

FRONT

PICTURE 1

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

- General Safety
- Electrical Safety.

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*1.0 Introduction to Diagnostic Tests*

This pamphlet provides diagnostic information for IBM (\*) Personal System/2 (\*) Micro Channel (\*) computers.

Subtopics

1.1 Diagnostic Procedures

1.2 Diagnostic Aids (All models)

### 1.1 Diagnostic Procedures

Advanced diagnostic programs are run in either of two ways:

- From the Reference Diskette
- From the fixed disk drive

If you are not sure if the system being serviced has fixed disk based or Reference-Diskette-based diagnostics, refer to the *Hardware Maintenance Reference* manual for the system you are servicing.

The information is presented as follows:

- Reference-Diskette-based diagnostic Tests
- Fixed-disk-based diagnostic Tests
- Service pamphlet

For diagnostic information about non-Micro Channel Personal System/2 computers (for example Models 25 and 30), refer to the *Diagnostic Information for Non-Micro Channel Computers* pamphlet.

1.2 Diagnostic Aids (All models)

The diagnostic aids used to isolate a failing field replaceable unit (FRU) are:

- Power-On Self-Test (POST)
- Advanced diagnostic tests on the Reference Diskette
- Hardware Maintenance Service pamphlets.

When instructed to *Power-on the system*, turn on the power to all externally attached devices (such as displays, printers, or plotters) before turning on power to the system unit.

When instructed to *Power-off the system*, turn off the power to all externally attached devices and then turn off the power to the system unit.

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## 2.0 Reference-Diskette-Based Diagnostic Tests

This section provides information about Personal System/2 computers that run the diagnostic programs from the Reference Diskette.

The Reference Diskette is model specific and comes with the IBM Personal System/2 *Hardware Maintenance Service* manual. It is permanently write protected. You can read information from the diskette, but you cannot write (record) information onto it. Make a backup copy of the diskette as soon as possible. After the copy is made, put the original Reference Diskette in a safe place and use the backup copy.

Some programs on the Reference Diskette are used primarily by the user, some by the servicer, and some by both the user and the servicer. The advanced diagnostic tests are used primarily by the servicer. For more information about advanced diagnostic tests, see "Starting the Advanced Diagnostic Tests." in topic 2.2.1

The Main Menu selections on the Reference Diskette are described as follows:

1. **Backup the Reference Diskette** is used to copy the original Reference Diskette onto another diskette, but not onto a fixed disk drive. To make a backup copy, use a blank, 2.0MB capacity diskette that is not write-protected.
2. **Set configuration** is used to view, change, back up, or restore the system configuration.

The configuration lists the system:

- Installed and usable memory size
- System board built-in features and their assignments
- Installed options with their location and assignments
- IBM Fixed Disk Drive Adapter
  - Type of drive
  - Arbitration level (assigns system access priority).

The Set configuration program automatically sets the system configuration when the Reference Diskette is started. During automatic configuration, the system makes a list of what it sees as being installed and assigns those items to operate a certain way. If the configuration program does not recognize an adapter, the program lists the adapter as the *unrecognized adapter* (see "Installed Devices List" later in this section). The configuration information is stored in the system memory (CMOS) and is kept current by the battery. Whenever you change, remove, or install an option or the battery, you must start the Reference Diskette so the system can automatically configure itself.

- View configuration** displays the present configuration information stored in memory.
- Change configuration** is used to change the configuration information stored in memory.
- Backup configuration** copies the configuration stored in memory onto the backup copy of your Reference Diskette. If changes have been made to the configuration, back up the configuration onto the backup copy of the Reference Diskette.

The system configuration is stored in system memory and kept current by the battery. If the battery is removed, replaced, or disconnected, the configuration information is lost.

- Restore configuration** retrieves the configuration information copied by **Back up configuration** and restores it to memory. Use Restore configuration after the battery is removed, replaced, or disconnected.
- Run automatic configuration** Run automatic configuration will automatically verify and update the configuration information stored in memory.

Warning: A customized setup configuration (other than default settings) may exist on the system you are servicing. Running Automatic Configuration may alter those settings. Note the current configuration settings (using the View Configuration option) and verify that the same settings are in place when service is complete.

- Set and view SCSI device configuration** is used to view or change SCSI device configurations.

- **Display memory map** displays how the system assigns part of the system memory.

3. **Set features** contains the following:

- **Set date and time** places the current date and time in memory that is retained by the battery after the system is powered-off.
- **Set passwords and network server mode** is used to restrict the use of the system by unauthorized persons. Three types of password security are available: a power-on password, a keyboard password and a network server password.
- **Set keyboard speed** is used to set the speed at which the keyboard responds when you type. Two choices are available: normal (15 cps) and fast (30 cps).
- **Copy an option diskette** is used when an IBM option comes with a diskette and instructions to update the backup copy of the Reference Diskette. The option diskette contains the testing program and configuration information for the option.
- **Test the computer** checks the system hardware. If a problem occurs during this testing, an error message appears on the display or terminal.
- **Move the computer** prepares the fixed disk drive for a move.

Subtopics

- 2.1 Power-On Self-Test (POST)
- 2.2 Advanced Diagnostic Tests

### 2.1 Power-On Self-Test (POST)

The power-on self-test (POST) is a series of system tests that verify the correct operation of the base system and most options. The POST runs each time the system is powered-on. It compares the system configuration information it detects with the configuration stored in the CMOS RAM. The test takes up to 90 seconds to finish, depending on the options installed.

The POST can detect critical and noncritical errors in the following areas:

- System board
- Memory
- VGA
- Keyboard
- Diskette drives
- Fixed disk drives
- Serial port
- Parallel port.

Some adapters have Read Only Memory (ROM) modules that contain extended BIOS routines that work with the system POST.

To start the POST, power-on the system. The following happens:

- The keyboard status lights blink on, then off.
- While the memory is being tested, the memory size appears in the top left corner of the screen in 64KB increments.
- When the POST is successful, one short beep occurs.
- If an operating system is not automatically loaded from a fixed disk drive and a diskette is not present in drive A, the diskette prompt is displayed along with the F1 prompt. The diskette and F1 prompts are icons showing that a diskette should be inserted into diskette drive A. Press the F1 key to continue loading programs from the diskette.

#### PICTURE 2

If POST errors are displayed, the F1 key can be pressed to bypass the errors and allow the POST to attempt to complete. Depending on the error, the POST may or may not complete.

If the Reference Diskette is present in drive A when a POST error is detected, the system displays the POST error message along with a message generated from the Reference Diskette. This additional message instructs the user to take a specific action to solve the problem. The message is not intended for use by trained service personnel.

*2.2 Advanced Diagnostic Tests*

The advanced diagnostic tests are on the Reference Diskette, which is located in the *Hardware Maintenance Service* manual. The Reference Diskette and *Hardware Maintenance Service* manual are used to isolate failing FRUs.

Subtopics

- 2.2.1 Starting the Advanced Diagnostic Tests.
- 2.2.2 Diagnostic Program
- 2.2.3 Presence Test
- 2.2.4 Installed Devices List
- 2.2.5 System Checkout
- 2.2.6 Error Log
- 2.2.7 Formatting a Fixed Disk Drive
- 2.2.8 Preparing a Fixed Disk Drive for Moving

*2.2.1 Starting the Advanced Diagnostic Tests.*

1. Insert the Reference Diskette into diskette drive A.
2. Power on the system. Follow the instructions on the screen until the Main Menu appears.
3. Press and hold the Ctrl key, and then press the A key. This selects the advanced diagnostic mode.
4. Select System Checkout from the Advanced Diagnostics Menu. Follow the instructions on the screen to isolate a failing FRU.

### 2.2.2 Diagnostic Program

The diagnostic program consists of a diagnostic control program (DCP) and a module of code for each device that is supported by the system. As new options are developed, modules of code are distributed as supplements and must be copied to the Reference Diskette.

To copy these modules to the Reference Diskette, a program is provided on the Reference Diskette. Select **Copy an option diskette** from the Main Menu and follow the instructions on the screen.

#### **Memory Diagnostics**

System memory diagnostics can detect parity, data, and addressing errors. The microprocessor writes patterns and reads those patterns to verify correct memory function. If a data error occurs, the diagnostic tests display the location of defective memory, the slot number (if the defect is on a memory expansion adapter), and expected and actual patterns.

### 2.2.3 Presence Test

During the initial program load, the DCP links, in sequence, to each of the modules on the Reference Diskette and performs a presence test for the device supported by each module. For a successful presence test, the following conditions must be met:

- The module of diagnostic code for that device must be on the diskette.  
**Note:** Some devices have their own stand-alone diagnostic diskette.
- The device must be installed or attached.
- The device must return a 'ready' acknowledgment value to the DCP.

If these conditions are met, the DCP loads that module into memory, adds the device name to the installed devices list, and continues with the next module. These steps are repeated until the DCP has performed a presence test for each module on the diskette. When all the presence tests have been performed, the DCP displays the installed devices list.

#### 2.2.4 Installed Devices List

This list contains the devices that met all the conditions described in "Presence Test." The servicer must verify this list.

An incorrect installed devices list can be caused by:

- The module of code for a device is not on the Reference Diskette.
- The device is unknown to the DCP and ignored.
- The device is not installed or attached.
- The device is not functioning.

2.2.5 System Checkout

Run **System Checkout** when a problem occurs, after a new option is installed, or after maintenance work is done on the system.

To run System Checkout:

1. Start the advanced diagnostic tests.
2. Select "System Checkout."
3. Follow the instructions on the screen.

### 2.2.6 Error Log

The following steps allow you to create an Error Log, start the advanced diagnostic tests, select **System Checkout**, and automatically record error messages in the Error Log. This procedure is normally used when diagnosing an intermittent problem or exercising the system.

You cannot log errors to a diskette drive that is being tested. If you plan to test a diskette drive, you must log the errors to the primary printer or to a diskette drive not being tested.

To create the Error Log:

1. Start the advanced diagnostic tests.
2. Select **System Checkout**.
3. Select **Error Log**.
4. Follow the instructions on the screen.

### 2.2.7 Formatting a Fixed Disk Drive

Warning: Formatting results in a complete loss of data on the fixed disk drive; have the user refer to the operating system manual and back up all information before formatting.

Before you replace a failing fixed disk drive, try to format the drive as follows:

1. Start the advanced diagnostic tests.
2. Select **Format Fixed Disk**.
3. Follow the instructions on the screen.

**Notes:**

1. Fixed disk drives normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen when the defect limit has been reached and service is recommended.
2. The diagnostic format program is different from the operating-system format program. Before you can transfer information from backup diskettes to the fixed disk drive, the fixed disk drive must be formatted using the operating-system format program. Refer to the operating-system manual for a description of the format program commands.

2.2.8 *Preparing a Fixed Disk Drive for Moving*

Before moving the system unit or removing the fixed disk drive for service, select **Move the computer** from the Main Menu on the Reference Diskette. This parks the heads of the fixed disk drive to help prevent damage to the drive.

**Note:** All SCSI fixed disk drives automatically position the read/write heads in nondata areas when the system is powered-off.

3.0 *Fixed-Disk-Based Diagnostic Tests*

Subtopics

- 3.1 System Utility Programs
- 3.2 Selectable Startup
- 3.3 Example One
- 3.4 Example Two
- 3.5 Power-On Self-Test (POST)
- 3.6 Advanced Diagnostic Tests

### 3.1 System Utility Programs

This section provides information about Personal System/2 computers that run the diagnostic programs from the fixed disk drive.

The utility programs and the diagnostic programs (customer and service) are stored on both the fixed disk drive and the Reference Diskette; however, the preferred method of operation is to run them from the fixed disk drive. Models with fixed-disk-based diagnostics can also run diagnostics from the Reference Diskette if the fixed disk drive is not operational.

The Reference Diskette is model specific and comes with the system. It is permanently write protected. You can read information from the diskette, but you cannot write (record) information onto it. Make a backup copy of the diskette as soon as possible. After the copy is made, put the original Reference Diskette in a safe place and use the backup copy.

The menu selections on the utility programs are described as follows:

1. **Start operating system** starts the operating system.
2. **Backup/restore system programs** contains the following:
  - Backup the Reference Diskette** is used to make a backup copy of the Reference Diskette.
  - Backup System Programs** is used to copy the system programs from the fixed disk drive to a diskette.
  - Restore System Programs** is used in case of accidental loss, or magnetic damage to, the system programs on the fixed disk drive. This option allows the user to copy the system programs from the backup copy of the Reference Diskette (or the original) to the fixed disk drive.
3. **Set Configuration** is used to view, change, backup, or restore the configuration information. It is also used to run the automatic configuration program and to configure the SCSI devices.

The system automatically sets the configuration when the utility programs are started or when Run automatic configuration is selected.

The configuration lists the system:

- Installed and usable memory size
- System board built-in features and their assignments
- Installed options with their location and assignments
- IBM Fixed Disk Drive Adapter
  - Type of drive
  - Arbitration level (assigns system access priority).

This information is then stored in memory and kept active by a battery after the system is powered-off.

If any changes are made, or if options or the battery are removed or replaced, start the utility programs to update the configuration information.

**Set Configuration** contains the following:

- View configuration** displays the present configuration information stored in memory.
- Change configuration** is used to change the configuration information stored in memory.
- Back up configuration** copies the configuration information stored in memory to the fixed disk. If changes have been made to the configuration, back up the configuration onto the backup copy of the Reference Diskette.

The system configuration is stored in system memory and kept current by the battery. If the battery is removed, replaced, or disconnected, the configuration information is lost.

- Restore configuration** retrieves the configuration information copied by **Back up configuration** and restores it to memory. Use Restore configuration after the battery is removed, replaced, or disconnected.
- Run automatic configuration** Run automatic configuration will automatically verify and update the configuration information stored in memory.

Warning: A customized setup configuration (other than default

settings) may exist on the system you are servicing. Running Automatic Configuration may alter those settings. Note the current configuration settings (using the View Configuration option) and verify that the same settings are in place when service is complete.

- Set and view SCSI device configuration** is used to view or change SCSI device configurations.
- Display memory map** displays how the system assigns part of the system memory.

4. **Set features** contains the following:

- Set date and time** places the current date and time in memory that is retained by the battery after the system is powered-off.
- Set passwords and network server mode** is used to restrict the use of the system by unauthorized persons. Two types of password security are available: a power-on password, and a network server password.
- Set keyboard speed** is used to set the speed at which the keyboard responds when you type. Two choices are available: normal (15 cps) and fast (30 cps).
- set console**
- Set console** is used to choose from the following:
  - VGA display
  - ASCII terminal
  - No console.
- Set startup device** allows a choice of which diskette or fixed disk drive the system will start from during the power-up sequence and the order in which the drives will be read.

5. **Copy an option diskette** is used when an IBM option comes with a diskette and instructions to update the backup copy of the Reference Diskette. The option diskette contains the testing program and configuration information for the option.

6. **Test the computer** checks the system hardware. If a problem occurs during this testing, an error message appears on the information panel and on the display or terminal.

7. **Display revision levels** displays service information.

8. **Update the system program** copies new or revised files to update the utility programs that are on the fixed disk.

### 3.2 Selectable Startup

The Selectable Startup function allows the user to control the startup sequence (path) of the system. After the path is changed, the letters of the drive designations also change as shown in the following two examples.

To install the Selectable Startup function, the user must go to the Main Menu and select **Set Features**. At the **Set Features** menu, select **Set startup sequence** and follow the instructions on the screen.

If Selectable Startup has not been installed, the system will follow the normal startup sequence.

**Note:** When the system utilities are run, either from the fixed disk drive or the Reference Diskette, the selected startup sequence is ignored. When the user returns to normal operations, the selected startup sequence is restored.

3.3 Example One

This example shows how the user can change the order of the drive sequence. The user can select a sequence of up to four drives, including diskette drives or fixed disk drives.

The drive sequence selected for this example is: the C drive first, the A drive second, and the E drive third. After the selectable startup utility has been run, diskette drives A and C exchange drive letter designations. Fixed disk drives D and E also exchange drive letter designations. Drives B and F remain as they were.

Normal Startup Sequence			Selected Startup Sequence			
Drive Desig	Startup Sequence	Drives		Drives	New Drive Desig	Selected Startup Sequence
A	1	3 1/2" Diskette 1		3 1/2" Diskette 1	C	2
B		3 1/2" Diskette 2		3 1/2" Diskette 2	B	
C		5 1/4" Diskette 3		5 1/4" Diskette 3	A	1
-----						
D	2	160 MB Fixed Disk		160 MB Fixed Disk	E	
E		320 MB Fixed Disk		320 MB Fixed Disk	D	3
F		60 MB Fixed Disk		60 MB Fixed Disk	F	

If only one drive is selected, it will always exchange drive letter designations with the first normal startup sequence drive of the same type (diskette or fixed disk).

3.4 Example Two

This example shows how the system temporarily rearranges the drive letter designation when an operating system is started from one of the diskette drives in the selected startup sequence. This example uses the selected startup sequence that was set in example one.

Any time the user starts an operating system from a diskette drive, that drive becomes the A drive. This drive remains the A drive, until the system is restarted. When the system is restarted, drives A and C revert back to the drive letter designations of the selected startup sequence.

Selected Startup Sequence			Diskette Drive Startup		
Drive Desig	Startup Sequence	Drives	Drives	New Drive Design	
C	2	+-----+   3 1/2"     Diskette   +-----+	+-----+   3 1/2"     Diskette   +-----+	A	Operating System Diskette Started
B		+-----+   3 1/2"     Diskette   +-----+	+-----+   3 1/2"     Diskette   +-----+	B	
A	1	+-----+   5 1/4"     Diskette   +-----+	+-----+   5 1/4"     Diskette   +-----+	C	
-----					
E		+-----+   170 MB     Fixed Disk   +-----+	+-----+   170 MB     Fixed Disk   +-----+	E	
D	3	+-----+   320 MB     Fixed Disk   +-----+	+-----+   320 MB     Fixed Disk   +-----+	D	
F		+-----+   60 MB     Fixed Disk   +-----+	+-----+   60 MB     Fixed Disk   +-----+	F	

### 3.5 Power-On Self-Test (POST)

The power-on self-test (POST) is a series of system tests that verify the correct operation of the base system and most options. The POST runs each time the system is powered-on. It compares the system configuration information it detects with the configuration stored in the CMOS RAM. The test takes up to 90 seconds to finish, depending on the options installed.

The POST can detect critical and noncritical errors in the following areas:

- System board
- Memory
- Processor adapter
- Keyboard
- Diskette drives
- Fixed disk drives
- Serial port
- Parallel port.

Some adapters have read-only memory (ROM) modules that contain extended BIOS routines that work with the system POST.

To start the POST, power-on the system. The following happens:

- The keyboard status lights blink on, then off.
- While the memory is being tested, the memory size appears in the top left corner of the screen in 64KB increments.
- When the POST is successful, one short beep occurs.
- If an operating system is not automatically loaded from a fixed disk drive and a diskette is not present in drive A, the diskette prompt is displayed along with the F1 prompt. The diskette and F1 prompts are icons showing that a diskette should be inserted into diskette drive A. Press the F1 key to continue loading programs from the diskette.

#### PICTURE 3

If POST errors occur, they are displayed on the screen for a few seconds and then disappear, while the POST attempts to continue. Depending on the error, the POST may or may not continue.

**Note:** To hold the POST errors on the screen, press the Pause key while the errors are being displayed. Press the F1 key to continue.

When a POST error is detected, the system displays the POST error message along with a message generated from the fixed disk drive. This additional message instructs the user to take a specific action to solve the problem. The message is not intended for use by trained service personnel.

### 3.6 *Advanced Diagnostic Tests*

The advanced diagnostic tests, along with the problem-isolation procedures in the *Hardware Maintenance Service* pamphlet, are used to isolate failing FRUs.

#### Subtopics

- 3.6.1 Starting the Advanced Diagnostic Tests
- 3.6.2 Diagnostic Program
- 3.6.3 Presence Test
- 3.6.4 Installed Devices List
- 3.6.5 System Checkout
- 3.6.6 Error Log
- 3.6.7 Formatting a Fixed Disk Drive
- 3.6.8 Relocating The System.

### 3.6.1 Starting the Advanced Diagnostic Tests

The advanced diagnostic tests are started from the Main Menu of the System Utility programs. Three ways to gain access to the System Utilities Main Menu are:

- From the Reference Diskette: Insert the Reference Diskette into diskette drive A. Then, power-on the system and the Main Menu is displayed.
- From the Fixed Disk Drive (POST Error): If a POST error is detected when the system is powered-on, follow the instructions on the screen until the Main Menu appears.
- From the Fixed Disk Drive (System Running): If the system is already running, press and hold the Ctrl and Alt keys, then press the Del key. When the cursor moves to the top right corner of the screen, press and hold the Ctrl and Alt keys, then press the Ins key. The Main Menu is displayed.

Once you have gained access to the Main Menu, do the following:

1. Press and hold the Ctrl key, and then press the A key. This selects the advanced diagnostic mode.
2. Select **System Checkout** from the Advanced Diagnostics Menu. Follow the instructions on the screen to isolate a failing FRU.

### 3.6.2 Diagnostic Program

The diagnostic program consists of a diagnostic control program (DCP) and a module of code for each device that is supported by the system. As new options are developed, modules of code are distributed as supplements and must be copied to the fixed disk drive and the backup copy of the Reference Diskette.

#### **Memory Diagnostics**

System memory diagnostics can detect parity, data, and addressing errors. The microprocessor writes patterns and reads those patterns to verify correct memory function. If a data error occurs, the diagnostic tests display the location of defective memory, the slot number (if the defect is on a memory expansion adapter), and expected and actual patterns.

### 3.6.3 Presence Test

During the initial program load, the DCP links, in sequence, to each module of code and performs a presence test for the device supported by each device module. For a successful presence test, the following conditions must be met:

- The module of diagnostic code for that device must be present on the fixed disk drive.

**Note:** Some devices have their own stand-alone diagnostic diskette.

- The device must be installed or attached.
- The device must return a 'ready' acknowledgment value to the DCP.

If these conditions are met, the DCP loads that module into memory, adds the device name to the Installed Devices list, and continues with the next module. These steps are repeated until the DCP has performed a presence test for each module on the fixed disk drive.. When all the presence tests have been performed, the DCP displays the Installed Devices list.

#### 3.6.4 *Installed Devices List*

This list contains the devices that met all the conditions described in "Presence Test." The servicer must verify this list.

An incorrect Installed Devices list can be caused by:

- The module of code for a device is not on the fixed disk drive.
- The device is unknown to the DCP and ignored.
- The device is not installed or attached.
- The device is not functioning.

### 3.6.5 System Checkout

Run **System Checkout** when a problem occurs, after a new option is installed, or after maintenance work is done on the system.

To run System Checkout:

1. Start the advanced diagnostic tests.
2. Select **System Checkout**..
3. Follow the instructions on the screen.

### 3.6.6 Error Log

The following steps allow you to create an Error Log, start the advanced diagnostic tests, select **System Checkout**, and automatically record error messages in the Error Log. This procedure is normally used when diagnosing an intermittent problem or exercising the system.

You cannot log errors to a diskette drive that is being tested. If you plan to test a diskette drive, you must log the errors to the primary printer or to a diskette drive not being tested.

To create the Error Log:

1. Start the advanced diagnostic tests.
2. Select **System Checkout**.
3. Select **Error Log**.
4. Follow the instructions on the screen.

### 3.6.7 Formatting a Fixed Disk Drive

Warning: Formatting results in a loss of data on the fixed disk drive; have the user refer to the operating system manual and back up all information before formatting.

Normal formatting does not affect the area of the fixed disk drive that stores the system utility programs.

Before you replace a failing fixed disk drive, try to format the drive as follows:

1. Start the advanced diagnostic tests.
2. Select **Format Fixed Disk**.
3. Follow the instructions on the screen.

**Notes:**

1. Fixed disk drives normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen when the defect limit has been reached and service is recommended.
2. The diagnostic format program is different from the operating-system format program. Before you can transfer information from backup diskettes to the fixed disk drive, the fixed disk drive must be formatted using the operating-system format program. Refer to the operating-system manual for a description of the format program commands.

3.6.8 *Relocating The System.*

The fixed disk drives automatically position the read/write heads in nondata areas when the system is powered-off.

4.0 Hardware Maintenance Service Pamphlet (All models)

The *Hardware Maintenance Service* pamphlets and the Reference Diskettes are located in the IBM Personal System/2 *Hardware Maintenance Service* manual, or on some models, they are located under the system cover. The pamphlets are the only printed information needed to service a system.

The *Hardware Maintenance Service* pamphlet contains a Symptom-To-FRU Index, problem-isolation procedures, and a parts listing.

You should always begin with the System Checkout procedure. Depending on the failure indication, this procedure directs you to the screen-driven diagnostic tests (the primary method of problem-isolation), one of the other procedures, or to the Symptom-To-FRU Index. The Symptom-To-FRU Index lists symptoms and error codes along with the FRUs most likely to have caused the failure.

Use the index to determine which FRUs to have available before servicing a failing system by matching a symptom or an error code to a FRU.