FRONT

PICTURE 1

September 25, 1990

This pamphlet contains procedures for isolating problems to a FRU, a
Symptom-to-FRU Index, and a parts listing for the IBM Personal System/2
Model 80.

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

Part Number 84F8547

Form Number S15F-2199-01

FRONT_1 Safety Information

Refer to the *Hardware Maintenance Service General Information* pamphlet for
the following information:
    General Safety
    Electrical Safety
    Safety Inspection Guide.

Second Edition (September 1990)

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1.0 General Checkout

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Subtopics
1.1 How to Diagnose Combined FRUs
1.2 How to Use Error Messages

1.0 General Checkout

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Subtopics
1.1 How to Diagnose Combined FRUs

1.1 How to Diagnose 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 replacing the adapter or device,
remove the FRUs, one by one, to see if the symptoms change.

1.2 How to Use Error Messages

Use the error codes displayed on the screen to diagnose failures. If more
than one error code is displayed, diagnose the first error code first.
The cause of the first error code can cause false error codes to be
displayed.

If there is not an error code on the screen, see if the error symptom is
listed in the Symptom-To-FRU Index.

```
+---+
¦001¦
+---+
```
- Power-off the system and all external devices.
- Check all cables and power cords.
- Make sure there are no diskettes in the drives.
- Power-on all external devices.
- Power-on the system.

  Note: Watch the screen for a POST error code. Write down any POST
         error codes that are displayed, then press F1 to continue.

ARE ANY EXTERNAL SCSI DEVICES ATTACHED TO THE SYSTEM?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦002¦
 ¦    +---+
 ¦    Go to Step 005.
 ¦
+---+
¦003¦
+---+
```
DID THE POWER-GOOD LIGHT ON ALL OF THE EXTERNAL DEVICES COME ON?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦004¦
 ¦    +---+
 ¦    Go to the external devices service pamphlet.
 ¦
 ¦
+---+
¦005¦
+---+
```
DID YOU RECEIVE A POST ERROR CODE?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦006¦
 ¦    +---+
 ¦    Continue with Step 014.
 ¦
+---+
¦007¦
+---+
```
**IS THE FIRST POST ERROR CODE WITHIN THE RANGE OF 02080000 190I TO 02410000
190I?**
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦008¦
 ¦    +---+
 ¦    Continue with Step 014.
 ¦
+---+
¦009¦
+---+
```
- Start the Reference Diskette and verify that the "Enable" and "Disable"
  settings are correct. For more information, go to "Enable and Disable
  Settings" in topic 6.0. 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 No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦010¦
 ¦    +---+
 ¦    Go to "Symptom-to-FRU Index" in topic 12.0.  Before replacing any
 ¦    SCSI devices, verify there are no duplicate SCSI ID settings.
 ¦
+---+
¦011¦
```

```
+---+
- Remove the Reference Diskette and restart the system.
```
DID THE ERROR REMAIN?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦012¦
 ¦    +---+
 ¦    If you suspect another problem, or want to run system checkout,
 ¦    continue with Step 014.
 ¦
+---+
¦013¦
+---+
Go to "Symptom-to-FRU Index" in topic 12.0.
--------------------------------------------------------------------------
```

```
+---+
¦014¦
+---+
- Insert your Reference Diskette.
- Press Ctrl+Alt+Del and check for the following responses:
  1.  One or two short beeps.
  2.  IBM logo screen appears.
```
DID YOU RECEIVE THE RESPONSES LISTED ABOVE?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦015¦
 ¦    +---+
 ¦    Go to "Symptom-to-FRU Index" in topic 12.0.
 ¦    - or -
 ¦    If that does not correct the problem, go to "Undetermined Problem" in
 ¦    topic 4.0.
 ¦
+---+
¦016¦
+---+
- Advance to the Main Menu.
- Press Ctrl+A and run system checkout.
```

  Notes:

  1. If the system has incorrect keyboard responses, go to "Keyboard" in
      topic 9.0.

  2. If the printer has incorrect responses, go to "Printer" in
      topic 10.0.

  3. If the display has problems such as jittering, rolling, shifting, or
      being out-of-focus, go to "Display Self-Test" in topic 7.0.

  4. If a minimum of 512KB of memory is not active, the diagnostic tests
      cannot be loaded.

IS THE LIST OF INSTALLED DEVICES CORRECT?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦017¦
 ¦    +---+
 ¦    Go to "Installed Devices List" in topic 2.0.
 ¦
+---+
¦018¦
+---+
- Run the diagnostic tests.
```
DID THE TESTS IDENTIFY A FAILURE?

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

Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦019¦
 ¦    +---+
 ¦
 ¦    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 12.0.
 ¦
 ¦    You may have an intermittent problem:
 ¦        Check for damaged cables and connectors.
```

```
¦        Reseat all adapters, drives, and modules.
¦        Check the system unit fan for proper operation.
¦        Start an error log and run the tests multiple times.
¦
+---+
¦020¦
+---+
```

Follow the action described on the screen. If that does not correct the
problem go to "Symptom-to-FRU Index" in topic 12.0.

2.0 Installed Devices List

If an adapter or device is missing from the list, you may have one of the
following conditions:
    Your Reference Diskette does not contain the module of code required
    to support that device.
    The missing device is a 5.25-Inch 360KB External Diskette Drive
    adapter or another unrecognizable adapter.
    The missing device is defective.
    An adapter is defective.

Subtopics
2.1 Automatic Configuration
2.2 Device Type
2.3 SCSI Devices
2.4 Non-SCSI Devices

2.1 Automatic Configuration

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
settings are in place when service is complete. (For more information
about configuration, refer to the *Hardware Maintenance Reference* manual.)

2.2 Device Type

Run **Automatic Configuration** (see "Automatic Configuration" in topic 2.1
before continuing) and determine which type of device, SCSI or non-SCSI,
is missing from the Installed Devices List, in Advanced Diagnostics, then
continue with the following steps. (If SCSI and non-SCSI devices both are
missing, go to "Undetermined Problem" in topic 4.0.)

2.3 SCSI Devices

The adapter supporting the missing device may be defective. If more than one SCSI adapter is installed, isolate them one at a time.
1. Power-off the system and disconnect all internal and external cables attached to the SCSI adapter.
2. Terminate the adapter, as required.
Warning: See "Automatic Configuration" in topic 2.1 before continuing.

3. Power-on the system and run **Automatic Configuration**. If the adapter is not on the Installed Devices List, in Advanced Diagnostics, the adapter is defective. If the adapter is on the list, run the adapter diagnostic tests.
4. If the adapter fails the tests, replace it. If the adapter passes the tests, a different adapter may be defective.
5. Reconnect the cables to the SCSI adapter, then terminate the adapter, as required.
6. Go to "Undetermined Problem" in topic 4.0 to find the problem.

2.4 Non-SCSI Devices

The missing device is defective. If that does not correct the problem, go
to "Undetermined Problem" in topic 4.0.

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

3.0 Power-On Password

To service a system with an active, unknown, power-on password, do one of
the following, depending on which battery and speaker assembly is
installed:
    On the type with two pins on the side of the speaker assembly, short
    the pins together.
    On the type with no pins, insert a meter lead into the connector
    (protruding from under the battery) and short the other end of the
    lead to frame ground.

Power-on the system and leave the assembly shorted until completion of
POST. This deactivates the password.

4.0 Undetermined Problem

1. Power-off the system.
2. Remove or disconnect one of the following adapters or devices:

     Non-IBM devices
     Any external device (modem, printer, or mouse)
     Math coprocessor
     Any adapter
     Fixed-disk or diskette drive
     Memory-module kits.

3. Power on the system.
4. If the symptom remains, repeat steps 1, 2, and 3 until you find the
    failing adapter or device.
5. If all adapters and devices have been removed and the problem remains,
    check the power supply voltages. If the voltages are correct, replace
    the system board. If the voltages are not correct, replace the power
    supply.

5.0 Power Supply Voltages / Fan

If the voltages are not correct, or if the fan is not running, replace the
power supply.

```
+--------------------------------------------------------------------+
¦ Vdc       ¦ Vdc       ¦ -Lead   ¦ +Lead                            ¦
¦ Minimum   ¦ Maximum   ¦   Pin   ¦    Pin                           ¦
+---------+---------+---------+------------------------------------+
¦         ¦         ¦         ¦                                    ¦
¦ -9.0    ¦ -15.0   ¦    2    ¦    9                               ¦
¦ +9.0    ¦ +15.0   ¦    2    ¦    3                               ¦
¦ +3.7    ¦ +6.2    ¦    2    ¦    1                               ¦
¦ +3.7 *  ¦ +6.2 *  ¦    B    ¦    D                               ¦
¦ +9.0 *  ¦ +15.0 * ¦    C    ¦    A                               ¦
¦         ¦         ¦         ¦                                    ¦
+--------------------------------------------------------------------¦
¦ * Disconnect the 15-pin connector from the system board before taking ¦
¦ this reading.                                                      ¦
+--------------------------------------------------------------------+
```

PICTURE 2

```
+--------------------------------------------------------------------+
¦ Vdc       ¦ Vdc       ¦ -Lead   ¦ +Lead
¦ Minimum   ¦ Maximum   ¦   Pin   ¦    Pin
+---------+---------+---------+------------------------------------+
¦         ¦         ¦         ¦
¦ -9.0    ¦ -15.0   ¦    2    ¦    9
```

6.0 Enable and Disable Settings

To verify that the "Enable" and "Disable" settings are correct, select **Set and View SCSI Device Configuration** from the **Set Configuration** menu, and determine if there are any "Presence Error Reporting" devices listed. The settings must be as follows:

    Devices connected to the system must be set to "Enabled."
    Devices listed but not connected must be set to "Disabled."

Change the settings by pressing the F5 key; then save them by pressing the F10 key.

7.0 Display Self-Test
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 detent to the center position.

The screen should be white with a black margin, as described below (some shading may occur near the edges). If the screen differs, replace the display. If the display passes the test, replace the display adapter or the system board.

8503, 8512, 8513, 8514, 8515: 2-20 mm (0.08-0.79 in.) wide on one or both sides.

8506: 2-50 mm (0.08-1.79 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.

8.0 Display Adapter 8514/A

PICTURE 3

9.0 Keyboard

```
+---+
¦001¦
+---+
```
- Power-off the system.
- Disconnect the keyboard cable from the keyboard.
- Power-on the system and check the keyboard cable connector for the
  voltages shown. All voltages are ± 5%.

   PICTURE 4

ARE THE VOLTAGES CORRECT?
Yes No
```
 ¦     ¦
 ¦    +---+
 ¦    ¦002¦
 ¦    +---+
 ¦    Possible failing FRUs are:
 ¦    1.  Keyboard cable
 ¦    2.  System board.
 ¦
+---+
¦003¦
+---+
```
Replace the keyboard.
```
------------------------------------------------------------------------
```

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

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

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

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

11.0 Memory

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

000**110**00 indicates a system-board parity-check error. If two system-board
memory-expansion kits are installed, remove the kit in the connector
labeled either J15 or J8. If the problem disappears, replace the kit. If
the problem remains, replace the kit in the connector labeled either J16
or J9. If that does not solve the problem, replace the system board.

000**111**00 indicates a memory-adapter parity-check error. Remove the memory
adapters from the expansion slots, one at a time, until the error goes
away. Remove the memory-expansion kits from the last adapter removed.
Install the memory-expansion kits, one at a time until the error returns.
Replace the last memory-expansion kit installed. If that does not solve
the problem, replace the adapter.

000**215**00 indicates a failing system-board memory-expansion kit in the
connector labeled either J15 or J8. Replace the kit. If that does not
solve the problem, replace the system board.

000**216**00 or 000**221**00 indicates a failing system-board memory-expansion kit
in the connector labeled either J16 or J9. Replace the kit. If that does
not solve the problem, replace the system board.

12.0 Symptom-to-FRU Index

Error symptoms and the FRUs that might be responsible for the failure are
listed in the "Symptom- to-FRU index." The most-likely failing FRU is
listed first. If you are unable to correct the problem using this index,
go to "Undetermined Problem" in topic 4.0.

If the system displays an error message and gives an incorrect audio
response, start with the FRUs listed for that error message. An "X" in an
error message can be any number.

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

How to Read POST Error Messages

POST error messages are displayed on the screen as three, four, five, or
eight digits. The error messages that can be displayed as shorter POST
messages are highlighted in this index. Some digits will represent
different information for SCSI errors versus non-SCSI errors.

The following example shows which digits display the shorter POST error
messages and also defines the SCSI information in an eight-digit error
message.

```
            Shorter POST Messages
            +-------------------+
            ¦   ¦   ¦   ¦   ¦   ¦
   +------------------------------------+
   ¦ 0 ¦ 0 ¦ 0 ¦ 0 ¦ 0 ¦ 0 ¦ 0 ¦ 0 ¦
   +------------------------------------+
    ¦   ¦   ¦   ¦   ¦   ¦   ¦   ¦
 Reserved ¦   ¦   ¦   ¦   ¦   ¦   Size (SCSI)
         +---------+   ¦   ¦   Slot Number (SCSI)
           Device Code ¦   Logical Unit Number (SCSI)
                      ID (SCSI)
```
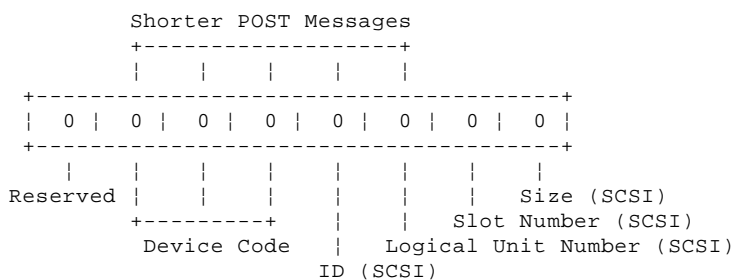
All SCSI devices are set to a different SCSI ID. Duplicate SCSI ID
settings can generate a false error message. Use the SCSI ID to determine
whether the error message is coming from an internal or an external
device.

Symptom/Error	FRU/Action
One or more keys do not work	**Keyboard** Keyboard Cable System Board
Changing Colors	**Display**
No beep and system is otherwise functional (See "Undetermined Problem" in topic 4.0 before replacing any FRUs.)	**Speaker** System Board
No beep and system is nonfunctional (See "Undetermined Problem" in topic 4.0 before replacing any FRUs.)	**System Board** Power Supply
Continuous beep (See "Undetermined Problem" in topic 4.0 before replacing any FRUs.)	**Power Supply** System Board
Repeating short beeps (See "Undetermined Problem" in topic 4.0 before replacing any FRUs.)	**Keyboard (Stuck Key)** System Board Power Supply
One long and one short beep (See "Undetermined Problem" in topic 4.0 before replacing any FRUs.)	**Display Adapter** System Board Power Supply

One long and two short beeps (See "Display Self-Test" in topic 7.0 before replacing any FRUs.)	**Display Adapter** System Board Power Supply Display
One or two short beeps and a blank or unreadable display (See "Display Self-Test" in topic 7.0 before replacing any FRUs.)	**Display Adapter** System Board Display Power Supply
One short beep and diskette prompt or a program loads from the fixed disk drive	**Diskette Drive** System Board Power Supply
000**110**XX (See "Memory" in topic 11.0 before replacing any FRUs.)	**System Board Memory** System Board
000**111**XX (See "Memory" in topic 11.0 before replacing any FRUs.)	**Adapter Memory** Memory Adapter
000**112**XX, 000**113**XX	**Any Adapter** System Board
000**161**XX	**Battery**
000**162**XX (Verify "Enable and Disable Settings" in topic 6.0 are correct before replacing any FRUs.)	**Any Device**
000**163**XX, 000**164**XX, 000**165**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**
0001**XX**XX (not listed above)	**System Board**
000**201**XX (Run Advanced Diagnostic Tests before replacing any FRUs.)	**System Board Memory** Adapter Memory Memory Adapter
000**215**XX, 000**216**XX, 000**221**XX (See "Memory" in topic 11.0 before replacing any FRUs.)	**System Board Memory** System Board
000**301**XX, 000**302**XX	**Keyboard** Keyboard Cable
000**303**XX	**System Board** Keyboard Keyboard Cable
000**304**XX	**System Board** Keyboard
000**305**XX	**Keyboard Cable**

000**401**XX	**System Board**
000**602**XX	**Defective Diskette**
000**6XX**XX	**Diskette Drive** System Board Power Supply
000**7XX**XX	**Math Coprocessor** System Board
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**202**XX, 001**206**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" in topic 10.0 before replacing any FRUs.)	**Printer** System Board
001**780**XX	**Fixed Disk Drive C** Fixed Disk Drive Adapter (ST506) System Board
001**781**XX	**Fixed Disk Drive D** Fixed Disk Drive Adapter (ST506) System Board
001**782**XX	**Fixed Disk Drive Adapter** (ST506) System Board
001**790**XX	**Fixed Disk Drive C** Fixed Disk Drive Adapter (ST506)
001**791**XX	**Fixed Disk Drive D**

	Fixed Disk Drive Adapter (ST506)
0017XXXX (not listed above)	**Fixed Disk Drive C or D** Fixed Disk Drive Adapter (ST506) System Board Power Supply
002401XX, 002402XX (changing colors)	**Display**
002401XX, 002402XX (no changing colors)	**System Board** Display
002409XX	**Display**
002410XX	**System Board**
004611XX, 004630XX	**Multiport/2 Interface Board** Multiport/2 Adapter
004612XX, 004613XX, 004640XX, 004641XX	**Memory Module Package** Multiport/2 Adapter
004650XX	**Multiport Interface Cable**
0046XXXX	**Multiport/2 Adapter** Multiport/2 Interface Board Memory Module Package
00744XXX, 00745XXX, 00746XXX, 00747XXX (See "Display Adapter 8514/A" in topic 8.0 to determine failing module.)	**8514/A Memory Module**
0074XXXX (not listed above)	**Display Adapter 8514/A** System Board
008601XX, 008602XX	**Pointing Device**
008603XX	**System Board**
008604XX	**System Board** Pointing Device
0096XXXX	**SCSI Adapter** (with cache) Any SCSI Device System Board
010002XX, 010006XX	**Multiprotocol Adapter/A** Any Serial Device
010007XX	**Communications Cable**

Code	FRU
	Multiprotocol Adapter/A
010008XX, 010009XX	**Multiprotocol Adapter/A** Any Serial Device
0100XXXX (not listed above)	**Multiprotocol Adapter/A** System Board
010102XX, 010106XX, 010108XX, 010109XX	**Modem Adapter/A** Any Serial Device
0101XXXX (not listed above)	**Modem Adapter/A** System Board
010480XX	**Fixed Disk Drive C** Fixed Disk Drive Adapter (ESDI) System Board
010481XX	**Fixed Disk Drive D** Fixed Disk Drive Adapter (ESDI) System Board
010482XX	**Fixed Disk Drive Adapter** (ESDI) Fixed Disk Drive C System Board
010483XX	**Fixed Disk Drive Adapter** (ESDI) System Board
010490XX	**Fixed Disk Drive C** Fixed Disk Drive Adapter (ESDI)
010491XX	**Fixed Disk Drive D** Fixed Disk Drive Adapter (ESDI)
0104XXXX (not listed above)	**Fixed Disk Drive C or D** Fixed Disk Drive Adapter (ESDI) System Board Power Supply
0107XXXX	**1.2MB 5.25 Inch Internal/External** **Drive** 5.25 Inch Adapter
0112XXXX	**SCSI Adapter (without cache)** Any SCSI Device System Board
012102XX, 012106XX, 012108XX, 012109XX	**300/1200/2400 Modem/A** Any Serial Device
0121XXXX (not listed above)	**300/1200/2400 Modem/A** System Board

```
+--------------------------------+--------------------------------+
¦ 016500XX                       ¦                                ¦
¦                                ¦ 6157 Tape-Attachment           ¦
¦                                ¦   Adapter                      ¦
¦                                ¦                                ¦
¦                                ¦                                ¦
+--------------------------------+--------------------------------+
¦ 016520XX                       ¦                                ¦
¦                                ¦ 6157 Streaming-Tape Drive      ¦
¦                                ¦                                ¦
¦                                ¦                                ¦
+--------------------------------+--------------------------------+
¦ 016540XX                       ¦                                ¦
¦                                ¦ 6157 Streaming-Tape Drive      ¦
¦                                ¦ 6157 Tape-Attachment           ¦
¦                                ¦   Adapter                      ¦
¦                                ¦                                ¦
+--------------------------------+--------------------------------+
¦ 0166XXXX, 0167XXXX             ¦                                ¦
¦ (For diagnostic                ¦ Token-Ring Network Adapter/A   ¦
¦ information refer               ¦ System Board                   ¦
¦ to the Token-Ring              ¦                                ¦
¦ Network Adapter/A              ¦                                ¦
¦ service Information.)          ¦                                ¦
+--------------------------------+--------------------------------+
¦ 0208XXXX                       ¦                                ¦
¦ (Verify there are              ¦ Any Device                     ¦
¦ no duplicate SCSI              ¦                                ¦
¦ ID settings.)                  ¦                                ¦
+--------------------------------+--------------------------------+
¦                                ¦                                ¦
¦ 0210XXXA                       ¦ SCSI Fixed Disk Drive (60MB)   ¦
¦ 0210XXXB                       ¦ SCSI Fixed Disk Drive (80MB)   ¦
¦ 0210XXXC                       ¦ SCSI Fixed Disk Drive (120MB)  ¦
¦ 0210XXXD                       ¦ SCSI Fixed Disk Drive (160MB)  ¦
¦ 0210XXXE                       ¦ SCSI Fixed Disk Drive (320MB)  ¦
¦ 0210XXXU                       ¦ SCSI Fixed Disk Drive (Size    ¦
¦ (If the failing device is      ¦ Undetermined)                  ¦
¦ an external device, go to      ¦ SCSI Adapter                   ¦
¦ the external devices           ¦ SCSI Cable                     ¦
¦ service pamphlet.)             ¦                                ¦
¦                                ¦                                ¦
+--------------------------------+--------------------------------+
¦ 0215XXXX                       ¦                                ¦
¦ (If the failing device is      ¦ SCSI CD-ROM Drive              ¦
¦ an external device, go to      ¦ SCSI Adapter                   ¦
¦ the external devices           ¦ SCSI Cable                     ¦
¦ service pamphlet.)             ¦                                ¦
+-----------------------------------------------------------------+
```

Supplemental Symptom-to-FRU Index:

```
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13.0 How To Use This 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 are broken down on the same list. Parts peculiar to one or
the other of the assemblies are listed separately and identified by
description.

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

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

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

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

Subtopics
13.1 Example of a Parts List

13.1 Example of a Parts List

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

13.1 - 1

14.0 System Overview

PICTURE 5

15.0 Parts

Index   System Unit Exterior
```
  1    Handle                              72X8569
  2    Front Bezel/Logo (R)(Exchange Only) 72X8549
  4    1/2-High Diskette-Drive Bezel       72X8550
  4    1/3-High Diskette-Drive Bezel       34F0030
       Blank Bezel for Diskette Drive      72X8535
       5.25-Inch Diskette-Drive Bezel      15F7915
       Blank Bezel for 5.25-inch Drive Bay 53F3422
       Feature Bezel (for 53F3422)         72X8560
  5    Base Foot                           72X8565
          6 mm Screw
          Flat Washer
          Spring Washer (Rear Foot)
          Detent (Front Foot)
  9    Cover (311)                         15F6801
  9    Cover (All Others)                  72X8548
       Cover-Lock Assembly                 72X8557
       Cover-Lock Kit                      72X8572
         Cover-Lock Ring (Break-Away)
         Cover-Lock Pawl
```


Index   System Unit Interior
```
  3    Diskette Drive (see Diskette Drives)
  6    Battery/Speaker Assembly (No Cable) 72X8511
  6    Above Assembly With Attached Cable  33F5950
       Battery                             72X8498
       Battery/Speaker Assembly Cable      72X8558
  7    Fixed Disk Drive Support Structure  72X8527
  8    Adapter (see Options and Adapters)
 10    Fixed Disk Drive (see Fixed Disk Drives)
 11    Support Structure Bracket           72X8563
 12    Drive Support Structure (1/2-High Drive)  72X8559
 12    Drive Support Structure (1/3-High Drive)  34F0032
 13    System Board (041,071)              33F8416
       1MB Memory Kit (for 33F8416)        72X6670
 13    System Board (081,111,121,161,311,321)    33F8415
       2MB Memory Kit (for 33F8415)        90X7391
 13    System Board (A21,A31,A16)          34F0022
       4MB Memory Kit (for 34F0022)        34F0023
       Math Coprocessors:
         16 MHz (041,071)                  72X6673
         20 MHz (081,111,121,161,311,321)  90X7393
         25 MHz (A21,A31,A16)              15F7661
 14    Power Supply (250 Watts)            57F1600
 15    System Base                         34F0029
       101/102-Key Keyboard Cable          72X8537
```


Miscellaneous Kits
```
Label Kit                                  72X6674
  Battery Ordering Label
  Cover Blank Label
  Power-Supply Warning Label
  Weight Warning Label
Misc Parts Kit (System)                    72X8578
  Handle Screw
  Air Baffle Push Nut
  4 mm Screw
  Fixed Disk Drive Ground Wire
Misc Parts Kit (Options)                   72X8579
  Adapter-Slot Cover
  Adapter-Handle Bracket
  Cable Clip
Misc Parts Kit (Memory Options)            72X7037
  Holder, 80386 Memory-Expansion Kit
  Shield, 80386 Memory-Expansion Kit
  Shield, 80386 System-Board Memory-
  Expansion Kit
Misc Parts Kit (Hardware Kit)              72X8580
  Knob Assembly, Fixed Disk Drive
  Support Structure
  Knob
  Washer
  Insert Screw
  Captive Cover Screw, Retainer, Washer
```


Diskette Drive
```
1/2-High 1.44MB Diskette Drive             72X8523
Diskette Drive Slide (for 72X8523)         72X8507
```

```
1/3-High 1.44MB Diskette Drive          33F8211
  Diskette Drive Slide (for 33F8211)    64F0156
5.25-Inch Diskette Drive:
  360KB External (4869-001)             72X6759
  360KB External (4869-501)             72X6768
  360KB Feature Group with Adapter      72X6758
  1.2MB Internal                        15F6912
  Cable (for 15F6912)                   15F6914
  1.2MB External (4869-002)             15F7993
  1.2MB External (4869-502)             15F7994
  1.2MB Adapter/A                       15F7996
Diskette Drive Cable (see DASD Cables)
```

Fixed Disk Drive

```
44MB Fixed Disk Drive ST506            72X8541
70MB Fixed Disk Drive ESDI             72X8519
115MB Fixed Disk Drive ESDI            90X7392
314MB Fixed Disk Drive ESDI            90X8745
60MB Fixed Disk Drive SCSI             6128296
80MB Fixed Disk Drive SCSI             56F8854
120MB Fixed Disk Drive SCSI            6128298
160MB Fixed Disk Drive SCSI            56F8851
320MB Fixed Disk Drive SCSI            33F8453
Fixed Disk Drive Slide Tray (SCSI)     34F0031
Fixed Disk Drive Cable (see DASD Cables)
```

CD-ROM

```
Internal CD-ROM Drive                  81F7930
Terminators Kit (for 81F7930)          59F3530
Rail Kit (for 81F7930)                 34F0041
Power Cable (single)                   72X8521
Signal Cable (single)                  34F0043
```

DASD Cables

PICTURE 6

Index	DASD Cables	
1	1/3 High Diskette Drive Cable	34F0036
1	1/2 High Diskette Drive Cable	72X8543
	Drive-Cable Retainer (1/2-High Drive)	72X8573
2	Power Cable (single)	72X8521
2	Power Cable (dual)	34F0034
3	Fixed Disk Drive Ground Wire, see Miscellaneous Parts Kit (System)	
4	1.2MB Internal Cable (for 15F6912)	15F6914
5	Signal Cable Drive C (except SCSI)	72X8545
5	Signal Cable Drive D (except SCSI)	72X8567
5	Control Cable (except SCSI)	72X8542
5	(SCSI) Signal Cable (supports 2 devices)	64F0154
5	(SCSI) Signal Cable (supports 3 devices)	34F0035
5	(SCSI) Signal Cable (supports 4 devices)	64F0155

Options and Adapters

```
Display Adapter 8514/A                 1887971
  Memory Module (for 1887971)          1887708
Dual Async Adapter/A                   34F0008
Fixed Disk Drive Adapter (ESDI)        90X9063
Fixed Disk Drive Adapter (ST506)       72X8540
Internal Tape Backup Unit              30F5273
  Adapter Cable (34 pin)               34F2990
  Tape Cover Plate                     30F5275
  Formatted Blank Tape                 30F5277
Multiprotocol Adapter/A                90X8995
Realtime Interface CoProcessor Multiport/2 09F1888
  8-port RS232-C Electrical Interface Board      09F1889
  4-port RS232-C Electrical Interface Board      09F1957
  4+4-port RS232-C RS422-A             09F1890
   Electrical Interface Board
  512KB Memory Module Package          16F2267
```

```
Multiprotocol Interface Cable (for 09F1888)        00F5524
Screen Reader Keypad                       1393515
Screen Reader Keypad Cable                 72X8537
SCSI Adapter/A (with cache)                85F0000
Terminator, External (for 85F0000)         33F8464
Terminator, Internal (for 85F0000)         34F0025
SCSI Adapter/A (without cache)             85F0002
Terminator, Internal (for 85F0002)         57F2870
Token-Ring Network Adapter/A               83X7488
Token-Ring 16/4 Adapter/A                  16F1144
Token-Ring Adapter/A RPL                   83X9180
300/1200 Modem Adapter/A                   34F0006
Communications Cable (for 34F0006)         8285985
300/1200/2400 Modem Adapter/A              65X1253
Communications Cable (for 65X1253)         94X1540
3270 Connection                            74F3464
36/38 Emulation Adapter                    69X6281
5.25-Inch Diskette Adapter/A
(1.2MB or 360KB)                           15F7996
5.25-Inch External Diskette Adapter/A
(360KB) - Included in Feature Group        72X6758
6157 Tape Adapter                          92X1459
80386 Memory-Expansion Adapter             72X6671
   Memory-Expansion Kit (for 72X6671)      72X6672
2-8MB 80386 Memory Expansion Option        90X9556
   1MB Memory Module (for 90X9556)         90X8624
   2MB Memory Module (for 90X9556)         90X8625
```

Keyboards/Mouse

```
Belgian                                    1392012
Canadian French                            1392011
Danish                                     1392005
Dutch                                      1392013
French                                     1392000
German                                     1392001
Italian                                    1392002
Norwegian                                  1392007
Portuguese                                 1392008
Spanish                                    1392003
Spanish/Latin                              1392015
Swedish                                    1392009
Swiss/French/German                        1392010
U.K. English                               1392004
U.S. English                               1392090
101/102-Key Keyboard Cable                 72X8537
Mouse                                      61X8923
Mouse Ball and Pop-Off Retainer            33F8461
Mouse Ball and Twist-Off Retainer          33F8462
```

8503 Monochrome Display (with tilt/swivel stand)

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

8506 Monochrome Display (with tilt/swivel stand)

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

8507 Monochrome Display (with tilt/swivel stand)

```
110/120 or 220/240 Vac (Universal Model)   6247808
```

8508 Monochrome Display (with tilt/swivel stand)

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

8512 Color Display (without tilt/swivel stand)

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

8513 Color Display (with tilt/swivel stand)

```
110/120 Vac                                68X3088
220/240 Vac (Northern Hemisphere)          72X7870
```

```
220/240 Vac (Southern Hemisphere)         72X7877
Tilt/Swivel Stand                         68X3061
```

8514 Color Display (without tilt/swivel stand)
```
110/120 Vac                               75X5945
220/240 Vac (Northern Hemisphere)         75X5946
220/240 Vac (Southern Hemisphere)         75X5947
Tilt/Swivel Stand                         75X5907
```

8515 Color Display (with tilt/swivel stand)
```
90/137 Vac (US and Canada) with
tilt/swivel stand                         38F3911
90/265 Vac (N Hemisphere) with
tilt/swivel stand                         38F3912
180/265 Vac (S Hemisphere) with
tilt/swivel stand                         38F3913
90/137 Vac (Japan, S.Korea, Taiwan) with
tilt/swivel stand                         38F3914
```

8604 Monochrome Display (with tilt/swivel stand)
```
110/120 Vac                               6398267
```

Tools and Miscellaneous
```
Tri-Connector Wrap Plug                   72X8546
Wrap Plug                                 59X4115
   (for 6157 Tape Attachment Adapter
Wrap Plug                                 6165899
   (for Token-Ring Network Adapter/A
Wrap Plug (for Real-time Interface        16F2478
   Co-Processor Multiport/2) 78-pin
Wrap Plug (for Multiport Interface Cable) 6425494
   Direct Connect 25-pin, ports 0 and 1
Wrap Plug (for Multiport Interface Cable) 09F1799
   Direct Connect 25-pin, ports 2 through 7
Plastic Envelope (For Wrap Plug)          6138013
Data Migration Facility                   61X8936
Tool (For Key Cap Removal)                6110464
Snap Tool (For Snap Removal)              72X8547
Shipping Carton (Type 8580)               72X8591
```

Power Cords

PICTURE 7

Index   Power Cords
```
         Warning:  Use the power cord
            certified for your country.
 1       Power Cord, Displays
         (except 8514), for:              68X3071
            Colombia, U.S., Venezuela
 2       Power Cord, System Unit, for:    62X1045
            Colombia, U.S., Venezuela
 3       Power Cord, System Unit, for:    8529341
            Hong Kong, Singapore, U.K.
 4       Power Cord, System Unit, for:    8529281
            France, Germany, Spain
 5       Power Cord, System Unit, for:    8529282
            Italy
 6       Power Cord, System Unit, for:    8529284
            Australia, New Zealand
```

Supplemental Parts:

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IBM

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