# 8573 Service Summary

This summary contains a Symptom-to-FRU Index, summaries for FRU isolation, and a partial parts listing for the IBM Personal System/2® Model P70 386 (Type 8573).

It should be used with the *IBM Personal System/2 Hardware Maintenance Service* manual (part number 68X2222, form number S68X-2222), and the *IBM Personal System/2 Hardware Maintenance Reference* manual (part number 68X2221, form number S68X-2221).

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.
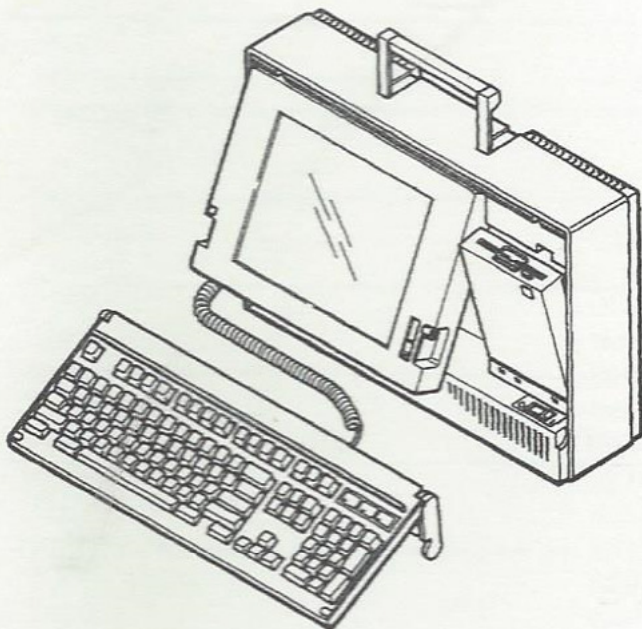
July 1, 1989

General Checkout

001

- Power off the system.
- Check all cables and power cords.
- Insert your Reference Diskette.
- Power on the system and check for the following responses:
  1. Memory test counts to the maximum value of the installed memory.
  2. One or two short beeps.
  3. IBM Logo Screen appears.

Are all three responses correct?

Yes   No

      002

      Go to the "Symptom-to-FRU Index."

003

- Advance to the Main Menu.
- Press Crtl-A and run System Checkout.

Is the installed devices list correct?

Yes   No

      004

      Go to "Installed Devices List Errors."

005

- Run the diagnostic tests.

Did the tests identify a failure?

Yes   No

      006

      You may have an intermittent problem.

- Check for damaged cables and connectors.
- Reseat all adapters, drives, and modules.
- Check the system unit fan for proper operation.
- Start an error log and run the tests multiple times.

007

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

Undetermined Problem

1. Power off the system.
2. Remove or disconnect one of the following adapters or devices.
   a. Non-IBM devices
   b. External modem, printer, mouse, or external display
   c. Math coprocessor
   d. Any adapter.
3. Power on the system.
4. If the symptom remains, repeat steps 1, 2, and 3 until you find the failing adapter or device.
5. If all adapters and devices have been removed and the problem persists, check the power supply voltages. If the voltages are good, replace the system board.

Installed Devices List Errors

- If an adapter or device is missing from the installed devices list and you **cannot add it to the list**, you might have one of the following conditions:
  - Your Reference Diskette does not contain the module of code required to support that device.
  - The missing device is a 5.25-Inch External Diskette Drive Adapter, or another unrecognizable adapter.
  - The missing device is defective.
- If an incorrect number of drives is shown on the list, an error can occur during the diagnostic tests. Restart the system and verify that the drive information on the Set Configuration menu is set correctly before running the diagnostic tests.
- If you are able to correct the list, do so and continue with the diagnostic tests.

External Display Self-Test

1. Power off the system unit and external display.
2. Disconnect the external display signal cable.
3. Power on the external display.
4. Turn the contrast to its maximum position.
5. Turn the brightness control to its detented center position.

The screen should be white with a black margin, 2-20 mm (0.08-0.79 in.), on one or both sides. If the screen is different, replace the external display.

System Unit Fan

A nonfunctioning fan can cause heat to build up resulting in intermittent problems.

If the fan is not running, replace the power supply.

Power Supply Voltages

Power off the system. Remove the power supply connector from the system board. Power on the power supply and check for the voltages listed below. If the voltages are not correct replace the power supply.

Vdc Minimum	Vdc Maximum	Ground (-) Pin	Positive (+) Pin
+4.8	+5.2	6, 7, or 8	3, 4, or 5
+11.5	+12.6	6, 7, or 8	2
-11.5	-12.6	6, 7, or 8	1

Printer Isolation

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.

Memory

Note: Power off the system before removing or replacing parts.

A **110** error code indicates a system board parity check. Remove the memory module kits in connectors 2, 3, and 4 if any. If the problem remains, replace the kit in connector 1; if that does not solve the problem, replace the system board.

If the problem disappears after removing the memory module kits, install the kits, one at a time, until the problem returns. Replace the kit that caused the error to return; if that does not solve the problem, replace the system board.

A **111** error code indicates a memory expansion adapter parity check. Remove the memory expansion adapter from the expansion slot. If the adapter has been removed and you still have a 111 error, replace the system board.

Remove the memory expansion kits from the adapter that was removed last. Install the kits one at a time until the failure returns. Replace the kit that caused the error to return; if that does not solve the problem, replace the adapter.

A **215** or **216** error code indicates a failing system board memory module kit. If the error message does not indicate the location of the failing kit, follow the procedure for a 110 error, described above.

System Unit Fan

A nonfunctioning fan can cause heat to build up resulting in intermittent problems.

If the fan is not running, replace the power supply.

Power Supply Voltages

Power off the system. Remove the power supply connector from the system board. Power on the power supply and check for the voltages listed below. If the voltages are not correct replace the power supply.

Vdc Minimum	Vdc Maximum	Ground (-) Pin	Positive (+) Pin
+4.8	+5.2	6, 7, or 8	3, 4, or 5
+11.5	+12.6	6, 7, or 8	2
-11.5	-12.6	6, 7, or 8	1

Printer Isolation

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.

Memory

Note: Power off the system before removing or replacing parts.

A **110** error code indicates a system board parity check. Remove the memory module kits in connectors 2, 3, and 4 if any. If the problem remains, replace the kit in connector 1; if that does not solve the problem, replace the system board.

If the problem disappears after removing the memory module kits, install the kits, one at a time, until the problem returns. Replace the kit that caused the error to return; if that does not solve the problem, replace the system board.

A **111** error code indicates a memory expansion adapter parity check. Remove the memory expansion adapter from the expansion slot. If the adapter has been removed and you still have a 111 error, replace the system board.

Remove the memory expansion kits from the adapter that was removed last. Install the kits one at a time until the failure returns. Replace the kit that caused the error to return; if that does not solve the problem, replace the adapter.

A **215** or **216** error code indicates a failing system board memory module kit. If the error message does not indicate the location of the failing kit, follow the procedure for a 110 error, described above.

Keyboard Isolation

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 ± 5%.

2 3   4   5
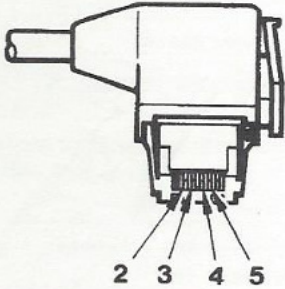
Pin	Voltage (Vdc)
2	+ 5.0
3	Ground
4	+ 5.0
5	+ 5.0

ARE THE VOLTAGES CORRECT?
Yes   No

002

Possible failing FRUs are:
1. Keyboard cable
2. System board.

003

Replace the keyboard.

Symptom-to-FRU Index

The Symptom-to-FRU Index associates error symptoms with the FRUs that can cause the error. The FRUs in bold type are the most likely cause. Use this index to help determine which FRUs to have available when you are servicing a system. To determine exactly which FRU is failing, you must use "MAP 0000: Start (Type 8573)" in the service manual.

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

Symptom	FRU
One or more keys do not work	**Keyboard** Keyboard Cable System Board
No beep	**System Board** Power Supply Speaker Assembly
Continuous beep	**Power Supply** System Board
Repeating short beeps	**Power Supply** System Board Keyboard (Stuck Key)
One long and one short beep	**Plasma Display Adapter** System Board Power Supply
One long and two short beeps	**Plasma Display Adapter** System Board Power Supply
One short beep and a blank or unreadable display with no external display	**System Board** Power Supply Plasma Display Assembly
One short beep and diskette prompt or a program loads from the fixed disk drive	**Diskette Drive** System Board Power Supply Diskette Drive Cable
110 (See "Memory")	**System Board Memory Module Kit** System Board
111 (See "Memory")	**Memory Expansion Kit** Memory Expansion Adapter

Code	FRUs
112, 113	**Any Adapter** System Board
161	**Battery**
162	**Any Device**
163, 164, 165 (See "Installed Devices")	**Set Configuration/Features** System Board
166	**Any Adapter**
1XX (not listed above)	**System Board**

201
(See "Memory")
	System Board Memory
	  Module Kit or
	  Memory Expansion Adapter
	  or **Memory Expansion Kit**
	System Board

20X (slot 0)	**System Board Memory** **Module Kit** System Board
20X (slot 1)	**Adapter Memory** Memory Adapter
211, 215, 216, 225 (See "Memory")	**System Board Memory** System Board
301, 302	**Keyboard** Keyboard Cable
303	**System Board** Keyboard Keyboard Cable
304	**System Board** Keyboard
305	**Keyboard Cable**
401	**System Board**
602	**Defective Diskette**
6XX	**Diskette Drive** System Board Power Supply Diskette Drive Cable
7XX	**Math Coprocessor** System Board
1102, 1106	**System Board** Any Serial Device
1107	**Communications Cable** System Board
1108, 1109	**System Board** Any Serial Device
11XX (not listed above)	**System Board**
1202, 1206	**Dual Async Adapter/A** Any Serial Device
1207	**Communications Cable** Dual Async Adapter/A
1208, 1209	**Dual Async Adapter/A** Any Serial Device
12XX (not listed above)	**Dual Async Adapter/A** System Board
14XX (See "Printer Isolation")	**Printer** System Board
1780, 1781, 1782	**Fixed Disk** Fixed Disk Drive Cable System Board
1790, 1791	**Fixed Disk** Fixed Disk Drive Cable
17XX (not listed above)	**Fixed Disk** Fixed Disk Drive Cable System Board Power Supply
8601, 8602	**Pointing Device**
8603	**System Board**
8604	**System Board** Pointing Device
10002, 10006	**Multiprotocol Adapter/A** Any Serial Device
10007	**Communications Cable** Multiprotocol Adapter/A
10008, 10009	**Multiprotocol Adapter/A** Any Serial Device
100XX (not listed above)	**Multiprotocol Adapter/A** System Board
10102, 10106, 10108, 10109	**Modem Adapter/A** Any Serial Device
101XX (not listed above)	**Modem Adapter/A** System Board
10480, 10481, 10482, 10483	**Fixed Disk** System Board Fixed Disk Drive Cable

10490, 10491	**Fixed Disk** Fixed Disk Drive Cable
104XX (not listed above)	**Fixed Disk** System Board Fixed Disk Drive Cable Power Supply
121XX	**300/1200/2400 Modem Adapter/A**
14901	**Plasma Display Adapter** System Board Plasma Display
14902	**Plasma Display Adapter** System Board Plasma Display
14922	**Plasma Display** Plasma Display Adapter System Board
14932	**External Display** Plasma Display Adapter
16500	**6157 Tape Attachment Adapter**
16520	**6157 Streaming Tape Drive**
16540	**6157 Streaming Tape Drive** 6157 Tape Attachment Adapter

Parts

System Unit

Battery	72X8498
Speaker Assembly	65X1319
System Board (20 MHz)	65X1564
2MB Memory Module Kit	90X8625
1MB Memory Module Kit	90X8624
80387 Coprocessor, 20 MHz	90X7393

Before changing any parts in the list below, follow the instructions.

List:

Plasma Display Assembly	38F4737
Plasma Display Adapter	38F4686
Power Supply	38F4734
Cable, Plasma Display Power	38F5939

Instructions:

Step 1: Check the serial number of the system unit. The serial number is shown under the left corner of the plasma display panel.

**Is the serial number
between 230000001 and 230003000 or
between 231000001 and 231003000 ?**

Yes: Go to step 2.
No: Replace the failing part.

Step 2: Check the FRU number of the plasma display assembly. The FRU number is shown on the back of the plasma display panel.
or
Check the color of the power supply cable wired from the power supply assembly to the plasma display assembly.

**Is the FRU number of the plasma display assembly
38F4737 ? or,
Is the color of the power supply cable GRAY ?**

Yes: Replace the failing part.
No: Replace all parts in the list at the same time.

For additional information refer to IBM Service Bulletin.

Fixed Disk and Diskette Drive

1.44MB Diskette Drive	38F5936
5.25-Inch External Diskette Drive, 110/120	72X6759
5.25-Inch External Diskette Drive, 220/240	72X6768
60MB Fixed Disk	90X8627
(includes ESDI fixed disk controller)	
120MB Fixed Disk	90X9286
(includes ESDI fixed disk controller)	

Adapters

Dual Async Adapter/A	34F0008
Multiprotocol Adapter/A	90X8995
300/1200/2400 Modem Adapter/A	65X1253
6157 Tape Adapter	92X1459
2-8MB 80386 Memory Expansion Option	90X9566
1MB Memory Module Kit (for 90X9566)	90X8624
2MB Memory Module Kit	90X8625
(for 90X9566 and system board)	

Cables

For 300/1200/2400 Modem Adapter/A	94X1540
For External Storage Device	23F3230

Keyboards / Mouse

Belgian	65X1598
Danish	65X1601
French	65X1603
German	65X1604
Italian	65X1605
Norwegian	65X1607
Portuguese	65X1608
Arabic	65X1616
Greece	65X1614
Hebrew	65X1615
Netherlandish	65X1602
Turkish	65X1613
Spanish	65X1609
Spanish / Latin	65X1606
Swedish	65X1610
Swiss German / French	65X1611
U.K. English	65X1612
U.S. English	65X1537
Cable	65X1576
Mouse	61X8923

8503 Monochrome Display

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

8512 Color Display

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

8513 Color Display

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

8514 Color Display

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

Supplemental Part Numbers:

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