

FRONT

PICTURE 1

November 29, 1991

Part Number 10G4419

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EDITION Edition Notice
Safety Information

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

- General Safety
- Electrical Safety.

First Edition (November 1991)

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Subtopics

FRONT_1.1 Trademarks and Service Marks

FRONT_1.1 Trademarks and Service Marks

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IBM	Personal System/2
PS/2	Micro Channel.

1.0 Product Description

The IBM (*) Personal System/2 (*) Model CL57 SX (hereafter called Model CL57 SX) is a laptop-size computer, with a color liquid crystal display (LCD), that uses the IBM Micro Channel (*) architecture. The Model CL57 SX operates on rechargeable batteries as well as on an external power source. The features of the Model CL57 SX include:

- Security: power-on password and keyboard password
- System board:
 - 20-MHz 80386SX microprocessor
 - 80387SX math coprocessor socket
 - Minimum of 2MB (MB equals 1 048 576 bytes) random access memory (RAM) on the system board, up to 16MB expandability with integrated circuit dynamic RAM (IC DRAM) cards.
 - Complementary metal-oxide semiconductor (CMOS) RAM with a real-time clock and an 8KB CMOS RAM (KB equals 1024 bytes) extension, to store configuration and status information
 - Read-only memory basic input/output system (ROM BIOS)
 - Diskette-drive controller
 - Hard disk drive (fixed disk drive) with system partition supported
 - Serial connector
 - Parallel connector
 - System expansion connector
 - Keyboard controller
 - External input device connector
 - Suspend and resume functions
 - Optional communication adapter slot for:
 - Internal data/fax modem
 - Secondary serial adapter.
- Display Control Card:
 - Video Graphics Array (VGA) with Liquid Crystal Display (LCD) controller
 - LCD panel connector
 - External display connector
- A maximum 640 by 480 PELS color LCD panel with a back light
- External power-supply device:
 - AC adapter, automatically switches to the 90 - 137 V ac or the 180 - 265 V ac range, 50 or 60 Hz.
- 84, 85, or 89-key keyboard
- Integrated trackball
- Speaker with a volume control.

(*) Trademark of the International Business Machines Corporation.

Subtopics

- 1.1 Security
- 1.2 System Board Features
- 1.3 VGA with LCD Controller

1.1 Security

Subtopics

1.1.1 Power-On Password and Keyboard Password

1.1.1 Power-On Password and Keyboard Password

System access can be denied by using a power-on password or keyboard password. To service a system with an active and unknown password, power-off the system and do the following.

1. Power-off the system.
2. Remove the keyboard and the top cover.
3. Identify the password-override connector on the system board (see "System Board" in topic 7.6).
4. Install a jumper over the pins as shown.

PICTURE 2

5. Power-on the system and leave it until the POST ends.

Note: Make sure that you remove the jumper from the password-override connector when you are finished.

To set the password, you must start the system program, select the **Set features** from the Main Menu, then select **Set password and unattended start mode** and follow the instructions.

1.2 System Board Features

The major features of the system board are:

- 80386SX Microprocessor
- CMOS RAM and CMOS RAM extension
- ROM BIOS
- Diskette-drive controller
- Serial connector
- Parallel connector
- External input device connector
- Optional communication adapter slot
- System expansion connector
- Suspend and resume functions.

Subtopics

- 1.2.1 Microprocessor
- 1.2.2 CMOS RAM and CMOS RAM Extension
- 1.2.3 ROM BIOS/POST
- 1.2.4 Diskette-Drive Controller
- 1.2.5 Serial Connector
- 1.2.6 Parallel Connector
- 1.2.7 External Input Device Connector
- 1.2.8 Optional Communication Adapter Slot
- 1.2.9 System Expansion Connector
- 1.2.10 Suspend and Resume Functions

1.2.1 *Microprocessor*

The microprocessor interprets and carries out instructions. The 80386SX microprocessor is a 32-bit processor with a 16-bit external data bus and a 24-bit external address bus. The microprocessor operates in two modes: real-address mode and virtual-address (protected) mode. The microprocessor speed is 20 MHz.

1.2.2 CMOS RAM and CMOS RAM Extension

The CMOS RAM provides 64 bytes of storage. The real-time clock uses the first 14 bytes of this storage to track the date, time, and battery level. The remaining 50 bytes are assigned to store system configuration and security information. The 8KB CMOS RAM extension stores additional configuration and system status information.

The data stored in CMOS RAM and CMOS RAM extension is kept active by the backup battery when the system is powered-off. If stored data is lost due to a depleted or removed battery, the data can be restored using one of the following methods:

- If the user has a customized configuration that uses settings other than the default, run the **Restore configuration** from the system utility programs stored on the hard disk.
- If the configuration settings use the default, run the **Automatic configuration** from the system utility programs stored on the hard disk.

1.2.3 ROM BIOS/POST

Read Only Memory - Basic Input/Output System (ROM BIOS) contains the instructions and routines that control the keyboard, diskette drive, hard disk drive, displays and other major I/O devices in the system. Some adapters have their own ROM modules containing extended BIOS routines that work with the system board ROM BIOS. The routines for performing the power-on self-test (POST) are also contained in the ROM.

1.2.4 Diskette-Drive Controller

The controller connects to the diskette drive through two interface connectors on the system board using a flexible cable. Both signals and voltages are supplied through this cable. These signals and voltages can only operate one IBM 3.5-inch diskette drive.

1.2.5 Serial Connector

The serial connector is fully programmable and is capable of asynchronous communications at a maximum speed of 19.2 kb/s. The 9-pin D-shell connector provides the signals to drive a standard EIA-232D device. The connected device is identified by the system configuration as either SERIAL_1 or SERIAL_2.

If an optional communication slot with a serial adapter is installed, the device address must be different from the primary one.

Note: Conflicts occur when two or more devices have the same address. Use the **Set configuration** from the system utility programs stored on the hard disk. Select **View configuration** to verify that no ports have the same address.

1.2.6 *Parallel Connector*

The parallel connector allows the attachment of devices that accept 8 bits of parallel data at standard transistor-transistor logic (TTL) levels. The connector is a 25-pin, D-shell connector and is designed primarily for printers. However, the connector can be used as a general input/output port for any device or application that matches its input/output capabilities. The system can support four different devices, each addressed separately as PARALLEL 1, PARALLEL 2, PARALLEL 3, or PARALLEL 4.

1.2.7 External Input Device Connector

The external input device connector is located at the rear of the system and accepts a mouse or 17-key numeric keypad. The Model CL57 SX has only one input-device connector. However, it is possible to connect the numeric keypad and the mouse at the same time through another input-device connector located at the rear of the numeric keypad.

The integrated trackball does not work when the mouse is connected.

1.2.8 Optional Communication Adapter Slot

This option slot can accept either a secondary serial adapter or an internal data/fax modem. The serial adapter complies with EIA-232D standard and provides alternative input/output capabilities that have the same function as the primary serial connector on the rear of the system. The internal data/fax modem is a dual-function modem that can operate as a G3 facsimile as well as a data modem.

1.2.9 System Expansion Connector

This is a 150-pin connector that can accept a communications cartridge II to support various communication capabilities provided with a 16-bit Micro Channel adapter installed in the cartridge.

1.2.10 Suspend and Resume Functions

The suspend and resume functions are unique methods to minimize the use of power from the battery. When the computer enters suspend mode, all tasks are suspended and their present states are stored in memory to save power. In suspend mode, the system is placed in a sleep state where only a minimum amount of power is consumed.

When the system returns to operating mode using the resume function, the system restores the same states as when it entered suspend mode.

The system enters suspend mode when:

- The display is closed.
- The time specified by the **System power off after** option in the Set Advanced Features program has elapsed.
- A battery-low condition (blinking an amber LED) is detected.
- The **PS2 OFF** command in the Set Advanced Features program has been entered.
- The temperature is outside the operating range.
- The humidity is outside the operating range.

The system returns to operating mode when:

- The display is opened.
- Setting **PS2 ON HH:MM:SS** command in the Set Advanced Features program before entering suspend mode.
- The "ring indicator" on the communication interface is detected.

Note: If a battery pack is replaced during suspend mode with the display opened, close the display and open it again to return to operating mode.

1.3 *VGA with LCD Controller*

The VGA with LCD controller is on the display control card and supports color and monochrome analog direct-drive displays in a variety of alphanumeric (A/N) text and all-points-addressable (APA) graphics modes.

The VGA with LCD controller supports a maximum of 720 by 400 (640 by 400 on LCD) picture elements (PELs) in text mode, and a maximum of 640 by 480 PELs in graphics mode. The VGA with LCD controller is capable of displaying 256 colors at one time. Composite video is not supported.

2.0 Option Compatibility

The Model CL57 SX has no internal expansion slot to accept any existing adapters for the IBM Personal System/2. However, a half-size communication adapter in the communications cartridge II, which is designed for IBM Personal System/2 computers that use Micro Channel architecture, can be attached to the system expansion connector. The communication adapters that the Model CL57 SX supports are:

- IBM 3270 Connection
- IBM 36/38 Workstation Emulation Adapter/A
- IBM Token Ring-Network Adapter/A.

Subtopics

2.1 Hard Disk Drive

2.2 Diskette Drive and Diskette

2.1 Hard Disk Drive

The Model CL57 SX has one 2.5-inch 80MB hard disk drive directly attached to Micro Channel bus. The hard disk drive automatically positions the read/write heads in nondata areas when the system is powered off or the system enters suspend mode. No special precautions are required regarding parking the heads when moving the computer.

Warning: Power-off the system or close the display whenever moving the computer to prevent damage to the hard disk.

Subtopics

2.1.1 System Partition

2.1.2 Errors during POST

2.1.3 Replacing the Hard Disk Drive

2.1.1 System Partition

The Model CL57 SX has a protected partition, called the system partition, on the hard disk that contains system setup and utility programs, customer and advanced diagnostics, and system-configuration data set. All necessary functions provided by the Reference Diskette are also on this partition and can be loaded by pressing Ctrl+Alt+Delete and, as soon as the cursor moves to the upper right corner of the screen, pressing Ctrl+Alt+Insert. The Reference Diskette is reserved to restore its contents on the system partition when you replace a hard disk drive or when a hard disk problem prevents the system from starting from this partition.

The system-configuration data set holds up to nine different configurations. The configuration data allows you to use the system without running the automatic configuration after the system configuration has been changed by attaching or removing a communications cartridge II to or from the system expansion connector. On each power-on-reset, the POST compares the current system configuration with the one stored in the CMOS RAM and CMOS RAM Extension. If both configurations are the same, the POST continues to test the system. If any differences are found, the POST looks for the same configuration in the system-configuration data set on the system partition, and selects the right configuration, then updates the configuration in the CMOS RAM and CMOS RAM Extension. System configuration data can be updated or removed by using the system utility programs.

Any format command provided by an operating system has no effect on formatting the system partition.

2.1.2 Errors during POST

If the POST detects a problem during access on the system partition, an **I99800XX** or **I9990303** error code is displayed. If this happens, do the following:

1. Start the system with the customer's backup copy of the Reference Diskette.
2. Select the **Backup/Restore system programs** from the Main Menu.
3. Select the **Restore the system partition** to load the system setup and utility programs, and the customer and advanced diagnostic programs onto the system partition of the hard disk.

2.1.3 Replacing the Hard Disk Drive

A replacement hard disk drive is shipped without any preloaded system information. Start the system with the customer's backup copy of the Reference Diskette, select **Backup/Restore system programs** from the Main Menu, and run the **Restore the system partition** to load the system utility programs, the advanced diagnostics programs, and the system-configuration data set onto the new hard disk.

Note: If the Reference Diskette has been loaded onto the hard disk drive but the customer's operating system has not been loaded, the Diskette and F1 prompts appear on the screen.

For information on system utility programs, see the *Diagnostic Information for Micro Channel Computers* pamphlet.

2.2 Diskette Drive and Diskette

The Model CL57 SX uses a 1.44MB formatted diskette drive. (It has **1.44** on the eject button). Both 1.0MB (formatted 720KB) and 2.0MB (formatted 1.44MB) capacity diskettes can be used in this drive.

3.0 System Memory Requirements

The Model CL57 SX has a minimum of 2MB of memory installed on the system board at the time of shipment. The memory capacity can be expanded by installing one or two 2MB, 4MB, or 8MB IC DRAM cards into the slots located on right side of the system. However, the maximum memory capacity of the Model CL57 SX cannot exceed 16MB. Therefore, the total memory capacity only can be 16MB even if both slots are occupied with 8MB IC DRAM cards.

If a memory error occurs, the Model CL57 SX relocates system memory in 1MB blocks. If the POST detects a memory error in the first 640KB of system memory, the entire 1MB of memory is deactivated and an error code is displayed.

Note: Customer diagnostics is capable of logically eliminating defective memory so that no memory error code appears at power-on reset.

After replacing a defective memory module on the system board, or whenever an IC DRAM card is added or removed from the system, run the **Automatic configuration** to store the new system configuration.

4.0 *Specifications*

Subtopics

4.1 System

4.2 AC Adapter

4.1 System

Size

- Depth: 278 mm (10.9 in.)
- Height: 71 mm (2.8 in.)
- Width: 325 mm (12.8 in.).

Weight

- Approximately 5.0 kg (11.0 lb.) with two battery packs.

Environment

- Air Temperature:
 - System On: 5.0° to 35.0° C (41.0° to 95.0° F)
 - System On (with diskette): 10.0° to 35.0° C (50.0° to 95.0° F)
 - System Off: 5.0° to 43.0° C (41.0° to 109.4° F).
- Relative Humidity:
 - System On (with no diskette): 8% to 80%
 - System Off: 8% to 95%
- Maximum altitude: 2437 m (8000 ft.).

Heat Output

205 British Thermal Units (BTUs) per hour (60 watts per hour).

4.2 AC Adapter

Input Voltage

- Low Range
 - Minimum: 90 V ac
 - Maximum: 137 V ac.
- High Range
 - Minimum: 180 V ac
 - Maximum: 265 V ac.
- Frequency Range
 - Minimum: 47 Hz
 - Maximum: 63 Hz.

Input kilovolt-amperes (kVA)

Maximum Configuration: 0.2 kVA

Output Voltage

- Output 1
 - Minimum: +18 V dc
 - Maximum: +22 V dc.
- Output 2
 - Minimum: +17 V dc
 - Maximum: +21 V dc.

Note: AC adapters in early production do not support output 2. To see this, refer to the information label on the AC adapter to check if the **NC** is indicated in the figure.

5.0 Special Tools

The following special tools are required to service the Model CL57 SX.

Volt-Ohm Meter

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

Wrap Plug

The Tri-Connector wrap plug (IBM part 72X8546) is used during advanced diagnostic tests of:

- Parallel Connectors
- Serial Connectors.

PICTURE 3

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

6.0 Removals and Replacements

This section contains information on removals and replacements, and locations.

- The arrows in the "Removals and Replacements" section show the direction of movement to remove a field replaceable unit (FRU), to turn a screw to release the FRU. The arrows are marked in numeric order to show the correct sequence of removal.
- When other FRUs must be removed before 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 FRU, power-off the system, unplug all power cords from electrical outlets, remove the battery packs, then disconnect any interconnecting cables.

CAUTION:

The battery pack contains small amounts of nickel and cadmium. Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations.

Warning: The hard disk drive has sensitive parts. Improper handling of it can cause damage to, and permanent loss of data on, the hard disk. Before removing the hard disk drive, have the user back up all the information on the hard disk.

Warning: The system board and adapters 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 1010 Keyboard and Top Cover
- 6.2 1020 Trackball Assembly
- 6.3 1030 Indicator Card and Speaker
- 6.4 1040 Hard Disk Drive
- 6.5 1050 Diskette Drive
- 6.6 1060 Backup Battery
- 6.7 1070 Keyboard Control Card
- 6.8 1080 Display Control Card
- 6.9 1090 System Board and I/O Panel Assembly
- 6.10 1100 Voltage Converter
- 6.11 1110 Math Coprocessor
- 6.12 1120 Communication Adapter
- 6.13 1130 IC DRAM Card
- 6.14 1140 LCD Assembly
- 6.15 1150 LCD Panel

6.1 1010 Keyboard and Top Cover

CAUTION:

Before removing any FRU, power-off the system, unplug all power cords from electrical outlets, remove the battery packs, then disconnect any interconnecting cables.

```
+--- Attention -----+
|
| Removals of both keyboard and top cover must be performed
| concurrently. The keyboard can be removed with the top cover on. The
| keyboard cables, however, cannot be reconnected unless the top cover
| is removed.
|
+-----+
```

Remove the keyboard first, then remove the top cover.

Subtopics

6.1.1 Keyboard Removal

6.1.2 Top Cover Removal

6.1.1 Keyboard Removal

PICTURE 4

1010 Keyboard (Continued)

PICTURE 5

PICTURE 6

Note: To reinstall the keyboard, the top cover must be removed.

1010 Top Cover

6.1.2 Top Cover Removal

Before removing the top cover, make sure the keyboard is removed (see "Keyboard Removal" in topic 6.1.1).

PICTURE 7

1010 Top Cover (Continued)

PICTURE 8

PICTURE 9

Note: Before reinstalling the top cover, be sure to reposition the keyboard and reconnect the two flexible cables to the keyboard control card.

6.2 1020 Trackball Assembly

- Keyboard and Top Cover (1010).

PICTURE 10

6.3 1030 Indicator Card and Speaker

- Keyboard and Top Cover (1010).

PICTURE 11

PICTURE 12

Note: When you replace the indicator card, make sure the speaker volume and the power-on switch fit into their respective slots on the top cover. After replacing the indicator card, check that you can correctly operate the speaker volume and the power-on switch from the outside.

6.4 1040 Hard Disk Drive

Warning: The hard disk drive has sensitive parts. Improper handling of it can cause damage to, and permanent loss of data on, the hard disk. Before removing the hard disk drive, have the user back up all the information from the hard disk.

Warning: To avoid damaging to the flexible cables, carefully unplug the two connectors from the system board.

Keyboard and Top Cover (1010).

PICTURE 13

Note: When you replace the hard disk drive with a new one, make sure the system information is restored onto the system partition using the customer's backup copy of the Reference Diskette (see "Replacing the Hard Disk Drive" in topic 2.1.3).

6.5 1050 Diskette Drive

- Keyboard and Top Cover (1010).

PICTURE 14

6.6 1060 Backup Battery

- Keyboard and Top Cover (1010).

CAUTION:

The backup battery is a lithium battery and presents a fire, explosion, or severe burn risk. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. When replacing the backup battery, use only Part No. 35G2282. Use of another battery could result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM authorized dealers.

PICTURE 15

6.7 1070 Keyboard Control Card

- Keyboard and Top Cover (1010).

PICTURE 16

6.8 1080 Display Control Card

- Keyboard and Top Cover (1010).

PICTURE 17

Note: Referring to the following figure, press and hold the metal clips on each side of connector PICTURE 18, then disconnect it from the display control card.

PICTURE 19

6.9 1090 System Board and I/O Panel Assembly

- IC DRAM Card (1130)
- Keyboard and Top Cover (1010)
- LCD Assembly (1140)
- Display Control Card (1080).

Note: When a new system board is installed, be sure to set the time and date, and restore the system configuration data.

PICTURE 20

1090 System Board and I/O Panel Assembly (Continued)

PICTURE 21

1090 System Board and I/O Panel Assembly (Continued)

PICTURE 22

Note: After reinstalling the system board and I/O panel assembly, make sure the power control switch PICTURE 23 on the I/O panel is set to ON.

6.10 1100 Voltage Converter

- Keyboard and Top Cover (1010)
- LCD Assembly (1140)
- Display Control Card (1080)
- System Board (1090).

Warning: To avoid damaging the bottom cover, save the removed mounting screws and use them to replace the voltage converter. Holding the voltage converter with incorrect length screws can break the bottom cover.

PICTURE 24

6.11 1110 Math Coprocessor

Warning: Because the math coprocessor can be damaged by an electrostatic discharge, establish personal grounding by touching a ground point with one hand before touching the math coprocessor. Once you are grounded, remove the math coprocessor being very careful not to bend the pins.

PICTURE 25

Note: When reinstalling the math coprocessor, align the dot PICTURE 26 on the math coprocessor with the beveled corner PICTURE 27 of its socket, then firmly press it into place.

6.12 1120 Communication Adapter

Notes:

1. The communication adapter can be either a serial adapter or an internal data/fax modem. The figure below shows the removal of the internal data/fax modem.
2. Before removing the communication adapter, disconnect any cable from the adapter and open the display.

PICTURE 28

PICTURE 29

6.13 1130 IC DRAM Card

PICTURE 30

PICTURE 31

1130 IC DRAM Card (Continued)

PICTURE 32

Notes:

1. The Model CL57 SX has two slots that hold any of three different capacities of the IC DRAM card in any combination: 2MB, 4MB, and 8MB.
2. When installing the IC DRAM card, insert the IC DRAM card, with the IBM logo facing up and the arrow mark first, into either slot 1 or 2.

6.14 1140 LCD Assembly

- Keyboard and Top Cover (1010).

PICTURE 33

1140 LCD Assembly (Continued)

PICTURE 34

6.15 1150 LCD Panel

- Keyboard and Top Cover (1010)
- LCD Assembly (1140).

PICTURE 35

PICTURE 36

Note: Push in the screwdriver into the slit to release the latch and take the LCD panel apart from the LCD rear cover.

1150 LCD Panel (Continued)

PICTURE 37

7.0 Locations

Subtopics

7.1 Front View

7.2 Rear View

7.3 Interior View without Keyboard

7.4 Top Cover

7.5 System Status Indicators

7.6 System Board

7.1 Front View

- 1 Release Levers
- 2 Contrast Control
- 3 Brightness Control
- 4 Power-On Light (green)
- 5 Power Switch
- 6 Option Slot
- 7 Integrated Trackball
- 8 Diskette Eject Button
- 9 Diskette Drive
- 10 Keyboard
- 11 Bottom Cover
- 12 Speaker Volume
- 13 Top Cover
- 14 LCD Panel

PICTURE 38

7.2 Rear View

- 1 Release Lever for Battery Pack 1
- 2 Battery Pack 1
- 3 Battery Pack 2
- 4 Release Lever for Battery Pack 2
- 5 External Power Jack
- 6 Power Control Switch
- 7 Machine Identification Label
- 8 Removable Rear Cover
- 9 System Expansion Connector
- 10 Viewing Hole
- 11 External Display Connector
- 12 Serial Connector
- 13 Latch
- 14 Parallel Connector
- 15 I/O Panel
- 16 External Input Device Connector
- 17 Lid

PICTURE 39

7.3 Interior View without Keyboard

- 1 Battery Compartment
- 2 Keyboard Control Card
- 3 Voltage Converter
- 4 Regulator
- 5 I/O Panel Assembly
- 6 Display Control Card
- 7 Eject Button for IC DRAM Card
- 8 IC DRAM Card Slot 1
- 9 IC DRAM Card Slot 2
- 10 System Board
- 11 Backup Battery
- 12 Communication Adapter Holder
- 13 Diskette Drive
- 14 Lid Switch
- 15 Hard Disk Drive

PICTURE 40

7.4 Top Cover

- 1 Top Cover
- 2 Integrated Trackball
- 3 Indicator Card
- 4 Speaker

PICTURE 41

7.5 System Status Indicators

PICTURE 42

7.6 System Board

PICTURE 43

- 1 System Expansion Connector (150-pin)
- 2 Display Control Card
- 3 Serial Connector
- 4 I/O Panel (Parallel and External Input Device)
- 5 Indicator Card
- 6 Password-Override Connector
- 7 Backup Battery
- 8 Communication Interface (Modem/Serial)
- 9 Diskette Drive
- 10 Thermal Sensor
- 11 Hard Disk Drive
- 12 Interconnection, Trackball and Keyboard Control Card
- 13 Dew Point Sensor
- 14 Voltage Converter
- 15 Voltage Converter

7.7 Display Control Card

PICTURE 44

- 1 LCD Panel
- 2 System Board Interface
- 3 External Display Connector