

FRONT

PICTURE 1

March 23, 1990

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 25 286.

This pamphlet is intended to be used with the IBM Personal System/2 Model 25 286 *Hardware Maintenance Reference* manual (part number 15F2190 and the IBM Personal System/2 *Hardware Maintenance Service* (part number 15F2200).

Part Number 15F2181

Form Number S15F-2181-00

FRONT_1 Safety Information

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

- General Safety
- Electrical Safety
- Safety Inspection Guide.

First Edition (March 1990)

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IBM Personal System/2

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1.0 General Checkout

The advanced 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.

IMPORTANT:

- If more than one error code is displayed, diagnose the first error code first. The cause of the first error code can cause false error codes to be displayed.
- If an adapter or device consists of more than one FRU, an error code may 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.

To disable the power-on password, move the J13 jumper on the system board to the unused position.

+----+
|001|

- Power-off the system and all external devices.
- Check the voltage-selector switch setting.
- Check all cables and power cords.
- Make sure there are no diskettes in the drives.
- Power-on all external devices.
- Power-on the system.

Note: If the power-on indicator is not on, go to "Undetermined Problem" in topic 2.0.

DID YOU RECEIVE A POST ERROR CODE?

Yes No

| |
| |
| | +----+
| | |002|
| | +----+
| | Continue with Step 010.

+----+
|003|

IS THE ERROR 162?

Yes No

| |
| | +----+
| | |004|
| | +----+
| | Continue with Step 010.

+----+
|005|

- Disconnect the external listening device (if connected) from the audio jack.
- Insert your Advanced Diagnostic Diskette.
- Press Ctrl-Alt-Del and check for the following responses:
 1. One or two short beeps.
 2. IBM logo screen appears.

Note: If you suspect a problem with the audio jack, go to "Audio Card Isolation" in topic 6.0.

DID YOU RECEIVE THE RESPONSES LISTED ABOVE?

Yes No

| |
| | +----+
| | |006|
| | +----+
| | Go to "Symptom-to-FRU Index" in topic 9.0. If that does not correct the problem, go to "Undetermined Problem" in topic 2.0.

+----+
|007|

- Press Enter.

HAS THE CONFIGURATION BEEN INTENTIONALLY CHANGED?

Yes No

| |
| | +----+
| | |008|
| | +----+
| | Press N, then go to Step 014.

+----+

|009|

+----+

Press Y to run Auto Configuration and verify that the error is no longer present. If you return to this point again, go to Step 007 and answer No.

+----+

|010|

+----+

- Disconnect the external listening device (if connected) from the audio jack.
- Insert your Advanced Diagnostics Diskette.
- Press Ctrl-Alt-Del and check for the following responses:
 1. One or two short beeps.
 2. IBM logo screen appears.

Note: If you suspect a problem with the audio jack, go to "Audio Card Isolation" in topic 6.0.

DID YOU RECEIVE THE RESPONSES LISTED ABOVE?

Yes No

|

|

+----+

|011|

+----+

CAN YOU ADVANCE TO THE FIRST DIAGNOSTIC MENU?

Yes No

|

|

+----+

|012|

+----+

Go to "Symptom-to-FRU Index" in topic 9.0. If that does not correct the problem, go to "Undetermined Problem" in topic 2.0.

+----+

|013|

+----+

Go to Step 014.

+----+

|014|

+----+

- Press Enter
- Select Test System.
- Select System Checkout.

Notes:

1. If the system has incorrect keyboard responses, go to "Keyboard" in topic 7.0.
2. If the printer has incorrect responses, go to "Printer" in topic 5.0.
3. If the screen is jittering, rolling, shifting, out-of-focus, or the colors are incorrect, go to "Display" in topic 3.0.
4. A minimum of 512KB of memory must be active to load the diagnostic tests.

IS THE LIST OF INSTALLED DEVICES CORRECT?

Yes No

|

|

+----+

|015|

+----+

Go to "Installed Devices List" in topic 4.0.

+----+

|016|

+----+

- Run the diagnostic tests.

DID THE TESTS IDENTIFY A FAILURE?

Note: If the test stops and you cannot continue, replace the last device being tested.

Yes No

|

|

+----+

|017|

+---+

If you have a description of the problem, check the "Symptom-to-FRU Index" in topic 9.0 for a symptom that matches the problem.

Verify that the power supply output voltages are within tolerance (see "Power Supply Output Voltages" in topic 2.1).

If the voltages are not correct, replace the display assembly.

If you still have not found a problem, the problem may be intermittent:

- Check for damaged cables and connectors.
- Reseat all adapters, drives, and modules.
- Check the system unit fan for proper operation.
- Start an error log (the diskette that you use has to be a system-formatted diskette) and run the tests multiple times.

+---+

|018|

+---+

Follow the action described on the screen. If that does not correct the problem go to "Symptom-to-FRU Index" in topic 9.0.

2.0 Undetermined Problem

If the power-on indicator is not on or the display assembly fan is not running, carefully check the power cord for damage and correct installation. (If the power-on indicator is not on but the system otherwise functions correctly, the LED in the display assembly is defective.) Make sure that the voltage selector switch is set correctly and that the power cord is connected to a functioning, properly grounded electrical outlet, then do the following:

1. Power-off the system.
2. Remove or disconnect the following, one at a time:
 - a. Non-IBM device
 - b. External devices (modem, printer, or mouse)
 - c. Math coprocessor
 - d. Any adapter
 - e. Bus adapter
 - f. Memory modules above 512KB
 - g. Fixed-disk or diskette-drive cable
3. Power-on the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed and the problem continues, check the power supply output voltages (see "Power Supply Output Voltages" in topic 2.1). If the output voltages are correct, replace the system board. If the output voltages are not correct, replace the display assembly.

Subtopics

2.1 Power Supply Output Voltages

2.1 Power Supply Output Voltages

PICTURE 2

Vdc Minimum	Vdc Maximum	-Lead Pin	+Lead Pin
+ 4.8	+ 5.2	P7-5	P7-1
+ 4.8	+ 5.2	P7-5	P7-10
+ 4.5	+ 5.4	P7-9	P7-5
+11.5	+12.6	P7-5	P7-3
+10.8	+12.9	P7-4	P7-8

3.0 Display

If the screen is rolling, replace the display assembly. If that does not correct the problem, replace the system board.

If the screen is not rolling, do the following to run the display self-test:

1. Power-off the system.
2. Unplug the internal display signal cable (J04).
3. Power-on the system.
4. Turn the brightness and contrast controls clockwise to their maximum setting.
5. Check for the following conditions:
 - The screen should be white or light gray with a black margin on both sides.
 - The contrast and brightness controls should vary the screen intensity.
 - The power supply output voltages should be within tolerance (see "Power Supply Output Voltages" in topic 2.1).

If any one of these conditions is not present, replace the display assembly.

If all conditions are present, replace the system board. If that does not correct the problem, replace the display assembly.

4.0 Installed Devices List

If a device or adapter is not on the installed devices list, replace the device, adapter or cable. For multiple devices, run the diagnostic test to isolate the failing device.

If the error remains, go to "Undetermined Problem" in topic 2.0.

5.0 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 diagnostic tests to determine which of the following FRUs is failing:

- System board
- Parallel adapter
- Printer cable.

6.0 Audio Card Isolation

```
+----+
|001|
+----+
- Power-off the system.
IS THE AUDIO CARD JACK ASSEMBLY CONNECTED TO THE SYSTEM BOARD?
Yes No
|      |
|      | +----+
|      | |002|
|      | +----+
|      | Connect the audio card jack assembly to the system board, then go to
|      | "General Checkout" in topic 1.0 to verify correct operation.
|      |
+----+
|003|
+----+
- Ensure that the external listening device is disconnected from the audio
  jack.
- Power-on the system.
DID YOU RECEIVE ANY AUDIO RESPONSE?
Yes No
|      |
|      | +----+
|      | |004|
|      | +----+
|      | - Replace the audio card jack assembly.
|      | - If the problem remains, replace the system board.
|      |
+----+
|005|
+----+
IS A KNOWN-GOOD EXTERNAL LISTENING DEVICE AVAILABLE?
Yes No
|      |
|      | +----+
|      | |006|
|      | +----+
|      | - Replace the audio card jack assembly.
|      | - Suspect the external listening device.
|      |
+----+
|007|
+----+
- Power-off the system.
- Connect the known-good external listening device to the audio jack.
- Power-on the system.
DID YOU RECEIVE ANY AUDIO RESPONSE?
Yes No
|      |
|      | +----+
|      | |008|
|      | +----+
|      | - Replace the audio card jack assembly.
|      | - If the symptom remains, replace the system board.
|      |
+----+
|009|
+----+
- Your system is functioning correctly.
- Suspect the original external listening device.
-----
```

7.0 Keyboard

+----+
|001|
+----+

- Power-off the system.
- Disconnect the keyboard cable from the keyboard.
- Power-on the system and check the keyboard cable connector for the voltages shown. All voltages are $\pm 5\%$.

PICTURE 3

ARE THE VOLTAGES CORRECT?

Yes No

| |
| |
| +----+
| |002|
| +----+
| Possible failing FRUs are:
| 1. Keyboard cable
| 2. System board.

+----+
|003|
+----+

Replace the keyboard.

8.0 Memory Isolation

+----+
|001|
+----+

- Power-off the system and wait 5 seconds.
- Insert the Advanced Diagnostics diskette into drive A.
- Power-on the system.
- Make a note of any POST errors you receive.
- Disregard 164-Memory Size Errors. Press the **F1** key (if necessary) and continue with these steps.

DID YOU RECEIVE A XXXXXX XXXX 201 POST ERROR?

Yes No

| |

+----+

|002|

+----+

- Run the memory tests. Use the RUN TESTS ONE TIME option.

DID THE MEMORY TESTS COMPLETE WITHOUT AN ERROR?

Yes No

| |

+----+

|003|

+----+

Follow the instructions on the screen.

+----+

|004|

+----+

Your system memory is now functioning correctly. If you suspect an intermittent problem, start an error log (the diskette that you use has to be a system formatted diskette).

+----+
|005|
+----+

- Replace pack A with a known good pack of the same size that is installed in the system (256KB and 1MB packs are not interchangeable).
- If the problem remains, swap the pack removed from A with pack B.
- If the problem remains, swap the pack removed from B with pack C.
- If the problem remains, swap the pack removed from C with pack D.
- If all memory packs have been swapped and the problem remains, replace the system board.

9.0 Symptom-to-FRU Index

The Symptom-to-FRU Index lists symptoms and errors and the possible causes. The most likely cause is listed first. Use this index to help you decide which FRUs you should have available when servicing a system.

Notes:

1. If you are using the Advanced Diagnostics diskette to determine what is actually failing, always begin with "General Checkout" on page 1.0.
2. Check the power supply voltages before you replace the system board.

If the system displays an error message and gives an incorrect audio response, the most likely causes are those listed for the error message. An X in an error message can be any number.

Symptom/Error	FRU/Action
No beep during POST but system is otherwise functioning properly	Go to "Audio Card Isolation" in topic 6.0 System Board Audio Card Jack Assembly
No beep during POST and the system is not functioning properly	Go to "Undetermined Problem" in topic 2.0 System Board Display Assembly
Repeating short beeps	Display Assembly System Board Keyboard (stuck key)
One long and one short beep during POST	System Board Display Assembly
One long and two short beeps during POST	System Board Display Assembly
Continuous beep	Display Assembly System Board
More than one beep during POST (except conditions listed above)	System Board Any Adapter
Blank or unreadable display and 1 short beep during POST	Go to "Display" in topic 3.0 System Board Display Assembly
Cursor only and one short beep during POST	Go to "Undetermined Problem" in topic 2.0 System Board Display Assembly Memory Pack
Other display problems (jittering, rolling, shifting, out-of-focus, or incorrect colors)	Go to "Display" in topic 3.0 System Board Display Assembly
Insert-a-Diskette Icon	Diskette Drive System Board Diskette Cable Network Adapter
Bad-Diskette Icon	Diskette Diskette Drive System Board Diskette Cable
System loads BASIC or loads from fixed disk	Diskette Drive System Board Diskette Cable Network Adapter
Incorrect memory size during POST	See "Memory Isolation" in topic 8.0 System Board
Printer problems	See "Printer" in topic 5.0
Serial- or parallel-port	Device Self-Test OK?

device failure	Device Cable System Board Alternate Adapter Bus Adapter
One or more keys do not work	Keyboard System Board Keyboard Cable
Real-Time Clock inaccurate	Clock Module System Board
110	See "Memory Isolation" in topic 8.0 System Board
111	See "Memory Isolation" in topic 8.0 Adapter Memory Bus Adapter System Board
XXXX ROM Error	Any Adapter
161	Run Setup Clock Module System Board
162	Run Setup If that does not fix the problem, go to "Undetermined Problem" in topic 2.0
163	Time and Date Set? Clock Module System Board
164	Run Setup See "Memory Isolation" in topic 8.0 System Board
199	See "Installed Devices List" in topic 4.0
1XX	System Board
201 or XXXXXX XXXX 201	See "Memory Isolation" in topic 8.0 System Board
301 (for XX 301, see below)	System Board Keyboard Keyboard Cable
3XX or XX 301	Keyboard System Board Keyboard Cable
601 and "Non-system disk or disk error" message with known-good diagnostic diskette	Diskette Drive System Board Diskette Cable
6XX	Diskette Drive System Board Display Assembly Diskette Cable
7XX	Math Coprocessor System Board
9XX	System Board
10XX	Alt. Parallel Adapter Bus Adapter
11XX	System Board
12XX	Alt. Serial Adapter Bus Adapter

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Symptom-to-FRU Index

13XX	Game Control Adapter Bus Adapter
14XX	See "Printer" in topic 5.0
17XX	Fixed Disk Drive System Board Fixed Disk Cable Display Assembly
24XX	System Board Display Assembly
30XX	PC Network Adapter LF Translator Cable Bus Adapter
31XX	Alt. PC Network Adapter LF Translator Cable Bus Adapter
36XX	GPIB Adapter Bus Adapter
38XX	DAC Adapter Bus Adapter
84XX	Speech Adapter Speech Control Assembly Bus Adapter
86XX	Mouse System Board
89XX	Music Card MIDI Adapter Unit Bus Adapter

Supplemental Symptom-to-FRU Index:

PICTURE 4

11.0 How To Use This Parts Catalog

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 dot) □ □ Detail part of a one-dot subassembly
(Two dot) □ □ Subassembly of a one-dot subassembly

Subtopics

11.1 Example of a Parts List

11.1 Example of a Parts List

System Unit

Cover	72X8501
Front Bezel/Logo (R)	72X8502
Miscellaneous Hardware Kit (AR)	72X8580
<input type="checkbox"/> Knob Assembly, Fixed Disk Drive Support Structure	
<input type="checkbox"/> Knob	
<input type="checkbox"/> Washer	

12.0 Parts

System Unit	
Top, Rear, and Sides	00F2110
Front Bezel	00F2111
Blank Drive Bezel	00F2117
Miscellaneous Parts Kit	00F2113
<input type="checkbox"/> Screw (Qty 20)	
<input type="checkbox"/> C Clip, Tilt Assembly	
<input type="checkbox"/> Cover - Top Cover Screw	
<input type="checkbox"/> Cover - Expansion Slot	
<input type="checkbox"/> Retainer - Feature Card	
<input type="checkbox"/> Spring - Rear Tilt Leg	
<input type="checkbox"/> Foot Pad	
Front Foot Assembly	00F2114
Tilt Assembly	00F2105
Retainer - Base to Cover	00F2134
Memory Pack - 256KB	1497256
Memory Pack - 1MB	74X8637
Memory Module Package 1 or 2 - 256KB (Qty 1)	61X8906
System Board	64F0178
80287 Math Coprocessor	72X8528
I/O Panel	64F0219
Audio Card Jack Assembly	64F0184
Bus Adapter	64F0182
Bracket, Bus Adapter	64F0220
Bracket, Center Rib	64F0221
Bracket, Base Rear	64F4100
Clock Module	8509237
Base Frame Assembly	64F0218
Diskette	
Diskette Drive 1.44MB	33F8211
Diskette Drive Bezel	00F2112
Diskette Drive Cable	00F2109
5.25-Inch Diskette Drive:	
360KB External (4869-001)	72X6759
360KB External (4869-501)	72X6768
Adapter	72X6757
5.25-Inch External Diskette Drive Cable	27F4211
Fixed Disk	
Fixed Disk Drive, 20MB	6128285
Fixed Disk Drive, 30MB	6128279
Tray, Fixed Disk Support	64F4101
Fixed Disk Drive Cable	64F0183
Fixed Disk Drive Bezel with Keylock	64F0185

Keyboards (101/102 Key)/Mouse	
Canadian French	1392011
Spanish	1392015
US English	1392090
Keyboard Cable	27F4984
Foot Adjustable (Qty 2)	6447054
Pointing Device (Mouse)	61X8923
Miscellaneous Parts Kit	6447056
<input type="checkbox"/> Screws, Cover (Qty 4)	
<input type="checkbox"/> Screw, Ground	
<input type="checkbox"/> Nut	
<input type="checkbox"/> Lock Washer	
Keyboards (84/85 Key)	
Canadian French	1396046
Spanish	1396047
US English	1393290
Adapters	
Data Acquisition Adapter	6181768
Synchronous Data Link Control (SDLC) Communications Adapter	8286099
Game Control Adapter	8529151
GPIB Adapter	6181770
MIDI Adapter Unit	81X8624
PC Music Adapter	81X8620
PC Network Adapter	8286171
PC Network Adapter Cable	8286172
Serial/Parallel Adapter	8286147
Serial Adapter Cable	8286170
Serial Adapter Connector	8286194
Speech Adapter	61X8921
Communications Adapter Cable	8529274
Printer Cable	8529214
Data Migration Connector Adapter	61X8936
3278/3279 Emulation Adapter	8665792
Display Assembly	
115/230 V, Northern Hemisphere	64F0181
115/230 V, Southern Hemisphere	64F0186
Power Cords	
Warning: Use the power cord certified for your country.	
Power Cord (Columbia, U.S., Venezuela)	62X1045

Parts

Power Cord (Hong Kong, Singapore, U.K.)	8529341
Power Cord (France, Germany, Spain)	8529281
Power Cord (Italy)	8529282
Power Cord (Australia, New Zealand)	8529284
Tools and Miscellaneous	
Tool (Key Cap Removal)	6110464
Tri-Connector Wrap Plug	72X8546
Shipping Material, System (includes shipping carton and cushions)	00F2115

Supplemental Parts:

Notes:
Notes:

Printed in the United States of America