.

1.2.2 Serial Port

The serial port is fully programmable and supports asynchronous communications. The 25-pin, D-shell connector provides the signals to drive a device with a standard 25-contact, RS-232 connector. The connected device is identified by the system configuration as either COM1 or COM2.

If an adapter with a serial port is installed in the system, it should be set to COM2.

1.2.3 Parallel Port

The parallel port allows the attachment of devices that accept eight bits of parallel data at standard transistor-transistor-logic (TTL) levels. The port has a 25-pin, D-shell connector and is designed primarily for printers. However, the port can be used as a general input/output port for any device or application that matches its input/output capabilities. When adapters with additional parallel ports are installed, the system can support two different devices, each addressed separately as LPT1 or LPT2.

1.2.4 Keyboard Connector and Pointing-Device Connector

The two 6-pin connectors in the rear of the system board are for connecting a keyboard and a pointing device (mouse). The keyboard connector is marked with a "1" molded into the back panel; the pointing-device connector is marked with a "2." The interface logic is the same for both.

1.2.5 Display Connector

The 15-pin connector supports either a 31.5-kHz analog color or monochrome display. If a video adapter is installed in the bus adapter, this connector is disabled.

2.0 Option Compatibility

Subtopics
2.1 Incompatible Adapters
2.2 Drive and Diskette Compatibility
2.3 Fixed Disk Drives
2.4 Terminators

2.1 Incompatible Adapters

Certain adapters are not compatible when used in the same system. If one of the following adapters is installed, the other adapters listed cannot be installed in the same system unit:

- Synchronous Data Link Control (SDLC)
- Alternate Binary Synchronous Communications (Alt BSC).

Problems can occur in the system when adapters share the same interrupt level. Check the adapter interrupt levels to ensure that they do not conflict. If the adapters have selectable interrupt levels, verify that the jumpers on the adapters are not set for the same level.

Some adapters are not supported by the Model 30. Supported option adapters are listed in the parts section of the *Hardware Maintenance Service* pamphlet for the system you are servicing.

2.2 Drive and Diskette Compatibility

Use only double-sided, high-capacity (2HC) 1MB 3.5-inch diskettes in the diskette drives.

The following provides information concerning the identification of diskette drives.

Diskette Drive	**Identifying Mark on Eject Button**
3.5 Inch - 720KB	None

The following addresses the compatibility of diskettes to diskette drives.

Diskette Capacity	**720KB Drive**
1.0MB	Read/Write

Note: For additional information, see "Diskette Drives and Diskettes" in the *IBM Personal System/2 Hardware Maintenance Reference General Information* pamphlet in this manual.

2.3 Fixed Disk Drives

Several fixed disk drives are available for PS/2 systems. The fixed-disk drive and fixed-disk-drive interface must be the same. For example, an ST506 adapter must be used with an ST506 drive. For supported fixed disk drives see, the parts section in the *Hardware Maintenance Service* pamphlet for the system you are servicing.

2.4 Terminators

Terminators are not required by the drives used in the Model 30.

3.0 Operating Requirements

This section describes the operations that occur from the time the system is powered-on until the minimum operating requirements are met.

Subtopics
3.1 Power Supply
3.2 Power-On Self-Test (POST)
3.3 System Memory

3.1 Power Supply

The power supply automatically switches to either the 100-125 Vac or the 200-240 Vac range. The ac input is converted to dc outputs that supply the system with the proper operating voltages.

When the system is powered-off for one second or more and then powered-on, the power supply generates a 'power good' signal that resets system logic. The presence of the 'power good' signal indicates that the power supply is operating properly and that the minimum under-voltage sense levels have been established. This means that all system-board power requirements have been met.

Output (Vdc)	**Minimum Under-Voltage Sense Level (Vdc)**
+ 5.0	+ 4.5
- 5.0	- 4.3
+12.0	+10.8
-12.0	-10.2

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

3.2 Power-On Self-Test (POST)

The POST is initiated automatically each time the system power is turned on.

The POST is a series of system checks and initializations that verify the correct operation of the system unit. The POST tests only those areas that allow the system to be operational enough to run advanced diagnostics. The POST can detect two types of errors: critical and noncritical.

Critical errors prevent the system from operating or can cause incorrect results that are apparent to the user. Examples of critical errors include microprocessor or interrupt-controller errors. If the POST detects a critical error, the microprocessor attempts to display the error and all testing stops.

Noncritical errors cause incorrect results that might not be apparent to the user. An example of a noncritical error would be a serial communications failure. If the POST detects a noncritical error, all testing stops and the microprocessor attempts to display the error. Pressing the F1 key allows testing to continue.

When the Advanced Diagnostics Diskette is in drive A, and a noncritical error is detected, the system displays the POST error message along with a message generated from the Advanced Diagnostics Diskette. The Advanced Diagnostics Diskette message instructs the user to take a specific action to correct the error.

After a successful POST, one short beep occurs. Control is then given to a BIOS routine called the system bootstrap loader. The bootstrap loader attempts to load an operating system or a program from either a diskette or the fixed disk drive. If neither is present in the system, the Insert Diskette icon is displayed (see the *IBM Personal System/2 Non Micro Channel Diagnostics* pamphlet in this manual. This icon indicates that a diskette should be inserted into drive A. After the diskette is inserted, press the F1 key to resume operation. If the F1 key is pressed when no diskette is in the diskette drive, the IBM Cassette BASIC screen appears.

3.3 System Memory

Subtopics
3.3.1 System-Board Memory
3.3.2 Memory-Expansion Adapters
3.3.3 Memory Errors

3.3.1 System-Board Memory

The Model 30 system board has 640KB of memory. The first 128KB consists of memory modules soldered to the system board. The next 512KB consists of two 256KB banks of memory modules plugged into the system board.

3.3.2 Memory-Expansion Adapters

Memory-expansion adapters cannot be used with the Model 30, with the following exception: the 2MB Expanded Memory Adapter can be used when the Model 30 is part of an IBM 3270 Workstation that uses the IBM 3270 Workstation Program Versions 1.0 and 1.1. For other supported options, see the parts section in the *Hardware Maintenance Service* pamphlet for the system you are servicing.

3.3.3 Memory Errors

If an error occurs in the first 128K memory, the system read-only memory basic input/output system (ROM BIOS) remaps the memory during the POST. This allows the system to complete the POST using 128KB from the memory module banks. The error message **205 Memory Error** appears and the system will operate with less total memory.

4.0 Specifications

Size

- Width: 406 mm (16 in.)
- Depth: 398 mm (15.7 in.)
- Height: 102 mm (4 in.).

Weight

7.4 kg (16.5 lb).

Environment

- Temperature:
  - Power on: 15.6° to 32.2°C (60° to 90°F)
  - Power off: 10° to 43°C (50° to 110°F).
- Humidity:
  - Power on: 8% to 80%
  - Power off: 20% to 80%.
- Maximum altitude: 2134 m (7000 ft).

Heat Output

341 British thermal units (BTUs) per hour (100 watts per hour).

Electrical

- Input voltage (Sinewave input is required)
  - Low Range:
    - Minimum: 90 Vac
    - Maximum: 137 Vac.
  - High Range:
    - Minimum: 180 Vac
    - Maximum: 265 Vac.
- Input kilovolt-amperes (kVA)
  - Minimum Configuration (as shipped from IBM): Approximately .05 kVA
  - Maximum Configuration: Approximately .15 kVA.

5.0 Special Tools

The following special tools are required to service the Model 30.

Volt-Ohm Meter

A meter similar to the Triplett Model 310. (1)

Wrap Plug

The Tri-Connector wrap plug (IBM part 72X8546) is used during advanced diagnostic tests of serial and parallel ports.

PICTURE 2

Note: Existing wrap plugs (IBM part 8529228 and IBM part 8529280), can be used.

(1) Manufactured by Triplett Corporation, Bluffton, Ohio 45817, U.S.A.

6.0 Removals and Replacements

The arrows in the removals and replacements show the direction of movement to remove a FRU, to turn a screw, or to press a tab to release a FRU. The arrows are marked in numeric order to show the correct sequence of removal.

When other FRUs must be removed prior to removing the failing FRU, they are listed at the top of the page. Go to the removal procedure for each FRU listed, remove the FRU, and then continue with the removal of the failing FRU.

To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement. See "Locations" for internal cable connection and arrangement information.

CAUTION:
Before removing any field replaceable unit (FRU), power-off the system, unplug all power cords from their electrical outlets, and disconnect any interconnecting cables.

Warning: The system board, adapters, memory modules, and the math coprocessor are sensitive to, and can be damaged by, electrostatic discharge. Establish personal grounding by touching a ground point with one hand before touching these units.

Note: An electrostatic discharge (ESD) strap may be used to establish personal grounding.

Subtopics

6.1 1000 Cover

CAUTION:
Before removing any field replaceable unit (FRU), power-off the system, unplug all power cords from their electrical outlets, and disconnect any interconnecting cables.

Note: Unlock the cover lock and loosen the cover screws 1.

PICTURE 3

6.2 1010 Rear Cover

- Cover **(1000)**

PICTURE 4

6.3 1015 Drives, Diskette and Fixed Disk

Warning: Improper shipping and handling can result in permanent loss of all data and formatting on the fixed disk drive. Have the user back up all information on the fixed disk drive. Before a fixed disk drive is removed, run the Advanced Diagnostics Diskette to park the heads.

PICTURE 5

PICTURE 6

6.4 1020 Adapters

Note: New option installations may require the plastic insert 1 on the rear panel to be removed.

PICTURE 7

Note: When installing a three-quarter length adapter, position the sliding support bracket to support the adapter.

PICTURE 8

6.5 1025 Bus Adapter

- Adapters **(1020)**

PICTURE 9

6.6 1030 Keylock Assembly

PICTURE 10

6.7 1035 Power Supply

- Rear cover **(1010)**
- Bus adapter **(1025)** (remove the bus adapter support only).

PICTURE 11

6.8 1040 Memory-Module Package

- Adapters **(1020)**

PICTURE 12

6.9 1045 Math Coprocessor

- Cover **(1000)**
- Adapters **(1020)**.

Warning: Remove the math coprocessor carefully. Do not bend the pins when removing the math coprocessor. The math coprocessor can be damaged by electrostatic discharge, prying between the module and connector, or prying between the connector and system board. Establish personal grounding by touching a ground point with one hand before touching the math coprocessor.

Note: Depending on the type system board installed, the math coprocessor can be in either of the two locations shown.

Align the notch on the math coprocessor with the notch on the math coprocessor socket.

PICTURE 13

6.10 1050 System Board

- Adapters **(1020)**
- Bus Adapter **(1025)**
- Memory-Module package **(1040)**.

Note: Disconnect all cables from the system board.

PICTURE 14

6.11 1055 Front Bezel

- Drives, diskette and fixed disk **(1015)**

PICTURE 15

6.12 1060 Power Switch and Link

- Drives, diskette and fixed disk **(1015)**
- Front bezel **(1055)**.

PICTURE 16

6.13 1065 Drive Cradle

- Cover **(1000)**
- Adapters **(1020)**
- Drives, diskette and fixed disk **(1015)**
- Front bezel **(1055)**.

PICTURE 17

7.0 Locations

Subtopics

7.1 Front View

1 Diskette drive A
2 Diskette-eject button
3 Fixed disk drive or diskette drive B
4 Power switch
5 Serial number
6 Keylock.

PICTURE 18

7.2 Rear View

1 Power connector
2 Keyboard connector
3 Pointing-device connector
4 Parallel port
5 Serial port
6 Display connector
7 Expansion slots.

PICTURE 19

7.3 Interior View

1 Bus adapter
2 Expansion slots
3 Bus-adapter support
4 Power supply
5 Power-switch link
6 Drive cradle
7 Keylock assembly
8 Power switch
9 Fixed disk drive (also can be diskette drive B)
10 Diskette drive A
11 Front bezel
12 System board.

PICTURE 20

7.4 System Board

1 Display connector
2 Serial port
3 Bus-adapter connector
4 Parallel port
5 Pointing-device connector
6 Keyboard connector
7 Power-supply connector
8 8086 Microprocessor connector
9 Math-coprocessor connector
10 Keylock connector
11 Fixed-disk-drive connector
12 Diskette-drive connector
13 Memory-modules packages

PICTURE 21

7.5 System Board (8530 - 001)

1 Display connector
2 Serial port
3 Bus-adapter connector
4 Parallel port
5 Pointing-device connector
6 Keyboard connector
7 Power-supply connector
8 Memory-modules connector
9 Fixed-disk-drive connector
10 Keylock connector
11 Diskette-drive connector
12 Math-coprocessor connector
13 8086 Microprocessor connector.

PICTURE 22

7.6 Diskette-Drive Cable

1 Drive B
2 System board
3 Drive A.

Note: The cable for the 1/3-high diskette-drive has 34-pin connectors.

PICTURE 23

7.7 Fixed-Disk-Drive Cable

1 Drive C
2 System board.

PICTURE 24

8.0 Safety Grounds

1 Primary ground
2 Chassis ground.

PICTURE 25