FRONT

PICTURE 1

July 1992

This pamphlet contains a Symptom-to-FRU Index, a parts listing, and procedures for isolating problems to a FRU for the IBM Personal System/2 Models 90 and 95 XP 486.

Part Number 10G6474

Form Number S10G-6474-00

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 (July 1992)

FRONT_2 Notices

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1.0 General Checkout

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

Before You Use This Pamphlet: The Model 90 and the Model 95 systems are complex. The *Hardware Maintenance Service* is written based on the assumption that you have first familiarized yourself with the background information in the model-specific *Hardware Maintenance Reference* pamphlet.

Running Automatic Configuration

Warning: Running Automatic Configuration may alter customized configuration settings. Note the current settings using **View configuration**. If the configuration was customized, restore it to the customized settings after service is complete.

Memory-Address Conflicts: For information on this subject, see "Resolving Memory-Address Conflicts" in the *Hardware Maintenance Reference* pamphlet.

Diagnosing Combined FRUs: If an adapter or device consists of more than one FRU, an error code may be caused by any of the FRUs. Before you replace the adapter or device, remove the FRUs, one by one, to see if the symptoms change.

If you are instructed to replace to replace either the processor board or the system board, and the first board that you replace does not correct the problem, then replace the other board (processor or system) and reinstall the original board.

Using Error Codes: Use the first error code presented on the screen to diagnose the failure. If multiple error codes are presented, diagnose them in the order that they are presented (the multiple errors might be false errors).

If there is not an error code on the screen, see if the error symptom is listed in the Symptom-to-FRU Index. On the Model 95, if there is not an error code displayed on the screen, check to see if there is one displayed on the information panel.

Check Point (CP) Codes (Model 95): Codes beginning with "CP" displayed on the information panel indicate system status during POST. The CP codes vary with the level of microcode installed and the type of processor board installed. CP codes are *not* error codes and they *do not* indicate hardware failures. If the system detects an error, the CP code will change to a POST error code.

If there is a CP code on the information panel, the display is blank, and the system appears to have a hang condition, the display might be defective. The system might be waiting for information to be entered (for example a password).

Erasing the Power-On Password

1. Power-off the system.
2. Move the override jumper J10 (Model 90) or J16 (Model 95), to connect the center pin and the pin on the opposite end of the connector.
3. Power-on the system to erase the password. Leave the jumper in the new position until the next time you need to erase the password.

System Diskettes and Diagnostic Tests: Run the diagnostic tests from the System Partition on the hard disk drive. If the hard disk drive is not operational, run the tests from the System Diskettes (Reference and diagnostic). There are three types of Reference Diskettes and three types of Diagnostic Diskettes. The diskettes are labeled for the type of processor board (type 1, 2 or 3) that they support. (Before using the System Diskettes, determine which type of processor board is installed in the system you are servicing.) See "Processor Board Matrix" in topic 3.1 for more information.

+---+
¦**001**¦
+---+
- Power-off the system and all external devices.
- Verify the power-on password is inactive.

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

Notes:

1. If you get a POST error code, press the pause key (while the error code is on the screen). Write down any error codes that are displayed, then press F1 to continue.

2. If the system hangs with a POST error presented, or if the system starts up in BASIC, go to "Symptom-to-FRU Index" in topic 5.0.

- Check for the following responses:

1. One or two short beeps.

2. Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSES?

Yes — Go to "Symptom-to-FRU Index" in topic 5.0.

No — **002**

003

ARE ANY EXTERNAL SCSI DEVICES ATTACHED TO THE SYSTEM?

Yes — Go to Step 007.

No — **004**

005

DID THE POWER-ON LIGHT ON ALL OF THE EXTERNAL DEVICES COME ON?

Yes — Go to the external devices service pamphlet.

No — **006**

007

DID YOU RECEIVE A POST ERROR CODE?

Yes — **Note:** If the system you are servicing has a 50-MHz type 3 processor board installed (submodel code 28 or 29), go to "System Error Log" in topic 4.7.

Go to Step 016.

No — **008**

009

IS THE FIRST POST ERROR CODE WITHIN THE RANGE OF 0208XXXX 190I TO 0247XXXX 190I?

IMPORTANT: If your error code is not in the range or if it is not followed by a 190I, answer *No*.

Yes — Go to Step 016.

No — **010**

011

- Restart the system and verify that the "Enable" and "Disable" settings are correct. (For more information, go to "SCSI Device Default Settings" in topic 4.4.) If you receive a warning on the screen regarding the "Keep" and "Remove" settings, follow the instructions on the screen before continuing.

DID YOU HAVE TO CORRECT ANY OF THE ENABLE AND DISABLE SETTINGS?

Yes → Go to "Symptom-to-FRU Index" in topic 5.0. Before you replace any SCSI devices, verify there are no duplicate SCSI ID settings.

No → **012**

013

- Restart the system.

DID THE POST ERROR REMAIN?

Yes → Continue with Step 016.

No → **014**

015

Go to "Symptom-to-FRU Index" in topic 5.0.

016

- Press **Ctrl+Alt+Del**. When the cursor moves to the upper right, press **Ctrl+Alt+Ins** and check for the following responses:

  1. One or two short beeps.

  2. Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSES?

Yes → Go to "Symptom-to-FRU Index" in topic 5.0.

  Note: If you cannot access the hard disk drive, try loading diagnostics from the System Diskettes. This might take up to 10 minutes.

No → **017**

018

- If you are not at the Main Menu, follow the instructions on the screen to advance to the Main Menu, then press **Ctrl+A** and run system checkout.
- If the test stops and you cannot continue, go to "Undetermined Problem" in topic 4.8.

  Notes:

  1. If the system has incorrect keyboard responses, go to "Keyboard Errors" in topic 4.3.
  2. If the printer has incorrect responses, go to "Printer Errors" in topic 4.2.
  3. If the information panel has missing or distorted digits, go to "Symptom-to-FRU Index" in topic 5.0.
  4. If the display has problems such as jittering, rolling, shifting, changing colors, or being out-of-focus, go to "Display Self-Test" in topic 4.1.
  5. If a minimum of 896KB of memory is not active, the diagnostic tests cannot be loaded.

IS THE LIST OF INSTALLED DEVICES CORRECT?

Note: Video Memory, 487SX (option), and 256KB processor board cache will not be listed.

Yes No

019

Go to "Installed Devices List" in topic 2.0.

020

- Run the advanced diagnostic tests.

DID THE TESTS IDENTIFY A FAILURE?

Note: If the test stops and the system hangs, replace the last device being tested.

Yes No

021

Note: If you noticed an error symptom or if you received any POST error codes when the system was powered-on, go to "Symptom-to-FRU Index" in topic 5.0.

You may have an intermittent problem:

- Check for damaged cables or connectors.
- Reseat all adapters, drives, and modules.
- Check the system fans.
- If you did not find a problem, go to "Undetermined Problem" in topic 4.8.

022

Follow the action described on the screen. If that does not correct the problem, go to "Symptom-to-FRU Index" in topic 5.0.

Note: Defective memory might be disabled. If you replace memory, run the memory diagnostic test to enable the replacement memory.

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2.0 Installed Devices List

At the start of the diagnostic tests, the Devices List is displayed. Normally, all adapters and devices installed in the system appear on the list.

- If an adapter or device that appears on the list *is not* installed in the system, use the procedure in "Undetermined Problem" in topic 4.8 to find the problem.
- If an adapter or device that *is* installed in the system does not appear on the list, you have one of the following conditions:
  - The DGS files for the missing device are not loaded onto the System Partition (run **Copy an option diskette** using the option diskette).
  - An unrecognizable adapter is installed.
  - The missing device is defective or it requires an additional diskette or service manual.
  - A defective adapter is causing the device to disappear from the list.

If you are sure that the DGS files are loaded and all the options are supported, note which type of device (SCSI or non-SCSI) is missing from the Devices List, then continue.

Subtopics
2.1 If a non-SCSI device is missing from the Devices List
2.2 If a SCSI device is missing from the Devices List
2.3 If both a non-SCSI device and a SCSI device are missing from the Devices List

2.1 If a non-SCSI device is missing from the Devices List

Replace the missing device.

If more than one non-SCSI device is missing, isolate them one at a time until you find the device causing the failure.

Note: If the number of diskette drives shown on the list is incorrect, an error can occur during the tests. If this is the case, restart the system, select **View Configuration** from the Set Configuration menu and verify that the drive information is correct, then continue testing.

2.2 If a SCSI device is missing from the Devices List

The SCSI adapter supporting the missing device might be defective. If more than one SCSI adapter is installed, isolate each *chain* of devices one at a time.

1. Power-off the system and disconnect any internal and external SCSI devices from the SCSI adapter (except default drive 6).

2. Install the terminator onto the SCSI adapter (some SCSI adapters have both an internal and an external terminator).

   Note: For information on terminating SCSI adapters, see "SCSI Adapter Terminators" in the *Hardware Maintenance Reference* pamphlet.

3. Power-on the system and run **Automatic Configuration**. If the SCSI adapter is not on the Devices List in Advanced Diagnostics, it is defective. If the SCSI adapter is on the list, run the adapter diagnostic tests.

4. If the SCSI adapter fails the tests, replace it. If the SCSI adapter passes the tests, a different adapter or device might be defective.

5. Reconnect all the devices to the adapter, then install or remove the terminator on the SCSI adapter as it was before service.

6. Use the procedure in "Undetermined Problem" in topic 4.8 to find the problem.

2.3 If both a non-SCSI device and a SCSI device are missing from the Devices List

Use the procedure in "Undetermined Problem" in topic 4.8 to find the problem.

3.0 Memory

Before continuing with the Memory section, you need to know what *type* of processor board (type 1, 2 or 3) is installed in the system. Use any of the following methods under "Processor Board Matrix" to determine which one is installed (and which System Diskettes are supported). Then, continue with the appropriate memory section (either type 1, 2, or 3).

Subtopics

3.1 Processor Board Matrix

- Go to the Diagnostic Main Menu and select **Display revision levels** (you might have to select **More utilities** first). Note the submodel code displayed on the screen. (The customer can use this screen to tell you the submodel code.)

- Read the FRU number printed near the card-edge of the processor board.

- Look for a second label (marked P1 - P9) to the right of the front serial number of the system. The second label indicates that the processor board has been upgraded.

The following table converts the submodel code, FRU number, or the second label to the processor board type.

Mod 90 Code	**Mod 95 Code**	**Processor Board FRU Number and Description**	**2nd Label**	**Proc Board Type**
		92F0049		
2F	2E	486SX 20	- -	1
11	14	64F0201 486	P1	1
13	16	25	P2	1
2B	2A	64F0198 486	P3	1
2D	2C	33	P4	1
57	58	92F0048 486	P5	2
59(1)	5A(1)	50	P6	2
3F	40	92F0065	P7	2
5B(2)	5C(2)	487SX 20	P8	2
29	28	92F0079	P9	3
		486SX 25		
		92F0079		
		486SX 25(1)		
		92F0161		
		486DX2 25/50		
		92F0079 486		
		25/50(2)		
		57F1597 486		
		50		

(1) Also has a 487SX processor (FRU 92F0100).

(2) Also has a 486 overdrive processor (ODP) (FRU 92F0147).

3.2 Memory (Type 1 Processor Boards)

Notes:

1. Only interleaved memory configurations are supported. The system memory-module kits operate in pairs. Each pair must be the same memory size, speed, and type.

2. On the Model 90, the pairs are J1 & J3, J2 & J4, on each riser card.

3. On the Model 95, the pairs are A1 & B1, A2 & B2, A3 & B3, A4 & B4, on the system board.

4. Only *parity* (70ns, 80ns and 85ns) kits are supported. Minimum operating requirement is one *pair* of 1MB kits. Total system memory capacity is 64MB.

5. Running customer diagnostic tests will deallocate defective memory. After you replace defective memory, run the memory diagnostic test to enable the replacement memory. Then, restart the system and rerun the same test to validate the installed memory-module kits.

Run the advanced-memory diagnostic test. If the test does not indicate which memory-module kit failed, or if the system hangs, try running the test from the System Diskettes. If you still cannot identify which memory-module kit failed, continue with the following procedure.

Note: If a screen message appears asking if you have replaced a specific memory module kit, suspect that *it* is the failing kit.

3.3 Finding the Failing Memory

Using a known-good kit, exchange each kit, one at a time (within each matched pair), and repeat the memory diagnostic test until you find the defective kit. Replace *only* the defective kit. If the kits are not the problem, suspect the riser card (model 90), then the processor board.

3.4 Memory (Type 2 Processor Boards)

Notes:

1. Interleaved and noninterleaved memory configurations are supported. If the kits are installed in pairs of the same memory size, speed, and type, the kits will run in interleaved mode. Any other configuration is supported, but will run in noninterleaved mode.

2. On the Model 90, the pairs are J1 & J3, J2 & J4, on each riser card.

3. On the Model 95, the pairs are A1 & B1, A2 & B2, A3 & B3, A4 & B4, on the system board.

4. Only *parity* (70ns and 80ns) kits are supported. Minimum operating requirement is one 2MB kit. Total system memory capacity is 64MB.

5. Running customer diagnostic tests will deallocate defective memory. After you replace defective memory, run the memory diagnostic test to enable the replacement memory. Then, restart the system and rerun the same test to validate the installed memory-module kits.

Run the advanced-memory diagnostic test. If the test does not indicate which memory-module kit failed, or if the system hangs, try running the test from the System Diskettes. If you still cannot identify which memory-module kit failed, continue with the following procedure.

Note: If a screen message appears asking if you have replaced a specific memory module kit, suspect that *it* is the failing kit.

3.5 Finding the Failing Memory

Using a known-good kit, exchange each kit, one at a time (within each matched pair), and repeat the memory diagnostic test until you find the defective kit. Replace *only* the defective kits. If the kits are not the problem, suspect the riser card (model 90), then the processor board.

Note: If the kits are installed in a noninterleaved configuration, you can remove and replace them in *any* order.

3.6 Memory (Type 3 Processor Boards)

Notes:

1. Only interleaved memory configurations are supported. The system memory-module kits operate in pairs. Each pair must be the same memory size, speed, and type.

2. On the Model 90, the pairs are J1 & J3, J2 & J4, on each riser card.

3. On the Model 95, the pairs are A1 & B1, A2 & B2, A3 & B3, A4 & B4, on the system board.

4. Parity (70ns, 80ns, and 85ns) or Error Correction Capability (ECC) (70ns) kits are supported (but not a combination of both). Minimum operating requirement is one *pair* of 4MB *ECC* kits or one *pair* of 1MB *parity* kits. Total system memory capacity is 64MB.

5. Running *either* customer or advanced diagnostics will deallocate defective memory. After you replace defective memory, run the memory diagnostic test to enable the replacement memory. Then, restart the system and rerun the same test to validate the installed memory-module kits.

Run the advanced-memory diagnostic test. If the test does not indicate which memory-module kit failed, or if the system hangs, try running the test from the System Diskettes. If you still cannot identify which memory-module kit failed, continue with the following procedure.

Note: If a screen message appears asking if you have replaced a specific memory module kit, suspect that *it* is the failing kit.

3.7 Finding the Failing Memory

Using a known-good kit, exchange each kit, one at a time (within each matched pair), and repeat the memory diagnostic test until you find the defective kit. Replace *only* the defective kits. If the kits are not the problem, suspect the riser card (model 90), then the processor board.

4.0 Related Service Procedures

You are here because you were sent here from another area of this pamphlet, or you want information on the following:

- Display Self-Test
- Printer Errors
- Keyboard Errors
- SCSI Device Default Settings
- Power Supply Voltages
- System Error Log
- Undetermined Problems.

Subtopics

4.1 Display Self-Test

Note: For additional information about displays, see "Miscellaneous System-Related Information" in the *Hardware Maintenance Reference* pamphlet.

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

The screen should be white with a black margin, as described below (shading may occur near the edges).

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

If the screen does not meet the test specifications, replace the display. If it meets the test specifications, replace the display adapter.

Note: Certain adapter failures can cause video problems. Before replacing FRUs, remove any option adapters to see if the problem disappears.

4.2 Printer Errors

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 FRU failed.

If the advanced diagnostic tests do not detect a failure, replace the printer cable. If the problem remains, replace the system board.

4.3 Keyboard Errors

1. Power-off the system.

2. Disconnect the cable from the keyboard.

3. Power-on the system and check the connector for the voltages shown. All voltages are ± 5%.

   PICTURE 2

   If the voltages are correct, replace the keyboard.

   If the voltages are not correct, suspect the keyboard cable, then the system board.

4.4 SCSI Device Default Settings

You are here with a 000174XX error or you want to check the settings (defective devices can also cause incorrect settings).

The optional settings are intended to let the user share devices (usually external) between systems without having to reconfigure the system each time the device is moved. The settings apply to SCSI Presence Error Reporting devices (such as SCSI tape drives and CD-ROM drives, and on some systems, hard disk drives). After a device is in the configuration table, the default settings are "Enable" and "Keep." The only way to remove the device from the configuration table is to manually remove it by changing the settings. Running automatic configuration will not remove it from the configuration.

Enable and Disable Settings: If the user plans to leave the device turned off, or share the device periodically between different systems, that device should be set to "Disabled" (on the systems that will share the device). When disabled, the drive will remain in the configuration but POST will not report a configuration error when the device is removed. For example, before the user *temporarily* removes a SCSI tape drive, the setting should be changed to "Disabled." When the device is reinstalled and the user no longer chooses to share the device, the setting should be changed back to "Enabled."

Keep and Remove Settings: The only time that you will see the "Keep" and "Remove" options is when the device physically is disconnected from the system. At that time, you have the option of removing the device from the configuration table by changing the setting to "Remove."

Changing the Settings: To change the settings, do the following:

- Select **Set and View SCSI device configuration** from the Set configuration menu.
- Select the appropriate device on the list.
- Press F6 to change the settings.
- Press F10 to save the changes (in configuration).

4.5 Power Supply Voltages (Model 95)

Disconnect the system board, diskette drives, and hard disk drives power supply connectors. While shorting pins 1 and 2 together, read the voltages on the other pins. If the voltages are incorrect, replace the power supply.

-Lead Pin	**+Lead Pin**	**V dc Minimum**	**V dc Maximum**
5	3	+3.7	+ 6.2
5	4	+9.0	+15.0
5	7	- 9.0	- 15.0
B	D	+3.7	+ 6.2
B	A	+9.0	+15.0

PICTURE 3

There are two systems fans: one in the power supply and one on the access cover. If the power supply fan does not work, replace the power supply. If you suspect that the access cover fan does not work, do the following:

1. Check for 12 V dc (±1.4 V dc) at the two fan cable pins on the base.

   If the voltage is *not* correct, go to step 2. If the voltage is correct, check for 1300 ohms (±10%) resistance between the fan terminals. If the resistance is incorrect, replace the fan. If the resistance is correct, check the spring clip connections. If the connections are good, there is not a fan problem.
2. Unplug the fan cable from J28 on the system board and check the cable for continuity.

   If the cable has continuity, replace the system board. If the cable does not have continuity, replace it.

4.6 Power Supply Voltages (Model 90)

Check the voltages with connectors P1 and P2 plugged into the system board.

Connector P2:

-Lead Pin	**+Lead Pin**	**V dc Minimum**	**V dc Maximum**
2	1	-11.5	-12.6

Connectors P1, P3, P4:

-Lead Pin	**+Lead Pin**	**V dc Minimum**	**V dc Maximum**
1	2-7	+ 4.8	+ 5.25
1	8,9	+11.5	+12.6
B	D	+ 4.8	+ 5.25
B	A	+11.5	+12.6

PICTURE 4

There are two systems fans: one in the power supply and one on the base. If the power supply fan does not work, replace the power supply. If the base fan does not work, replace the fan.

4.7 System Error Log

If the system you are servicing has a 50-MHz processor board installed (type 3) (submodel code 28 or 29), the system maintains an error log.

Notes:

1. If you are not familiar with the error log, refer to the detailed information under "System Error Log" in the *Hardware Maintenance Reference* pamphlet.

2. After service, clear any noninformational errors from the error log.

Viewing the Error Log: Go to the Main Menu, select **More utilities**, then select **Display system error log**. Follow the instructions on the screen. Read the error log to see if any errors are stored. Use that information to help determine what is causing the failure.

If you cannot find the problem using the error log, run diagnostics, if you have not already done so.

4.8 Undetermined Problem

You are here because the diagnostic tests did not identify which adapter or device failed, the Devices List is incorrect or the system is inoperative. Follow the isolation procedure below (do not isolate FRUs that are known to be good).

If the power-on light is not on, verify (with power off) that the voltage-select switch is in the correct position (Model 95). Then check the power supply voltages. If the voltages are not correct, replace the power supply. If the voltages and switch setting are correct, do the following:

1. Power-off the system.

2. Remove or disconnect the following (one at a time) until you find the failure (power-on the system and reconfigure each time).

   Note: Minimum operating requirements are one *pair* of 1MB parity kits (Types 1 and 3 processor board), one 2MB parity kit (Type 2 processor board), the processor board, and the default drive.

   - Any external devices
   - Surge suppressor device (on the system)
   - Modem, printer, mouse, or non-IBM devices
   - Any adapter (not the Processor Board)
   - 256KB Processor Board Cache Option
   - Drives
   - Memory-Module Kits
   - Memory-Riser Card (Model 90).

3. Power-on the system. If the problem remains, suspect the processor board, system board, then the power supply, in that order.

5.0 Symptom-to-FRU Index

This index lists error symptoms, error codes, and the possible causes. The most-likely cause is listed first. To diagnose failures, always start with "General Checkout" on page 1; however, you can use this index as a guide to decide which FRUs to bring with you on a service call.

IMPORTANT: Familiarize yourself with *all* of the following information *before* you use the index.

Subtopics

5.1 POST and Diagnostics

These tests usually identify the failing device, but because of the many dependencies, you can be misled by an error code. It is important to understand that all devices in a SCSI chain depend on an open line of communication on the SCSI data bus. Certain conditions can cause misleading error codes to be presented. For example, a short circuit in the bus arbitration logic, on the processor board, can cause an inability to read from the SCSI adapter. In that case, the error code presented would indicate the SCSI adapter failed when the failure was really on the processor board. If the index does not lead you to the cause of the problem, you might have to remove devices, one at a time, to locate the problem. That procedure is in "Undetermined Problem" in topic 4.8.

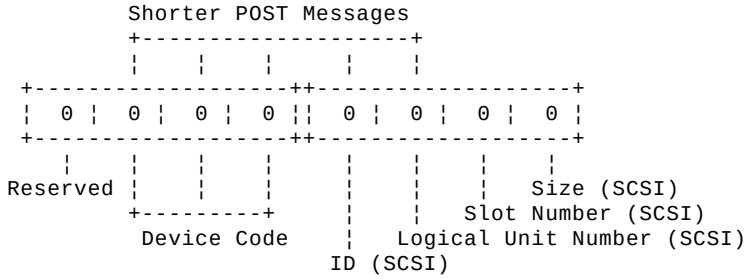
Processor Boards with LEDs: The 50-MHz type 3 processor board (submodel code 28 or 29), has two LEDS (one in position CR1 and one in CR2). During POST, CR1 should come on momentarily and CR2 should stay off. If the LEDS work any other way, suspect that the processor board is defective. Use the LEDs to help differentiate between a processor board or a system board failure.

Processor Boards without LEDs: If the processor board does not have LEDs and you are instructed to replace either the processor board or the system board, and the first board that you replaced does not correct the problem, then replace the other board and reinstall the original (first) board.

VPD Codes: Each type 3 processor board has a unique vital product data (VPD) code stored in the nonvolital memory on the system board. After you replace a type 3 processor board, run "Automatic configuration" to store the *new* processor board VPD code in nonvolital memory. If you do not run "Automatic configuration," POST displays a 01299000 error.

Reading Error Messages: Error messages are displayed on the screen as three, four, five, or eight digits. An "X" in an error message can be any number. The shorter POST errors are highlighted in this index. Some digits will represent different information for SCSI errors versus non-SCSI errors.

The following figure shows which digits display the shorter POST errors. The figure also defines additional SCSI information.



Using the SCSI ID to Help Isolate Failures: Each device on a SCSI chain has a unique SCSI ID. Use the SCSI ID to help pinpoint which device is failing. For example, if diagnostics presents a "U" (size undetermined) as the last digit in the error code, suspect the device that has the SCSI ID indicated in the error code.

Note: Duplicate SCSI ID settings will cause misleading error symptoms or messages.

5.2 Using the Index

You can be sent here (from the MAP) under various conditions. Listed below are instructions for those conditions.

Note: If this index *does not* solve the problem, go to "Undetermined Problem" in topic 4.8.

System Does Not Have a POST Error: If you were sent here *without* a POST error code, go to the appropriate "Symptoms" section.

System Has an I999XXXX POST Error: If the POST error code is in the I999XXXX range, go to "IML and IPL Errors" in topic 5.8.

System Has Any Other POST Error: If the POST error code is any *other* range (not I999XXXX) go to "Numeric Error Codes."

System Starts Up in BASIC: If the system starts up in BASIC, go to "IML and IPL Errors" in topic 5.8.

Error Range is Not Listed: If the error code *range* presented is not listed in this index, it may be generated by a device that requires an additional service package. Refer to that service package.

Warning: Some FRUs are sensitive to Electro-Static Discharge (ESD). See "Handling Electro-Static Discharge Sensitive Devices" in the *Hardware Maintenance Reference* pamphlet for specific ESD instructions.

5.3 No-Beep Symptoms

Symptom / Error	**FRU / Action**
(50 MHz type 3 dual-board) No beep, power-on light lights, fan runs, CR1 LED or CR2 LED stays on.	**Processor Board**
Power supply *appears* to fail at power-on, but if you disconnect optional hard disk drives, the problem goes away (load problem).	**Motor-Start Jumper** Remove the motor-start jumper from one or more option drives. (For more information see "Motor-Start Jumper" in the *Hardware Maintenance Reference* pamphlet.)
No beep, power-on light does not light, and fan does not run. (See "Undetermined Problem" in topic 4.8 before replacing any FRUs.)	**Power Supply** Processor Board System Board Any device or adapter
No beep, fan runs, and a 000**2XX**XX is displayed. (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** Processor Board System Board
No beep, fan runs, and a 000**1XX**XX is displayed.	**Processor Board** System Board
No beep, fan runs, power- on light lights, system stops during POST with a message on the display. (See "Undetermined Problem" in topic 4.8 before replacing any FRUs.)	**System Board** Processor Board
No beep, fan runs, power- on light lights, system stops during POST with no message on the display, or an unreadable display. (See "Undetermined Problem" in topic 4.8 before replacing any FRUs.)	**Processor Board** System Board
No beep, fan runs, power- on light lights, memory may or may not count, and blinking cursor continuously loops.	**Processor Board Cache Option** Processor Board
No beep and system is otherwise functional	**Switch Assembly** (Model 90) **Speaker** (Model 95) Information Panel (Model 95) System Board

5.4 Beep Symptoms

Symptom / Error	**FRU / Action**
Operating system does not work, or the system starts up in BASIC. (See "IML and IPL Errors" in topic 5.8 before replacing any FRUs.)	**Default Hard Disk Drive**
One long and two short beeps (See "Display Self-Test" in topic 4.1 before replacing any FRUs.)	**Display Adapter** (Model 95) Video Memory (Model 90) System Board Processor Board Display
One long and one short beeps (See "Display Self-Test" in topic 4.1 before replacing any FRUs.)	**Display Adapter** (Model 95) Video Memory (Model 90) System Board
One or two short beeps and a blank or unreadable display or a blinking cursor (See "Display Self-Test" in topic 4.1 before replacing any FRUs.)	**Display Adapter** (Model 95) Video Memory (Model 90) System Board Display
Continuous beep (See "Undetermined Problem" in topic 4.8 before replacing any FRUs.)	**System Board**
Repeating short beeps (See "Undetermined Problem" in topic 4.8 before replacing any FRUs.)	**System Board** Keyboard (stuck key)

5.5 SCSI Tape Drive Symptoms

Symptom / Error	**FRU / Action**
The tape is automatically ejected from the drive.	**Tape Cassette** Drive
The tape sticks or breaks in the drive. (Verify that the tapes used meet ANSI standard X3B5.)	**Tape Cassette**

5.6 Miscellaneous Symptoms

Symptom / Error	**FRU / Action**
Read / write errors on a 2.88MB diskette drive. (If the drive was just installed, either the system has down-level IML code loaded or that model does not support a 2.88MB drive.)	Use **View configuration** to determine if the diskette drive is listed as a 2.88MB. If it is not, the latest level Reference Diskette code must be loaded onto the System Partition.
Program loads from the hard disk drive, or a non-system or disk error (with the Reference Diskette in drive A).	**Diskette Drive** System Board
Information-Panel Display fails (Model 95)	**Information-Panel Assembly** System Board Power Supply
Display screen changes colors	**Display** Video Memory (Model 90) Display Adapter (Model 95) System Board
Power-on light does not light and fan runs	**Switch Assembly** (Model 90) **Information-Panel** (Model 95) System Board Power Supply
IML image has been updated and the insert-diskette icon appears on display and a **I99903**XX on the information panel.	Verify an operating system has been loaded onto the default hard disk drive.
Memory count displayed does not match memory installed. (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** Memory Riser-Card (Model 90)
One or more keys do not work and system is otherwise functional	**Keyboard** Keyboard Cable System Board
Intermittent Failures (See "Undetermined Problem" in topic 4.8 before replacing any FRUs.)	**System Fans** Any device or adapter
System will not power-off	**Switch Assembly** (Model 90) **Information-Panel** (Model 95) System Board Power Supply
Hard Disk LED stays on (Model 90)	**Hard Disk Drive** System Board Power Supply
Hard Disk LED is not	**Switch Assembly**

working and system is otherwise functional (Model 90)	System Board

5.7 Numeric Error Codes

Symptom / Error	**FRU / Action**
000**102**XX, 000**104**XX	**System Board** Processor Board
000**103**XX (If a 20-MHz board is installed, and the processor is not a 487SX, verify that the jumper is in positions 2 and 3. 487SX is indicated on the processor.)	**Processor Board** System Board
000**107**XX, 000**110**XX (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** System Board
000**118**XX (Previously detected error. Run advanced diagnostics.)	**System Board Memory** Processor Board
000**119**XX	2.88MB diskette drive is installed but not supported.
000**120**XX	**System Board** Processor Board Cache Processor Board
000**161**01	**Processor Board** System Board
000**161**XX (not listed above)	**Battery** System Board
000**163**01	**Processor Board**
000**163**XX (not listed above) 000**164**XX, 000**165**XX 000**167**XX, 000**169**XX (If setting configuration does not solve the problem, see "Installed Devices List" in topic 2.0 before replacing any FRUs.)	**Set Configuration/Features** System Board
000**166**XX	**Any adapter**
000**170**XX (ASCII console configuration error.)	If the serial port is enabled, verify that the ASCII terminal has been selected.
000**171**XX 000**172**XX	**System Board** Processor Board
000**173**XX Configuration data checksum error.	Settings might be incorrect. See "SCSI Device Default Settings" in topic 4.4.
000**174**XX (If Automatic configuration does not solve the problem, run advanced diagnostics. If you have disconnected a SCSI non-hard disk device, see "SCSI Device Default Settings" in topic 4.4.)	**Set Configuration/Features** System Board
000**179**XX (NVRAM Error log might be full.)	Run advanced diagnostics. If the problem remains, clear the error

	log.
000**194**XX (not listed above) (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** System Board
0001**XX**XX (not listed above)	**Processor Board** System Board
000**201**XX (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** System Board
000**20X**XX (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** Processor Board
000**210**XX, 000**211**XX (See "Memory" in topic 3.0 before replacing memory.)	**Processor Board** System Board Memory System Board
000**214**XX, 000**215**XX, 000**216**XX, 000**217**XX, 000**225**XX, 000**226**XX, 000**235**XX, 000**240**XX, 000**241**XX (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** System Board Processor Board
000**243**00, 000**244**00	**Processor Board**
000**245**XX, 000**246**XX, (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** System Board Processor Board
000**247**00	**Processor Board**
000**252**00	**Processor Board** System Board
000**253**XX, 000**254**XX	**Processor Board Cache** (if removable) Processor Board
000**255**XX (See "Memory" in topic 3.0 before replacing any FRUs.)	**System Board Memory** System Board
000**290**00 (Unsupported memory combination detected. See "Memory" in topic 3.0 for more information.)	Correct the unsupported combination of ECC and parity memory modules. Run Automatic Configuration then rerun advanced diagnostics.
000**291**XX, 000**292**XX, 000**293**XX, 000**294**00, (Checksum value mismatch.)	Run Automatic Configuration and rerun Advanced Diagnostics
000**295**XX, 000**296**XX (Check for an unsupported memory configuration or memory modules. See "Memory" in topic 3.0 for more information.)	**System Board Memory**

000**298**00 (Checksum value mismatch.)	**System Board Memory** Run Automatic Configuration and rerun advanced diagnostics.
000**2XX**XX (not listed above)	**System Board Memory** System Board
000**30X**XX	**Keyboard** Keyboard Cable System Board
000**401**XX	**System Board**
000**601**XX	**Diskette Drive** System Board
000**602**XX	**Defective Diskette**
000**604**XX (Check for an unsupported diskette drive.)	**Diskette Drive**
000**6XX**XX (not listed above)	**Diskette Drive** System Board
0007**XX**XX	**Processor Board** (Math Coprocessor)
001**102**XX, 001**106**XX	**System Board** Any serial device
001**107**XX	**Communications Cable** System Board
001**108**XX, 001**109**XX	**System Board** Any serial device
001**1XX**XX (not listed above)	**System Board**
001**2XX**XX	**Dual Async Adapter/A** Any serial device
001**207**XX	**Communications Cable** Dual Async Adapter/A
001**208**XX, 001**209**XX	**Dual Async Adapter/A** Any serial device
001**2XX**XX (not listed above)	**Dual Async Adapter/A** System Board
001**4XX**XX (See "Printer Errors" in topic 4.2 before replacing any FRUs.)	**Printer** System Board

00**24XX**XX	**System Board** Display Adapter Display
00**4611**XX, 00**4630**XX	**Multiport/2 Interface Board** Multiport/2 Adapter
00**4612**XX, 00**4613**XX, 00**4640**XX, 00**4641**XX	**Memory Module Package** Multiport/2 Adapter
00**4650**XX	**Multiport Interface Cable**
00**46XX**XX	**Multiport/2 Adapter** Multiport/2 Interface Board Memory Module Package
00**75XX**XX (See "Display Self-Test" in topic 4.1 before replacing any FRUs.)	**Display Adapter** (Model 95) System Board Video Memory Display
00**86XX**XX	**System Board** Pointing Device
00**96XX**XX	**SCSI Adapter (with cache)** Processor Board Any SCSI Device System Board
0**10002**XX, 0**10006**XX	**Multiprotocol Adapter/A** Any serial device
0**10007**XX	**Communications cable** Multiprotocol Adapter/A
0**10008**XX, 0**10009**XX	**Multiprotocol Adapter/A** Any serial device
0**10102**XX, 0**10106**XX, 0**10108**XX, 0**10109**XX	**Modem Adapter/A** System Board Any serial device
0**101XX**XX	**Modem Adapter/A** System Board
0**107XX**XX	**5.25 Inch Diskette Drive** 5.25 Inch Diskette Adapter/A
0**100XX**XX (not listed above)	**Multiprotocol Adapter/A** System Board
0**112XX**XX	**SCSI Adapter (Without Cache)**

	Any SCSI Device System Board
0**1291X**XX, 0**12940**XX, 0**12950**XX	**Processor Board**
0**12917**XX (If a 20-MHz board is installed, and the processor is a 487SX, verify that the jumper is in positions 1 and 2.) (487SX is indicated on the processor.)	**Processor Board**
0**12944**XX (A hardware default interrupt has occurred.)	Restart the system and run advanced diagnostics
0**1290X**XX (not listed above)	**Processor Board Cache Option** Processor Board System Board
0**129X3**00 (Busmaster arbitration error. If more than one is installed, remove them one at a time to isolate the failure.)	**Busmaster Adapter** Processor Board
0**141XX**XX	**Realtime Interface Coprocessor Adapter/A**
0**147XX**XX, 0**148XX**XX	**Video-Memory Module** System Board
0**152XX**XX	**XGA(*) Display Adapter/A** Video-Memory Module System Board
0**164XX**XX	**120MB Internal Tape Drive** Diskette Cable System Board
0**165XX**XX	**6157 Streaming-Tape Drive** 6157 Tape-Attachment Adapter
0**166XX**XX, 0**167XX**XX (For diagnostic information refer to the Token-Ring Network Adapter/A service Information.)	**Token-Ring Network Adapter/A** System Board
0**185XX**XX	**DBCS Japanese Display Adapter/A** System Board
0**200XX**XX	**Image Adapter/A** Video-Memory Module System Board
0**208XX**XX (Verify there are no duplicate SCSI ID settings or invalid Enable and Disable settings.)	**Any SCSI Device**

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Symptom / Error	**FRU / Action**
0**210XX**XA 0**210XX**XB 0**210XX**XC 0**210XX**XD 0**210XX**XE 0**210XX**XF 0**210XX**XH 0**210XX**XU (If the failing device is an external device, go to the external devices service pamphlet.)	**SCSI Hard Disk Drive (60MB)** **SCSI Hard Disk Drive (80MB)** **SCSI Hard Disk Drive (120MB)** **SCSI Hard Disk Drive (160MB)** **SCSI Hard Disk Drive (320MB)** **SCSI Hard Disk Drive (400MB)** **SCSI Hard Disk Drive (1GB)** **SCSI Hard Disk Drive (Size Undetermined)** SCSI Adapter SCSI Cable
0**211XX**XX (If the failing device is an external device, go to the external devices service pamphlet.)	**SCSI Tape Drive** SCSI Adapter SCSI Cable
0**215XX**XC 0**215XX**XD (If the failing device is an external device, go to the external devices service pamphlet.)	**SCSI CD-ROM Drive (I)** **SCSI CD-ROM Drive (II)** SCSI Adapter SCSI Cable
0**217XX**XX (If the failing device is an external device, go to the external devices service pamphlet.)	**SCSI Rewritable Optical Drive** SCSI Adapter SCSI Cable
I**999XX**XX (This is usually not a hardware failure. Go to "IML and IPL Errors" before replacing any FRUs.)	**Default Hard Disk Drive** Processor Board SCSI Adapter SCSI Cable

5.8 IML and IPL Errors

You are here because the system detects an Initial Machine load (IML) problem or an Initial Program Load (IPL) problem. You can correct most of these errors without replacing any FRUs. IML/IPL problems are associated with the following:

- An I999XXXX error is displayed.
- The system powered-on without a POST error, but the operating system does not work.
- The system starts up in BASIC.

IML and IPL errors can be caused by any of the following conditions:

- Invalid startup Sequence (the default drive is not in the startup sequence)
- Operating system not found
- IML code not found
- Related hardware failure (SCSI adapter, hard disk, SCSI cable)
- Unrelated hardware failure (misleading error code due to another problem on the SCSI bus).

Before replacing any FRUs, check the following:

Verifying the startup sequence is valid

1. Start the system from the Reference Diskette and select **Set Features** from the Main Menu.
2. Select **Set Startup Sequence** and see if the *default* hard disk drive (usually drive 6) is in the startup sequence. If you receive an error message, follow the instructions on the screen, then return here.
3. If the default drive is in the startup sequence, exit from the screen and the Main Menu, then go to step 2 under "Testing the Hard Disk Drive." If the default drive is *not* in the startup sequence, follow the instructions on the screen, then go to "Testing the Hard Disk Drive."

Testing the Hard Disk Drive

1. Remove the Reference Diskette, power-off the system, then power-on the system. If the "F1" (Insert Diskette) icon appears on the screen, this means no operating system was found. Go to the next step. If the "Not OK" icon appears on the screen, this means that the system cannot access the System Partition. Go to "Updating the System Programs (restoring the partition)."
2. Either install an operating system on a device that is in the startup sequence, or change the startup sequence to include a device that has an operating system, then go to step 3 under "Updating the System Programs."

Updating the System Programs (restoring the partition)

1. Restart the system from the Reference Diskette. Select **Update System Programs** from the Main Menu and wait for the program to complete running.
2. Power-off the system, remove the Reference Diskette and continue with the next step.
3. Power-on the system, check for the normal power-up sequence and then run the advanced diagnostic tests. If the problem still exists, suspect the SCSI adapter, then the hard disk drive.

Notes:

1. If the default startup sequence was customized, restore it to the customized settings after service is complete.

2. If you are not able to correct the problem using the IML and IPL Errors section, go to "Undetermined Problem" in topic 4.8.

Symptom / Error	**FRU / Action**
I999001X, **I999002**X **I999003**X, **I999004**X **I999005**X, **I999006**X **I999007**X (The actions for these errors are valid only when running the system from the hard disk drive.)	Update the system programs using the Reference Diskette. See "Updating the System Programs.")

I99900X1, I**99900**X2 I**99900**X3, I**99900**X4 I**99900**X6, I**99900**X7 I**99900**X8 (The actions for these errors are valid only when running the system from the Reference Diskette.)	Verify you have the correct Reference Diskette. Restart the system from the Reference Diskette.
I**99900**X5 (Diskette IML recovery prevented while running the system from the Reference Diskette.)	Power-off the system, move the power-on password jumper, then power-on the system.
I**99903**01 (Hard disk drive reset failure.)	Investigate possible hard disk problem.
I**99903**02 (No operating system found on the default drive.)	Install an operating system.
I**99903**03 (System Partition start failure.)	Update the system programs using the Reference Diskette. See "Updating the System Programs.")
I**99903**04 (No startable device with the ASCII console.)	Restart the system with a startable operating system diskette.
I**99903**05 (No startable device found.)	Restart the system using a diskette or check for a valid selectable startup sequence
I**99903**06 (Invalid CD-ROM or read/write optical drive start error.)	Restart the system from a startable diskette or hard disk drive
I**9990**401 (Unauthorized access. Clear the power-on password before replacing any FRUs.)	**Processor Board**
I**9990**402, I**9990**403 I**99906**00, I**99906**07 I**99906**09	**Processor Board**

Supplemental Symptom-to-FRU Index:

6.0 Using the Parts Catalog

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

SIMILAR ASSEMBLIES: If two assemblies contain a majority of identical parts, they're 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

6.1 Example Parts List

Index	***System Unit***	
32	Cover	90X9288
3	Front Bezel/Logo (R)	72X8502
	Miscellaneous Hardware Kit (AR)	72X8580
	□ Knob Assembly, Hard Disk Drive Support Structure	
	□□ Knob	
	□□ Washer	

6.2 Model 90 Overview

PICTURE 5

6.3 Model 90 Parts

Index			
	System Unit Exterior		
1	Cover	33F8350	
	Logo	33F8367	
4	Base Frame (R)	64F4116	
	5.25-Inch Diskette-Drive Bezel	33F8459	
	5.25-Inch Hard Disk Drive Bezel	64F4104	
15	Bezel for Hard Disk Drive	33F8361	
16	3.5-Inch Diskette Drive Bezel	33F8360	
	3.5-Inch device filler Bezel	64F4149	
17	Blank Bezel for 5.25-inch Drive Bay	33F8362	
	CD-ROM I Drive Bezel	64F4122	
	CD-ROM II Drive Bezel	92F0081	
	Rewritable Optical Drive Bezel (Upper)		85F0016
	Rewritable Optical Drive Bezel (Lower)		85F0017
	Large Ground Shield (Upper Bay)	85F0006	
	Small Ground Shield (Upper Bay)	85F0005	
	Ground Shield (Lower Bay)	85F0034	
	Keylock Assembly	33F8353	
	System Unit Interior		
2	Power Supply	92F0088	
	Power Supply Bracket	64F4131	
3	System Board (Without Memory)	64F3287	
5	Hard Disk Drive (See Common Parts)		
6	Diskette Drive (See Common Parts)		
7	Air Baffle (for 57F1597 Processor Board)		92F0134
	Air Baffle (for all others)	85F0062	
8	Base Fan	64F4128	
9	Power Switch/Speaker assembly	33F8352	
10	Memory-Riser Card	81F8823	
11	Memory-Riser Card	81F8823	
	System-Board Memory-Module Kit (See Options and Adapters)		
12	Processor Board (See Common Parts)		
	Adapter Card-Guide Assembly	33F8363	
13	SCSI Adapter (See Common Parts)		
14	Memory-Riser-Card Support Bracket	57F3029	
19	SCSI Internal Cable	64F4127	
18	Hard Disk Drive Power Cable (See Common Parts)		
20	Diskette Drive Signal Cable	57F3030	
	Video-Memory Module	75X5894	
	Battery	33F8354	
	Label Kit	33F8367	
	Misc. Parts Kit	33F8370	

6.4 Model 95 Overview

PICTURE 6

6.5 Model 95 Parts

Index		
	System Unit Exterior	
1	Access Cover	33F8427
2	Rear Bezel	33F8419
4	Pedestal with Plate	64F0215
5	Drive Support Structure	33F8421
	Ground spring (for 33F8421)	33F6853
8	Drive Retainer	64F4135
9	Front Bezel	64F4137
10	DASD Bezel	64F4136
11	DASD Bezel	33F8425
12	DASD Bezel	33F8425
	2-Feature Bezel	64F0168
	5.25 Inch Diskette Drive Bezel	64F4103
	5.25 Framing Bezel	33F8459
	CD-ROM Drive I & II Bezel	64F0138
	Rewritable Optical Drive Bezel	85F0018
13	Diskette Drive Blank Bezel	33F8437
14	3.5-Inch Diskette Drive Bezel (AR)	33F8426
	3.5-Inch Device Filler bezel	64F4149
15	Information Panel Bezel	33F8423
18	Base Frame (R)	33F8417
	Keylock Assembly	33F8433
	Misc. Parts Kit	33F8435
	System Unit Interior	
3	Power Supply	92F0051
	Ground Strap (for 92F0051)	33F8418
16	Information Panel Assembly	33F8434
	Information Panel kit	33F8442
19	System Board (Without Memory)	33F5717
	□ Battery	33F8354
17	Diskette Drive (AR) (See Common Parts)	
24	Diskette Drive Signal Cable	33F8430
6	Hard Disk Drive Mounting Tray (AR)	64F0141
7	Hard Disk Drive (AR) (See Common Parts)	
	DASD Option Guide	33F8441
26	SCSI Signal Cable	33F8436
27	Hard Disk Drive Power Cable (See Common Parts)	
20	SCSI Adapter (See Common Parts)	
21	Processor Board(See Common Parts)	
	Adapter Guide	33F8440
22	System-Board Memory-Module kit (See Options and Adapters)	
25	Information Panel Cable	33F8429
	Speaker	33F8444
	Access Cover Fan	64F4115
23	Power Cable (for 64F4115)	64F4120
	I/O Shadowbox Ground Spring (With Thumb Screws)	92F0099

7.0 Common Parts

Diskette Drive

1.44MB Drive	64F0162
Drive Slide (for 64F0162)	64F0156
2.88MB Drive with slide (not supported on all early type 1 systems)	64F0204
Drive Slide (for 64F0204)	64F3197
5.25-Inch Diskette Drive:	
360KB External (4869-001)	72X6759
360KB External (4869-501)	72X6768
1.2MB External (4869-002)	15F7993
1.2MB External (4869-502)	15F7994
1.2MB Internal Drive (with rails)	64F4102
1.2MB Rail kit (for 64F4102)	85F0041
Slide kit (for 64F4102)	85F0040

SCSI Hard Disk Drive

60MB Drive	6128296
80MB Drive	56F8854
100MB Drive	95F4748
200MB Drive	95F4749
120MB Drive	6128298
160MB Drive	56F8851
320MB Drive	85F0011
400MB Drive	85F0012
1GB Drive	92F0089
Terminator in-line (for 320/400MB)	92F0142
EMC Bezel and Spring Shield (for 92F0089)	92F0255
Drive Slide (Model 90)	85F0035
SCSI Adapter (with cache)	85F0063
SCSI Adapter (Without Cache)	85F0002
Terminator, External (for 85F0000)	33F8464
Terminator, Internal (for 85F0000)	34F0025
Terminator, Internal (for 85F0002)	57F2870
Drive Power Cable	33F8431
Drive Power Cable (supports two devices)	34F0014

Processor Board (with connector for a cache option)

80486 (25 MHz)	64F0201	
80486 (33 MHz)	64F0198	
256KB L2 Cache (17ns) (for 64F0201 & 64F0198)		64F0199
80486 (50 MHz)	92F0048	
256KB L2 Cache (12ns) (for 92F0048)	92F0050	
Cache Kit (Misc. Parts)	33F8435	

Processor Board (Without connector for a cache option)

80487SX (20 MHz)	92F0065	
80486SX (20 MHz)	92F0049	
80486SX (25 MHz) (Dual Processor Sockets)	92F0079	
80487SX Microprocessor (Extended Math Capability for 92F0079)	92F0100	
80486 25/50 Overdrive Microprocessor (ODP) (runs internally at 50 MHz) (for 92F0079)	92F0147	
80486DX2 (25/50 MHz) (runs internally at 50 MHz)		92F0161
80486 (50 MHz Single Socket, Dual Boards) (Both Boards Are a Single FRU)	57F1597	

CD-ROM Drive

CD-ROM Drive (I)	81F7930	
Slide (Model 90)	85F0014	
Terminator Kit (for 81F7930)	59F3530	
Cleaning Kit (for 81F7930)	59F3562	
□ Cleaning Disk		
□ Test Disk		
□ CD Caddy		
CD-ROM Drive (II)	92F0084	
Slide (Model 90)	92F0162	
Terminator Kit (for 92F0084)	92F0082	
Media Kit (No Cleaning Necessary, for 92F0084)		31F4232
□ Test Disk		
□ CD Caddy		
Generic CD-ROM parts:		
Ground Spring (Model 95)	92F0087	
CD Caddy	22F9419	
Rail Kit	34F0041	
Headphones	53F3610	

Options and Adapters

300/1200 Modem Adapter/A	34F0006
Communications Cable (for 34F0006)	8285985
300/1200/2400 Modem Adapter/A	65X1253
Communications Cable (for 65X1253)	94X1540
Baseband Card	72X8102
Baseband Cable	72X8107
Broadband Card	72X8106
3270 Connection	74F3464
6157 Tape Adapter	92X1459
Image Adapter/A	06G8221
Double Byte Character Set (DBCS)	
Display Adapter (Japan)	07G0446
Display Adapter (Tiawan)	07G0508
Video-Memory Module (512KB) (for 07F2508)	07F4401
Video-Memory Module (1MB) (for 07F2508)	07F4402
XGA(*) Display Adapter/A	75X5886
Video-Memory Module (for 75X5886)	75X5894
Dual Async Adapter/A	34F0008
Pageprinter Adapter	75X8213
Realtime Interface Coprocessor	
Portmaster(*) Adapter/A	53F2603
512KB Memory Module Package (for 53F2603)	53F2656
1MB Memory Module Package (for 53F2603)	53F2660
2MB Memory Module Package (for 53F2603)	53F2664
RS232 Interface Board (for 53F2603)	53F2612
RS422 Interface Board (for 53F2603)	53F2615
Multiprotocol Adapter/A	90X8995
Token-Ring Busmaster Adapter/A	74F4149
Printer Accessory Kit	1183003
Token-Ring Network Adapter/A	83X7488
Token-Ring Adapter/A RPL Module	83X9180
Token-Ring 16/4 Adapter/A	16F1144
Token-Ring 16/4 Adapter/A RPL Module	53F7747

(*) Trademark of the IBM Corporation.

Options and Adapters (continued)

Realtime Int. Coprocessor Multiport/2	09F1888
8-port RS232-C Electrical Interface Board (for 09F1888)	
(for 09F1888)	91F7974
4-port RS232-C Electrical Interface Board	
(for 09F1888)	91F7976
Electrical Interface Board (for 09F1888)	91F7966
512KB Memory Module Package (for 09F1888)	16F2267
Multiprotocol Interface Cable	
(for 09F1888)	00F5524
4+4-port RS232-C RS422-A	
Screen Reader Keypad	1393515
Screen Reader Keypad Cable	72X8537
5.25-Inch External Diskette Adapter/A	
(1.2MB or 360KB)	15F7996
3.5-Inch 127MB Rewritable Optical Drive	85F0015
Drive Mounting Slide (for 85F0015)	85F0022
Objective Lens Cleaning Cartridge (for 85F0015)	85F0043
Prism Lens Cleaning Cartridge (for 85F0015)	85F0054
Parity Memory-Module Kits:	
□ 1MB (85ns) (For Type 1 & 3 Boards only)	90X8624
□ 2MB (85ns) (For Type 1 & 3 Boards only)	92F0104
□ 2MB (70ns)	92F0102
□ 2MB (80ns)	92F0103
□ 4MB (70ns)	92F0105
□ 4MB (80ns)	87F9980
□ 8MB (70ns)	64F3606
□ 8MB (80ns)	64F3607
ECC Memory-Module Kits:	
□ 4MB (70ns) (For Type 3 Boards only)	92F0097
□ 8MB (70ns) (For Type 3 Boards only)	92F0098

Keyboard Cable and Mouse

Keyboard Cable Assembly 0.9 m (3 ft.)	61X8898
Keyboard Parts Kit	33F8174
Mouse	61X8923
□ Mouse Ball and Pop-Off Retainer	33F8461
□ Mouse Ball and Twist-Off Retainer	33F8462

Space-Saving Keyboards (84/85 Key)

Canadian French	1396046
Latin-American Spanish	1396047
U.S. English	1393290
Cable Assembly, External	1393082

DBCS Japanese Keyboards

Space Keyboard (89 Key)	65X1121
Space Keyboard (106 Key)	79F0167
Enhanced Keyboard (116 Key)	94X1110
Host-Connect Keyboard (124 Key)	94X1220
DBCS Keyboard Cable	79F5443

Enhanced Keyboards (101/102 Key)

Arabic	1391490
Belgian	1391414
Canadian French	1392011
Cyrillic	1393866
Danish	1391407
Dutch	1391511
French	1391402
German	1391403
Greek	1393285
Hebrew	1391408
Italian	1391404
Latin-American Spanish	1392015
Norwegian	1391409
Portuguese	1391410
Russian/Cyrillic	1395622
Spanish	1391405
Swedish/Finish	1391411
Swiss	1391412
Swiss/French	1395881
Swiss/German	1395882
Turkish	1393286
U.K. English	1391406
U.S. English (E/ME/A use only)	1396790
U.S. English	1392090
Yugoslavian	1393669

Host-Connected Keyboards (122 Key)

Austrian/German	1396902
Belgian	1396903
Canadian French	1397051
Cyrillic	1396916
Danish	1396904
Dutch	1396905
French	1396990
Greek	1396917
Icelandic	1396941
Italian	1396908
Latin-American Spanish	1397052
Norwegian	1396909
Portuguese	1396910
Spanish	1396911
Swedish/Finish	1396906
Swiss/French	1396912
Swiss/German	1396913
Turkish	1396921
U.K. English	1396914
U.S. English (E/ME/A use only)	1397025
U.S. English	1397050
Yugoslavian	1396920

Tools and Miscellaneous

Tri-Connector Wrap Plug	72X8546
Wrap Plug	59X4115
Wrap Plug (for Token-Ring Network Adapter/A	6165899
Wrap Plug (for Real-time Interface Co-Processor Multiport/2) 78-pin	16F2478
Wrap Plug (for Multiport Interface Cable) Direct Connect 25-pin, Ports 0 and 1	6425494
Wrap Plug (for Multiport Interface Cable) Direct Connect 25-pin, ports 2 through 7	09F1799
Plastic Envelope (For Wrap Plug)	6138013
Data Migration Facility	61X8936
Key Cap Removal (Keyboard) Tool	6110464
Video Memory Removal Tool	79X5893
Video Memory Insertion Tool	07F2518

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 (6 ft), U.S.	38F3968

Supplemental Parts Catalog:

7.1 Power Cords

Index	***Power Cords***	
	Display Power Cord, for:	
1	Colombia, U.S., Venezuela	68X3071
	System Unit Power Cord, for:	
1	Colombia, U.S., Venezuela	62X1045
	System Unit Power Cord, for:	
2	Hong Kong, Singapore, U.K.	14F0033
	System Unit Power Cord, for:	
3	France, Germany, Spain	13F9979
	System Unit Power Cord, for:	
4	Italy, Chile	14F0069
	System Unit Power Cord, for:	
5	Australia, New Zealand, New Guinea, Papua	13F9940
	System Unit Power Cord, for:	
6	Denmark	13F9997
	System Unit Power Cord, for:	
7	Israel	14F0087
	System Unit Power Cord, for:	
8	Bangladesh, Pakistan, South Africa, Sri Lanka	14F0015
	System Unit Power Cord, for:	
9	Switzerland	14F0051
	System Unit Power Cord, for:	
10	Thailand	1838574
	System Unit Power Cord, for:	
	Japan	79F2755

PICTURE 7