FRONT

PICTURE 1

October 22, 1991

This pamphlet contains procedures for isolating problems to a FRU, a Symptom-to-FRU Index, and a parts listing for the IBM Personal System/2 Model N51 SX.

This pamphlet is intended to be used with the IBM Personal System/2 *Hardware Maintenance Reference* manual (part number 15F2190, form number S15F-2190-00) and the IBM Personal System/2 *Hardware Maintenance Service* manual (part number 15F2200, form number S15F-2200-00).

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FRONT_1 Safety Information

Refer to the *Hardware Maintenance Service General Information* pamphlet for the following information:

- General Safety
- Electrical Safety
- Safety Inspection Guide.

First Edition (October 1991)

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CONTENTS Table of Contents

FRONT_1 Safety Information
FRONT_2 Notices
FRONT_2.1 Trademarks and Service Marks
CONTENTS Table of Contents
1.0 General Checkout
1.1 How to Diagnose Combined FRUs
1.2 How to Use Error Messages
1.3 How to Disable the Power-On Password
2.0 Installed Devices List
3.0 Undetermined Problem
4.0 Hard Disk Partition
4.1 Restoring the Partition
4.2 Setting System Configuration
5.0 Power Supply
5.1 Checking the AC Adapter
5.2 Checking the Car Battery Adapter
5.3 Checking the Battery Pack
5.4 Checking the Backup Battery
5.5 Checking the Standby Battery
5.6 Checking the Quick Charger
5.7 Checking the Voltage Converter
6.0 Keyboard
7.0 Printer
8.0 External Display Self-Test
9.0 Memory
10.0 Symptom-to-FRU Index
10.1 No-Beep Symptoms
10.2 Beep Symptoms
10.3 Miscellaneous Symptoms
10.4 Numeric Error Codes
11.0 How To Use This Parts Catalog
12.0 System Overview
13.0 Parts

1.0 General Checkout

The diagnostic tests are intended to test *only* IBM (*) products. Non-IBM products, prototype cards, or modified options can give false errors and invalid system responses.

Warning: Drives in the system you are servicing might have been rearranged or the drive startup sequence might have been altered. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

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Subtopics

1.1 How to Diagnose Combined FRUs
1.2 How to Use Error Messages
1.3 How to Disable the Power-On Password

1.1 How to Diagnose Combined FRUs

If an adapter or device consists of more than one FRU, an error code can be caused by any of the FRUs. Before replacing the adapter or device, remove the FRUs, one by one, to see if the symptoms change.

1.2 How to Use Error Messages

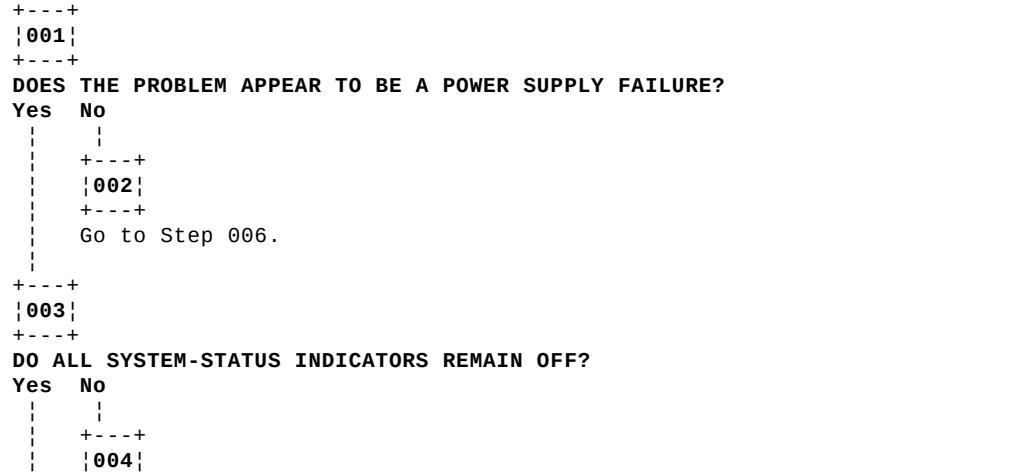
Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. The cause of the first error code can result in false error codes being displayed. If no error code is displayed, see if the error symptom is listed in the "Symptom-to-FRU Index" in topic 10.0.

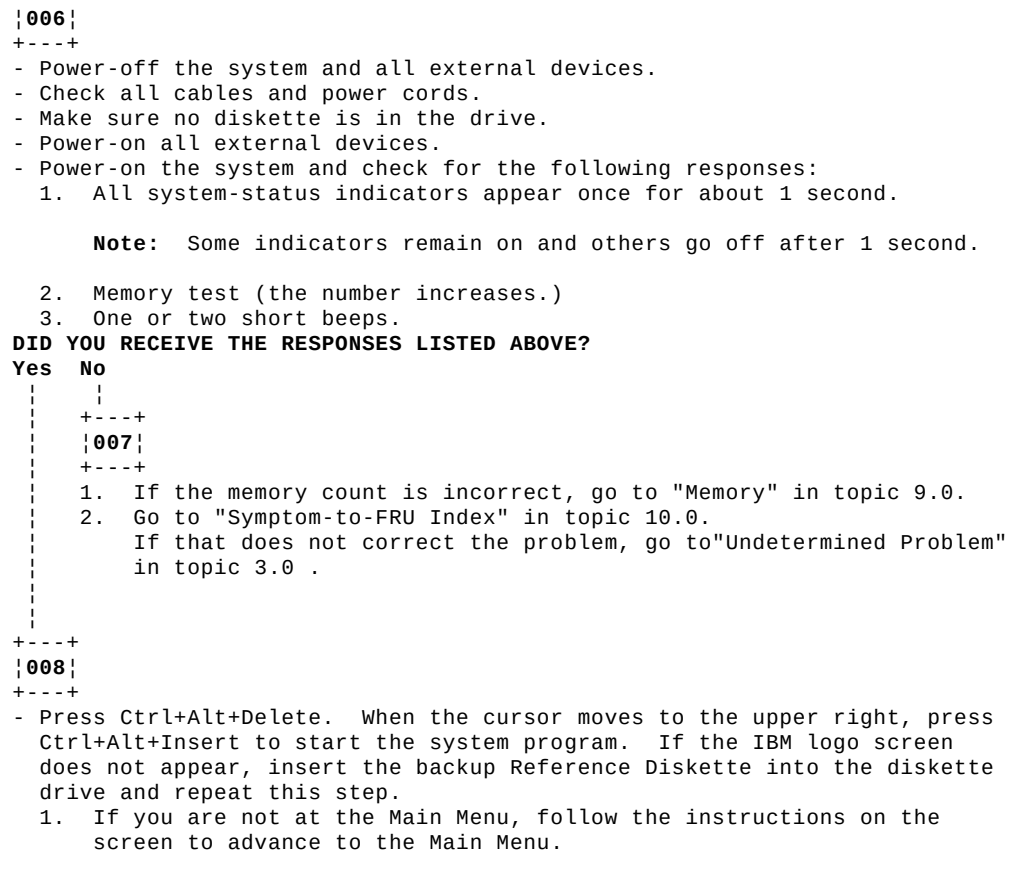
1.3 How to Disable the Power-On Password

To disable the power-on password, do the following:
1. Power-off the system.
2. Remove the battery pack and the bottom cover.
3. Identify the password-override connector on the system board.
4. Install a jumper over the pins at position 1.
5. Power-on the system and leave it until the POST ends.

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

To reactivate the password, start the system programs, select **Set features** from the Main Menu, then select **Set password and unattended start mode**, and follow the instructions on the screen.





topic 3.0 .

Notes:

a. If the system has an incorrect keyboard or numeric keypad response, go to "Keyboard" in topic 6.0.

b. If the printer has incorrect responses, go to "Printer" in topic 7.0.

c. If the external CRT display has problems such as jittering, rolling, shifting, or being out-of-focus, go to "External Display Self-Test" in topic 8.0.

2. Press Ctrl+A and run the system checkout.

IS THE LIST OF INSTALLED DEVICES CORRECT?

Yes **No**

No → **009**: Go to "Installed Devices List" in topic 2.0.

Yes → **010**:

- Run the diagnostic tests.

DID THE TEST IDENTIFY A FAILURE?

Note: If the test stops and you cannot continue, replace the last device tested.
- or -
If any POST error code appears, go to"Symptom-to-FRU Index" in topic 10.0 .

Yes **No**

No → **011**:

You may have an intermittent problem:

- Check for damaged cables and connectors.
- Reseat all adapters, drives, and modules.
- Start an error log and run the tests multiple times.
- Check the power supply in use when the error is reported (see "Power Supply" in topic 5.0).
- Check "Symptom-to-FRU Index" in topic 10.0. If this does not fix the problem, go to "Undetermined Problem" in topic 3.0.

Yes → **012**:

Go to "Symptom-to-FRU Index" in topic 10.0.

2.0 Installed Devices List

The Installed Devices List shows the presence of devices on the system. If an adapter or device is missing from the list, you may have one of the following conditions.

Warning: A customized setup configuration (other than default settings) might exist on the system you are servicing. Running Automatic Configuration can alter those settings. Note the current configuration settings (using the **1. View configuration**) and verify that the same settings are in place when service is complete. (For more information about configuration, refer to the *Hardware Maintenance Reference* manual.)

- The protected partition on the hard disk or the Reference Diskette you are using does not contain the code required to support that device.
- An adapter or device is defective.
- The device missing from the list is an unrecognizable drive or adapter.
- The device missing from the list requires an additional diskette. (See the service manual.)
- A power supply voltage is incorrect (see "Power Supply" in topic 5.0).

If the adapter is on the list, run the adapter diagnostics tests. If the list contains an adapter or device that is not installed, go to "Undetermined Problem" in topic 3.0.

3.0 Undetermined Problem

You are here because the diagnostics tests did not identify the failing FRU.

Check the power supply in use (see "Power Supply" in topic 5.0). If the power supply is operating correctly, return here and continue with the following procedure.

1. Power-off the system.
2. Remove or disconnect one of the following devices or adapter: (Do not isolate FRUs that are known to be good.)
   a. Non-IBM devices
   b. Modem, printer, mouse, or other external device
   c. Memory module kit
   d. Hard disk drive (fixed disk drive)
   e. Communications cartridge
   f. Any adapter and device.
3. Power-on the system and start the system program.
4. Press Ctrl+A to run the system checkout. Do not configure the system. If diagnostics cannot be loaded from the hard disk, try and load them from the Reference Diskette. Test only those adapters and devices still attached to the system.
5. If the symptom remains, repeat steps 1 through 3 until you find the failing FRU or until all FRUs have been removed.
6. If all of the FRUs listed have been removed and the problem remains, replace the system board.

4.0 Hard Disk Partition

A protected partition on the hard disk contains the system configuration data set, system setup programs, and customer and advanced diagnostics. System setup and diagnostic programs can be loaded from this partition by pressing and holding Ctrl+Alt+Delete and, as soon as the cursor moves to the upper right corner of the display, pressing and holding Ctrl+Alt+Insert.

Subtopics
4.1 Restoring the Partition
4.2 Setting System Configuration

4.1 Restoring the Partition

If a system or hard disk problem prevents system setup or diagnostic programs from being loaded from the protected partition, load and run the programs from the Reference Diskette. If no errors are found, restore the programs to the protected partition on the hard disk using the following procedure.

1. Start the system with the customer's backup copy of the Reference Diskette installed.

   Note: The languages of the Reference Diskette and the system must match.

2. Select the **2. Backup/Restore system programs** from the Main Menu.
3. Select the **3. Restore the system partition** option to load the system setup and utility programs, and the customer and advanced diagnostic programs onto the system partition of the hard disk.

If this does not correct the problem, use the backup copy of the Reference Diskette to format the hard disk and then restore the programs to the protected partition. If the problem remains, return to the **I998XXXX, I9990303** error code (on page 10.4 in the Symptom-to-FRU index).

Note: After the programs have been restored, the Insert-Diskette icon appears, unless an operating system is present.

4.2 Setting System Configuration

If you configure the system using the **4. Set configuration** from the Reference Diskette, make sure the languages of the Reference Diskette and the system must match.

5.0 Power Supply

As the battery pack, backup and standby batteries have a given lifespan, having spares of these batteries on hand can eliminate problems. When one of these batteries is suspected of failing, the spare can be used in its place. One or all of these batteries can be discharged if a short circuit is present in the system.

1. Replace the failing FRU if the power supply problem is caused by a short circuit.
2. Determine if one (or all) of the batteries have become discharged. Replace any discharged battery with its spare.

The test procedures for each power device are found on the following pages.

- "Checking the AC Adapter" in topic 5.1.
- "Checking the Car Battery Adapter" in topic 5.2.
- "Checking the Battery Pack" in topic 5.3.
- "Checking the Backup Battery" in topic 5.4.
- "Checking the Standby Battery" in topic 5.5.
- "Checking the Quick Charger" in topic 5.6.
- None of the above. Follow the steps below.

001

DID THE PROBLEM OCCUR ONLY WHEN USING THE AC ADAPTER?

Yes — **No**

002

Go to Step 004.

003

Go to "Checking the AC Adapter" in topic 5.1.
If"Checking the AC Adapter" does not correct the problem, replace the voltage converter.

004

DID THE PROBLEM OCCUR ONLY WHEN USING THE CAR BATTERY ADAPTER?

Yes — **No**

005

Go to Step 007.

006

Go to "Checking the Car Battery Adapter" in topic 5.2.

007

DID THE PROBLEM OCCUR ONLY WHEN USING THE BATTERY?

Yes — **No**

008

Go to Step 014.

009

DOES A FULLY-CHARGED BATTERY DISCHARGE QUICKLY?

Yes — **No**

010

Go to Step 013.

011

- Run advanced diagnostics for all devices using the AC adapter. Use the 'RUN TEST ONE TIME' option.

DID ALL THE TESTS END WITHOUT AN ERROR?

Yes → **No**

012

Follow the instructions on the screen.
If the instructions do not appear or do not correct the problem, replace the system board.

013

Go to "Checking the Battery Pack" in topic 5.3.
If "Checking the Battery Pack" does not correct the problem, go to "Checking the Voltage Converter" in topic 5.7.

014

- Unplug the AC adapter if used.
- Remove the bottom cover and disconnect the flat cable from connector CN6 on the voltage converter. (See page 5.7 for the connector location.)
- Check that the resistance at connector CN5 is greater than 5 ohms between pins 7 and 1, and also between 7 and 3.

IS THE RESISTANCE CORRECT?

Yes → **No**

015

Go to Step 017.

016

Go to "Checking the Voltage Converter" in topic 5.7.
If"Checking the Voltage Converter" does not correct the problem, go to Step 017.

017

- Remove the following if installed:
  - ☐ Battery pack
  - ☐ Standby battery
  - ☐ Backup battery
  - ☐ Memory module kit
  - ☐ Internal Data/Fax modem
  - ☐ Serial adapter
  - ☐ Numeric keypad
  - ☐ Mouse
  - ☐ External display
  - ☐ Hard disk drive
  - ☐ Diskette drive
  - ☐ LCD inverter cable
  - ☐ LCD panel cable.
- Make sure the voltage converter is correctly installed.
- Plug in the AC adapter and power-on the system.

DID YOU HEAR ONE LONG OR TWO SHORT BEEPS?

Yes → **No**

018

Replace the following FRUs one at a time until the problem is corrected.

- ☐ Voltage converter
- ☐ I/O panel assembly
- ☐ System board.

019

Replace the voltage converter to verify the fix. If the problem still remains, do the following.

- Suspect one of the options or devices. Reinstall each of the options or devices to the system one at a time, and power-on the system to see if the original problem occurs.
- Replace the last installed option or device when the problem occurs.

Subtopics

5.1 Checking the AC Adapter
5.2 Checking the Car Battery Adapter
5.3 Checking the Battery Pack
5.4 Checking the Backup Battery
5.5 Checking the Standby Battery
5.6 Checking the Quick Charger
5.7 Checking the Voltage Converter

5.1 Checking the AC Adapter

If the Power-On indicator is not on, check the power cord of the AC adapter for proper installation and continuity.

1. If any noise can be heard from the AC adapter when it is plugged into line voltage, replace the AC adapter with a new one.

   If no noise can be heard from the adapter, go to Step 3.
2. If the noise still comes from the new AC adapter, suspect the system unit. Replace the AC adapter with the original one, then go to the next step. If no noise comes from the new adapter, the original adapter has the problem.
3. Unplug the AC adapter cable from the system and measure the output voltage at the plug of the AC adapter cable.

PICTURE 2

Pin	**Voltage (V dc)**
1	+19.0 to +21.0
2	Ground

- If the voltage is not correct:
  1. Unplug the AC adapter from the ac power outlet and leave it for a few minutes.
  2. Plug the AC adapter into the ac outlet.
  3. Measure the output voltage of the AC adapter.
  4. If the voltage is still not correct, replace the AC adapter.
- If the voltage is OK, plug the cable into the system and try the failing operation again.

If the problem still remains, replace the voltage converter. If the problem disappeared, suspect the installation and continuity of the AC adapter cable.

5.2 Checking the Car Battery Adapter

If an output voltage from a cigarette lighter socket is less than 10.5 V dc, the power-on indicator on the car battery adapter blinks and a noise can be heard continuously. The battery of the car is defective.

1. Unplug the car battery adapter from the computer if connected.
2. Plug the car battery adapter into the cigarette lighter socket.

    Note: If the adapter is already plugged in, be sure to unplug the adapter from the cigarette lighter socket, then plug it into the socket again.

3. Measure the output voltage of the car battery adapter.

    PICTURE 3

Pin	**Voltage (V dc)**
1	+19.0 to +21.0
2	Ground

If the voltage is correct and the power-on indicator on the car battery adapter is on steady, the car battery adapter is working correctly.

If the voltage is out of range, do one of the following.

- Try the above test procedures on another car if available.
- Replace the car battery adapter if the system works with the AC adapter and does not work with the car battery adapter.

5.3 Checking the Battery Pack

1. Invert the system unit and place it on its top.
2. Remove the battery pack and measure the voltage at the battery terminals between 1 (+) and 3 (-).

   PICTURE 4

Pin	**Voltage (V dc)**
1	+8.5 to +18.0
2	Thermal Detection
3	Ground

   - If the voltage is less than +8.5 V dc, the battery pack is discharged or defective.
   - If the voltage is more than +8.5 V dc, go to the next step.

3. Using a low-power ohm meter, measure the resistance at the battery terminals between 2 (**T**) and 3 (**-**). The resistance must be 4 kilohms to 30 kilohms.

   If the resistance is out of range, replace the battery pack.

4. Remove the bottom cover and set the battery pack in place without connecting any external power devices.
5. Measure the voltage at the connector between terminals 1 (+) and 3 (-) on the voltage converter and note the voltage.

   PICTURE 5

6. Using the AC adapter, apply external power to the system.

   Warning: Be careful not to cause a short circuit while doing the following steps. The charging circuit is active even if the system power switch is set to off.

7. Measure the voltage again between terminals 1 (+) and 3 (-).
   - If the voltage is not greater than that measured in Step 5, replace the AC adapter, then go to the next step.
   - If the voltage is greater than that measured in Step 5, the battery pack is good.
   - Repeat Steps 6 and 7 using a new AC adapter. If the voltage is still not greater than that measured in Step 5, replace the voltage converter.

5.4 Checking the Backup Battery

1. Invert the system unit and place it on its top.
2. Remove the bottom cover.
3. Disconnect the battery connector from the voltage converter.
4. Measure the voltage of the backup battery.

PICTURE 6

Wire	**Voltage (V dc)**
Red	+2.5 to +3.7
Black	Ground

If the voltage is correct, replace the system board. If it is not, the backup battery is discharged by a short circuit or is defective.

5.5 Checking the Standby Battery

1. Invert the system unit and place it on its top.
2. Remove the battery pack from the system and remove the bottom cover.
3. Disconnect the battery connector from the voltage converter.
4. Plug the AC adapter into the system and power-on the system.
5. Measure the output voltage at the connector on the voltage converter.

PICTURE 7

Pin	**Voltage (V dc)**
1	+4
3	Ground

- If the voltage is less than +4 V dc, replace the voltage converter.
- If the voltage is greater than +4 V dc, go to the next step.

6. Power-off the system.
7. Reconnect the standby battery to the voltage converter.
8. Power-on the system and leave it approximately 30 minutes to allow the standby battery to be charged.
9. Power-off the system again and disconnect the standby battery.
10. Measure the voltage of the standby battery.
    - If the voltage is less than 3.5 V dc, replace the standby battery.
    - If the voltage is greater than 3.5 V dc, replace the voltage converter.

5.6 Checking the Quick Charger

If a strange noise can be heard from the operating quick charger, replace it.

1. Perform steps 1 through 3 in topic 5.3 of the "Checking the Battery Pack" to verify the battery pack is operating correctly.
2. Connect the power cord to the quick charger and the other end to the electrical outlet. Ensure that the power indicator (PICTURE 8) turns on.

   If the power indicator does not turn on, check the power cord of the quick charger for proper installation and continuity. If this does not correct the problem, replace the quick charger.
3. Install the battery pack.

   If the charging indicator (PICTURE 9) does not start blinking, replace the quick charger.

5.7 Checking the Voltage Converter

Use the following procedure to isolate the voltage converter from the problem.

Note: If the problem occurs only when using the system with a good battery pack, replace the voltage converter.

1. Turn off the system power switch.
2. Turn off all attached devices and disconnect them from the system.
3. Unplug the AC adapter from the system.
4. Remove the battery pack and the bottom cover.
5. Disconnect the standby-battery connector and the flexible cable from connector CN6 on the voltage converter.
6. Turn on the system power switch.
7. Plug the AC adapter into the system.

Attention

The system goes into suspend mode in about 20 seconds after plugging in the AC adapter. The following procedure must be performed during this period. If the system is already in suspend mode, unplug the AC adapter and plug it in again to reactivate it.

8. Check the voltages of the voltage converter using the following table.

PICTURE 10

Connector	Pin	Signal	V dc Min.	V dc Max.
CN5				
	1	VCCA	+4.7	+5.3
	3	VCCB	+4.7	+5.3
	7, 8	GND	-	-
	9, 10	GND	-	-
	13	+20 V dc	+19.0	+21.0
	21	POWER_GD	+4.0	+5.3
	32	POWER_ON#	0	+0.5
CN7	2	VCCG	+4.7	+5.3
	23, 24	GND	-	-

- If all the voltages are correct, the voltage converter is good.
- If +20 V dc is not correct, check the output voltage of the AC adapter (see "Checking the AC Adapter" in topic 5.1). If the voltage is correct, replace the voltage converter.
- If any of the measured voltages except +20 V dc is not correct, replace the following FRUs one at a time to correct the problem.
  1. Voltage converter
  2. System board
  3. I/O panel assembly.

Note: Reconnect the standby-battery connector and the flexible cable that were removed in Step 5 before leaving this procedure.

6.0 Keyboard

- If the system has no response when the numeric keypad is used:
  1. Disconnect the numeric keypad from the system.
  2. Repeat the failing operation.

     If the problem does not appear, replace the numeric keypad. If the problem still remains, replace the keyboard control card.

  If that does not correct the problem, replace the system board.
- Make sure that the two flexible cables extending from the keyboard are properly attached to the connectors on the keyboard control card.
- If you suspect a problem with any of the auxiliary input devices, replace the device. If that does not correct the problem, replace the keyboard control card. If this does not correct the problem, replace the system board.
- If the system has an incorrect keyboard response, replace the keyboard, then replace the keyboard control card. If that does not correct the problem, replace the system board.

Note: The following auxiliary input devices are available for Model N51 SX.

- Numeric keypad
- Mouse.

7.0 Printer

1. Make sure the printer is properly connected and powered on.
2. Run the printer self-test.

If the printer self-test does not run correctly, the problem is in the printer. Refer to the printer service manual.

If the printer self-test runs correctly, install a wrap plug on the parallel port and run the advanced diagnostics tests to determine which FRU failed.

If the advanced diagnostic tests (with the wrap plug installed) do not detect a failure, replace the printer cable. If that does not correct the problem, replace the system board.

8.0 External Display Self-Test

If the display problem occurs only when using an external display, use the following instructions to correct the problem.

1. If the screen is rolling, replace the display assembly.
   If the problem remains, go to the next step.
2. Run the following display self-test:
   a. Power-off the system and the display.
   b. Disconnect the display signal cable from the system.
   c. Power-on the display.
   d. Turn the contrast control to its maximum position.
   e. Turn the brightness control to the center detent position.
3. Check for the following conditions:
   - The screen should be white or light gray, with a black margin as described below:

     - **8503, 8512, 8513, 8514:** 2-20 mm (0.08-0.79 in.) wide on one or both sides
     - **8506:** 2-50 mm (0.08-1.97 in.) wide on the top, bottom, or both
     - **8507, 8508, 8515:** 2-20 mm (0.08-0.79 in.) wide on the top, bottom, or both.

   - The screen intensity should vary when turning the contrast and brightness controls.

   If the screen differs from the above, replace the display.

   If the display passes the display self-test, replace the FRUs, in the following order, until the problem is corrected.
   a. I/O panel assembly
   b. System board

9.0 Memory

Customer diagnostics can eliminate defective memory so no memory error code appears at power-on reset. After you replace a defective memory module kit, run **5. Automatic configuration** or the new memory will not be recognized. Power-off the system before removing or replacing parts.

001

- Remove the memory module kit in the connector if installed.
- Run the memory tests.
  Use the RUN TESTS ONE TIME option.

DID THE MEMORY TESTS END WITHOUT AN ERROR?

Yes → **003**

No → **002**

002

Replace the system board.

003

DID YOU REMOVE THE MEMORY MODULE KIT IN THE CONNECTOR?

Yes → **005**

No → **004**

004

Go to Step 007.

005

- Reinstall the memory module kit in the connector and run **5. Automatic configuration**.
- Run the memory test.
  Use the RUN TESTS ONE TIME option.

DID THE MEMORY TESTS END WITHOUT AN ERROR?

Yes → **007**

No → **006**

006

Replace the memory module kit in the connector.
If that does not correct the problem, replace the system board.

007

If the problem occurs intermittently, run the memory tests multiple times to have an error log.

10.0 Symptom-to-FRU Index

The Symptom-to-FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "General Checkout" in topic 1.0. This index also can be used to help you decide which FRUs to have available when servicing a system.

If you are unable to correct the problem using this index, go to "Undetermined Problem" in topic 3.0.

IMPORTANT:

1. If you have both an error message and an incorrect audio response, diagnose the error message first.

2. If you cannot run the advanced diagnostics tests, but did receive a POST error message, diagnose the POST error message.

3. If you did not receive an error message, look for a description of your error symptoms in the first part of this index.

4. Check all power supply voltages before you replace the system board. (See "Power Supply" in topic 5.0.)

5. If an error message is not listed, there is a device installed that requires an additional diskette or service manual. Refer to the diskette or service manual for that device.

How to Read POST Error Messages

POST error messages are displayed on the screen as 3, 4, 5, or 8 digits. The error messages that can be displayed as shorter POST messages are highlighted in this Symptom-to-FRU Index.

The following example shows which digits display the shorter POST error messages.

PICTURE 11

In the following index, an *X* in an error message can be any number.

Subtopics
10.1 No-Beep Symptoms
10.2 Beep Symptoms
10.3 Miscellaneous Symptoms
10.4 Numeric Error Codes

10.1 No-Beep Symptoms

Symptom/Error	**FRU/Action**
No beep and a blank or unreadable display during POST. (See "Power Supply" in topic 5.0 before replacing any FRUs.)	**System Board** Any option or device Power source when failing Voltage Converter Speaker
No beep with a blinking cursor.	**System Board** Communications Cartridge
No beep with a normal display during POST.	**Speaker** I/O Panel Assembly System Board Keyboard Control Card
No beep and the system hangs up after displaying memory count.	**System Board** Communications Cartridge Hard Disk Drive

10.2 Beep Symptoms

Symptom/Error	**FRU/Action**
Continuous beep.	**System Board**
Repeating short beeps. (See "Keyboard" in topic 6.0 before replacing any FRUs.)	**Keyboard** Keyboard Control Card System Board
One long and one short beep.	**System Board**
One long and two short beeps.	**System Board**
One short beep and a blank, unreadable, or flashing display with no external display attached.	**LCD Panel** LCD Inverter System Board LCD Cable
One short beep and Diskette Prompt or a program load from the hard disk or unable to read diskette.	**Diskette Drive** System Board Diskette Drive Cable
Two short beeps and a blank display.	**System Board**

10.3 Miscellaneous Symptoms

Symptom/Error	**FRU/Action**
LCD too dark, unable to adjust contrast or brightness.	**LCD Inverter** LCD Panel System Board
LCD unreadable or distorted.	**LCD Panel** System board LCD Inverter LCD Cable
LCD cannot be turned on or off.	**LCD Inverter** System Board LCD Cable
Blank screen, or extra horizontal or vertical line(s) displayed on upper or lower half of the LCD.	**LCD Panel** System Board LCD Cable
System status indicator is incorrectly blinking or stays on.	**System Board** Related Device
System status indicator stays off, but the POST ends without an error.	**I/O Panel Assembly** System Board Related Device
Keyboard does not work.	**Keyboard-control card** Numeric Keypad if used System Board
One or more keys do not work. (See "Keyboard" in topic 6.0 before replacing any FRUs.)	**Keyboard** Numeric Keypad if installed Keyboard Control Card
External display problems. (See "External Display Self-Test" in topic 8.0 before replacing any FRUs.)	**External Display** System Board I/O Panel Assembly
Incorrect memory size during POST. (See "Memory" in topic 9.0 before replacing any FRUs.)	**System Board** Memory Module Kit
System hang-up or Intermittent hang-up. (See "Undetermined Problem" in topic 3.0 before replacing any FRUs.)	**System Board** Hard Disk Drive Cable Hard Disk Drive Replace the last device being tested Voltage Converter
The system goes into suspend mode after the POST.	**System Board** Voltage Converter Lid Switch Keyboard Control Card
The system does not suspend or resume.	**System Board** Voltage Converter Lid Switch Keyboard Control Card
The system does not power off.	**Voltage Converter** System Board I/O Panel Assembly
Real-time clock inaccurate. (See "Checking the Backup Battery" in topic 5.4 before replacing any FRUs.)	**Backup Battery** System Board
Printer problems.	**See** "Printer" in topic 7.0.
Serial or parallel port device problems.	**Device** Cable System Board Serial Adapter (if attached) I/O Panel Assembly
Internal Data/Fax modem does not communicate with a remote modem or a fax.	**See the *Internal Data/Fax Modem Hardware Maintenance Service* supplement.**

10.4 Numeric Error Codes

Symptom/Error	**FRU/Action**
000**102**00, 000**103**00, 000**104**00, 000**107**00	**System Board**
000**108**00	**System Board** Communications Cartridge
000**110**00 (See "Memory" in topic 9.0 before replacing any FRUs.)	**Memory Module Kit** System Board
000**113**XX	**System Board** Communications Cartridge Any Drive
000**114**XX	**Communications Cartridge**
000**118**XX	**Memory Module Kit**
000**161**00	**See** "Checking the Backup Battery" in topic 5.4 . System Board Voltage Converter
000**163**00, 000**164**00, 000**165**00, 000**169**00 (If setting configuration does not solve the problem, see "Installed Devices List" in topic 2.0.)	**Set Configuration/Features** System Board Communications Cartridge Hard Disk Drive Memory Module Kit
000**166**XX	**Communications Cartridge**
000**171**XX	**System Board**
000**172**XX	**System Board**
000**173**00	**See** "Checking the Backup Battery" in topic 5.4 . System Board Voltage Converter
000**174**00 (If Automatic Configuration does not solve the problem, run Advanced Diagnostics.)	**Set Configuration/Features**
000**190**00, 000**191**XX	**System Board**
000**192**00	**Lid Switch** Keyboard Control Card System Board
000**193**00	**System Board**
000**199**XX	**System Board**
0001**XX**XX (not listed above)	**System Board** Communications Cartridge I/O Panel Assembly
0002**XX**XX (See "Memory" in topic 9.0 before replacing any FRUs.)	**Memory Module Kit** System Board
000**301**00, 000**305**00	**Keyboard Control Card** System Board Keyboard Numeric Keypad
000**302**00, 000**303**00, 000**304**00	**System Board** Keyboard Control Card Keyboard or Numeric Keypad
000**306**00	**Keyboard or Numeric Keypad** Auxiliary Input Device Keyboard Control Card System Board I/O Panel Assembly

0004**XX**XX	**System Board** Any Parallel Device Communication Cable I/O Panel Assembly
000**601**XX	**Diskette Drive** System Board Diskette Drive Cable
000**602**XX	**Defective Diskette**
000**655**XX, 000**662**XX 000**670**XX - 000**675**XX	**System Board** Diskette Drive Diskette Drive Cable
0006**XX**XX (Unsupported drive or cable.)	**Diskette Drive** System Board Diskette Drive Cable
0011**XX**00	**System Board** Any Serial Device Communication Cable I/O Panel Assembly
0014**XX**XX (See "Printer" in topic 7.0 before replacing any FRUs.)	**Printer** System Board
0024**XX**00	**System Board**
005**002**XX, 00**5006**XX, 005**008**XX, 00**5041**XX	**System Board** External Display I/O Panel Assembly
005**004**XX, 00**5010**XX, 005**030**XX - 00**5032**XX, 005**051**XX - 00**5062**XX	**System Board** LCD Panel LCD Inverter LCD Cable
005**009**XX, 00**5040**XX	**External Display** System Board I/O Panel Assembly
008**601**00, 008**602**00	**Pointing Device (Mouse)** System Board Numeric Keypad I/O Panel Assembly
0086**XX**00	**System Board** Pointing Device (Mouse) Numeric Keypad I/O Panel Assembly
0**10103**XX - 0**10110**XX, 0**10116**XX - 0**10153**XX, 0**10171**XX, 0**101XX**XX	**See the *Internal Data/Fax Modem Hardware Maintenance Service* supplement.**
0**10436**XX	**System Board** Hard Disk Drive Hard Disk Drive Cable
0**104XX**XX	**Hard Disk Drive** System Board Hard Disk Drive Cable
0**130XX**XX	**I/O Panel Assembly** System Board Keyboard Control Card
0**137XX**XX	**Any Serial Adapter** System Board Voltage Converter Any Serial Device Communication Cable
0**166XX**XX, 0**167XX**XX	**Adapter in Communications Cartridge** Communications Cartridge
I9990301 (Startup drive not found.)	**Start the backup copy of the Reference Diskette and check if the startup sequence is correct.** 1. Select **Set features** from the Main Menu.

	2. Select **Set startup sequence**. 3. Check the list of devices on the screen.
I9990302 (Operating system not found.)	**Make sure that an operating system is installed.** Hard Disk Drive System Board Hard Disk Drive Cable
I998XXXX, **I9990303** (See "Hard Disk Partition" in topic 4.0 before replacing any FRUs.)	**Restore the system programs onto the system partition.** Set configuration Hard Disk Drive System Board Hard Disk Drive Cable

11.0 How To Use This Parts Catalog

INDEX REFERENCE NUMBERS: Refer to the illustrations for the index reference numbers that are listed in the left margin of the parts listing.

SIMILAR ASSEMBLIES: If two assemblies contain a majority of identical parts, they are broken down on the same list. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.

AR: (As Required) indicates that the quantity is not the same for all machines.

R: (Restricted) indicates that the part has a restricted availability.

INDENTURE: The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture Relationship of Parts

(No dot) Main Assembly
(One dot) □ Detail parts of a main assembly
(One dot) □ Subassembly of the main assembly
(Two dots) □ □ Detail part of a one-dot subassembly
(Two dots) □ □ Subassembly of a one-dot subassembly

12.0 System Overview

PICTURE 12

13.0 Parts

Index	***System Unit***	
1	LCD Bezel	07G1741
	LCD Bezel for Japan	07G1842
2	Bumper, Rubber	07G1742
3	LCD Panel	07G1737
	Cable, LCD	07G1739
4	LCD Rear Cover	07G1740
	LCD Rear Cover for Japan	07G1841
5	Inverter, LCD	07G1738
6	LCD Hinge Cover, Left	07G1745
7	LCD Hinge Cover, Right	07G1744
8	LCD Hinge, Right/Left	07G1210
9	Lid Switch	07G1211
10	I/O Panel Assembly	07G1216
11	Terminal Assembly, Battery	07G1223
12	Hard Disk Drive, 40MB	95F4707
	Cable, Hard Disk Drive	07G1226
13	Diskette Drive Assembly	06G9865
	Cable, Diskette Drive	07G1228
14	Backup Battery, Lithium	07G1225
	Holder, Backup Battery	07G1736
15	Standby Battery	07G1240
	Standby Battery, Benelux	07G1503
	Standby Battery, Switzerland	07G1241
16	Door, Bus Connector	07G1212
	Door, Bus Connector	07G1954
17	Door, I/O Connector	07G1213
18	Bezel, Diskette Drive	07G1227
19	Battery Pack, Nickel-Cadmium	07G1242
	for Sweden	07G1194
	for Benelux	07G1497
	for Switzerland	07G1243
19	Battery Pack, Nickel-Hydride	07G1244
	for Sweden	07G1195
	for Benelux	07G1500
	for Switzerland	07G1245
20	Bottom Cover	07G1209
21	Cover, Memory-Module Kit	07G1222
22	Communication Adapter:	
	Serial Adapter	79F6840
	Data/Fax Modem Adapter (U.S./Canada only)	94X2554
	Telephone Cable	94X1540
23	Door, Option Slot	07G1214
24	Voltage Converter	07G1219
	Holder, Voltage Converter	07G1221
25	Memory-Module Kit:	
	2MB	07G1879
	4MB	07G1880
	8MB	07G1881
26	Card, Keyboard Control	07G1218
	Supporter, Keyboard Control Card	07G1220

Index	***System Unit***	
27	System Board	07G1876
	System Board for Japan	07G1877
28	Keyboard (see ***Keyboard***)	
29	Speaker	07G1229
	Holder, Speaker	07G1734
30	Holder, Cable Assembly	07G1761
	Bracket, Option Slot	07G1215
	Cover, Keyboard	07G1208
	Miscellaneous Kit	07G1743
	Screw Kit	07G1835

System Unit	
Arabic	07G1569
Belgian	07G1558
Danish	07G1563
Dutch	07G1567
Finnish	07G1562
French	07G1555
German	07G1556
Greek	07G1572
Hebrew	07G1571
Icelandic	07G1570
Italian	07G1557
Norwegian	07G1560
Portuguese	07G1566

Spanish	07G1559
Swedish	07G1561
Swiss / French	07G1564
Swiss / German	07G1565
Turkish	07G1568
U.K.	07G1554
U.S. English for EMEA	07G1553

Options and Adapters

Note: When you replace the AC adapter or the Quick Charger with a new one, use the one available for the country you are in even though the system is from another country.

AC Adapter	07G1851
AC Adapter for U.S., Canada, Latin America	07G1246
AC Adapter for Japan, 2-pin	07G1248
AC Adapter for Japan, 3-pin	07G1771
Quick Charger	07G1854
Quick Charger for U.S., Canada, Latin America	07G1247
Quick Charger for Japan, 2-pin	07G1249
Quick Charger for Japan, 3-pin	07G1774
Car Battery Adapter	07G1190
Communications Cartridge	07G2581
Miniature Mouse	95F5723
External Power Pack	07G1540
for Sweden	07G1544
for Benelux	07G1546
for Switzerland	07G1542
Cartridge, External Power Pack	07G1541

Keyboard

Arabic	07G2954
Belgian	07G1482
Canadian French	07G1490
Danish	07G1483
Dutch	07G1484
French	07G1167
German	07G1168
Greek	07G2957
Hebrew	07G2956
Icelandic	07G2955
Italian	07G1169
Japan	07G1481
Norwegian	07G1485
Portuguese	07G1489
Spanish	07G1480
Spanish Speaking	07G1491
Swedish / Finnish	07G1486
Swiss / French	07G1487
Swiss / German	07G1488
Turkish	07G2953
U.K. English	07G1166
U.S. English	07G1735

Numeric Keypad

Arabic	75F6877
Belgian	95F5741
Canadian French	95F5466
Danish	95F5467
Dutch	95F5467
French	95F6313
German	95F6314
Greek	95F5467
Hebrew	95F5741
Icelandic	95F5467
Italian	95F6316
Japan	79F6401
Norwegian	95F5467
Portuguese	95F5741
Spanish	95F6315
Spanish Speaking	95F6315
Swedish / Finnish	95F5468
Swiss / French	95F7711
Swiss / German	95F5715
Turkish	95F5467
U.K. English	95F5741
U.S. English	95F5741

8503 Monochrome Display (with Tilt /Swivel Stand)

110/120 V ac	68X3045
220/240 V ac (Northern Hemisphere)	68X3046
220/240 V ac (Southern Hemisphere)	72X7878
Tilt /Swivel Stand	68X3061

8506 Monochrome Display (with Tilt /Swivel Stand)

110/125 V ac (US/Canada)	39F8087
110/125 or 200/240 V ac (Northern Hemisphere)	39F8088
110/125 or 220/240 V ac (Southern Hemisphere)	39F8089

8507 Monochrome Display (with Tilt /Swivel Stand)

110/120 or 220/240 V ac (Universal Model)	6247808

8508 Monochrome Display (with Tilt /Swivel Stand)

110/125 V ac (US/Canada)	6247838
110/125 or 200/240 V ac (Northern Hemisphere)	39F8067
110/125 or 220/240 V ac (Southern Hemisphere)	39F8068

8512 Color Display (without Tilt /Swivel Stand)

110/120 V ac	61X8924
220/240 V ac (Northern Hemisphere)	61X8928
220/240 V ac (Southern Hemisphere)	61X8927
Tilt /Swivel Stand	61X8925

8513 Color Display (with Tilt /Swivel Stand)

110/120 V ac	68X3088
220/240 V ac (Northern Hemisphere)	72X7870
220/240 V ac (Southern Hemisphere)	72X7877
Tilt /Swivel Stand	68X3061

8514 Color Display (without Tilt /Swivel Stand)

110/120 V ac	75X5945
220/240 V ac (Northern Hemisphere)	75X5946
220/240 V ac (Southern Hemisphere)	75X5947
Tilt /Swivel Stand	75X5907

8515 Color Display (with Tilt /Swivel Stand)

Model 001 (90/137 V ac (U.S. and Canada) with	
Tilt /Swivel and packaging set	38F3911
Model 002 (90/265 V ac, Universal voltage) with	
Tilt /Swivel and packaging set	38F3912
Model A01 (90 V ac) with	
Tilt /Swivel and packaging set	38F3913
Shipping material:	16F0188
□ Box	
□ Front cushion	
□ Rear cushion	
Power cable, 1.8 meters (6 ft.), U.S.	38F3968
Alternative to part number 38F3968 above	6952301

Tools and Miscellaneous

Tri-Connector Wrap Plug	72X8546
Screwdriver Kit	95F3598

Power Cords

PICTURE 13

Index Power Cords

Warning: Use the power cord certified for your country.

1	Power Cord, System Unit, for:	6952301
	Colombia, U.S., Venezuela	
	Power Cord, System Unit, for:	
	Japan, 2-pin	6454377
	Japan, 3-pin	65F0031
2	Power Cord, System Unit, for:	14F0033
	Hong Kong, Singapore, U.K.	
3	Power Cord, System Unit, for:	13F9979
	France, Germany, Spain	

4	Power Cord, System Unit, for: Italy	14F0069
5	Power Cord, System Unit, for: Australia, New Zealand	13F9940
6	Power Cord, System Unit, for: Denmark	13F9997
7	Power Cord, System Unit, for: Israel	14F0087
8	Power Cord, System Unit, for: Bangladesh, Pakistan, Sri Lanka South Africa	14F0015
9	Power Cord, System Unit, for: Switzerland	14F0051
10	Power Cord, System Unit, for: Thailand	1838574

Supplemental Parts:

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