FRONT

PICTURE 1

May 28, 1991

This pamphlet contains procedures for isolating, to a FRU, problems with
an IBM Personal System/2 external SCSI device. The pamphlet also has a
parts listing for those devices.

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

Part Number 92F1656

Form Number S64F-1426-03

Safety Information

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

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1.0 General Checkout

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

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Subtopics
1.1 Automatic Configuration

1.1 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.)

IMPORTANT:
   You have entered this pamphlet because you were directed here from a
   system service pamphlet, or you have identified a failing external
   SCSI device.
   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. Refer to the Symptom-to-FRU index in the
   Hardware Maintenance Service pamphlet for the system being serviced.
   If a device has more than one FRU, an error code may be caused by any
   of the FRUs. Before replacing the device, remove the FRUs, one by
   one, to see if the symptoms change.

```
+---+
¦001¦
+---+
```
- Power-off the system.
HAVE YOU IDENTIFIED THE FAILING DEVICE?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦002¦
 ¦    +---+
 ¦    Depending on the device you are servicing, go to "Single-Device
 ¦    Isolation" in topic 2.0,
 ¦    - or -
 ¦    "3511 External Storage Enclosure Isolation" in topic 10.0.
 ¦
+---+
¦003¦
+---+
```
**IS THE FAILING DEVICE INSTALLED IN A 3511 EXTERNAL STORAGE ENCLOSURE FOR
SCSI DEVICES?**
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦004¦
 ¦    +---+
 ¦    Go to "3510 Power Supply Check" in topic 4.0.
 ¦
+---+
¦005¦
+---+
```
Go to "3511 Power-Supply Check" in topic 12.0.
```
------------------------------------------------------------------------
```

2.0 Single-Device Isolation

Go to the **Set and View SCSI Device Configuration** screen and determine
which external device is missing.
1. If only one external device is missing, that device is defective. Go
    to "Single-Device Power Supply" in topic 3.0. If more than one device
    is missing, continue with the next step.

    Note: Each time you connect or disconnect a device, run **Automatic
             configuration** (see "Automatic Configuration" in topic 1.1
             before continuing) and verify that the devices listed on the
             Set and View SCSI Device Configuration screen match what is
             connected to the adapter. If the list does not match, then the
             last device reconnected, or the cable, is defective.

2. Follow the isolation sequence below (do not run diagnostic tests
    during this sequence).
    a. To isolate the devices, disconnect the last device in the chain.
    b. Move the external terminator to the next device in the chain.
    c. Continue the isolation process until you find the failing device.

    If the status of any presence error-reporting device has been changed,
    make sure it is set back to "enabled." After the failing device has
    been isolated, go to "Single-Device Power Supply" in topic 3.0.

3.0 Single-Device Power Supply

Go to the power supply check procedure for the external device you are
servicing.

Note: An inoperative fan can cause intermittent heat-related problems.
If the fan is not running, replace the fan. If the problem
remains, replace the power supply.

4.0 3510 Power Supply Check

The direction of air flow, and the position in which the fan must be
installed, varies depending on the device installed. If the fan is
installed facing in the wrong direction, intermittent heat-related
problems may occur. If a 320MB or 400MB SCSI fixed disk drive is
installed, the fan must be installed with the arrow on top of the fan
pointing towards the inside of the enclosure. On all other devices, the
fan must be installed with the arrow pointing away from the enclosure.

Remove the external cover and check the power-supply voltages. If the
voltages are not correct, replace the power supply. If the voltages are
correct, replace the device.

Vdc Minimum	Vdc Maximum	-Lead Pin	+Lead Pin
+3.7	+6.2	B	D
+9.0	+15.0	C	A

PICTURE 2

5.0 3532 Power-Supply Check

If the power-on light on the 3532 is not on, remove the external cover and
check the power-supply voltages. If the voltages are not correct, replace
the power supply.

V dc Minimum	V dc Maximum	-Lead Pin	+Lead Pin
+11.40	+12.60	B	D
+ 4.75	+ 5.25	C	A

PICTURE 3

If the power-on light is on, go to "3532 Checkout" in topic 6.0.

V dc Minimum	V dc Maximum	-Lead Pin	+Lead Pin

6.0 3532 Checkout

```
+---+
¦001¦
+---+
```
DID YOU RECEIVE A 0211XXXX POST ERROR CODE?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦002¦
 ¦    +---+
 ¦    Follow the instructions on the screen to run the diagnostic tests,
 ¦    then go to Step 004.
 ¦
+---+
¦003¦
+---+
```
Go to "Symptom-to-FRU Index" in topic 9.0.

```
+---+
¦004¦
+---+
```
DID THE DIAGNOSTIC TESTS IDENTIFY A FAILURE?
Yes No
```
 ¦    ¦
 ¦    +---+
 ¦    ¦005¦
 ¦    +---+
 ¦    Go to "In-Use Light Checkout" in topic 7.0.
 ¦
+---+
¦006¦
+---+
```
Follow the instructions on the screen. If that does not correct the
problem, go to "In-Use Light Checkout" in topic 7.0.

7.0 In-Use Light Checkout

You are here because you suspect the drive has failed but the diagnostic
tests did not detect an error. Do the following:
1. Load a blank tape cassette (with write protect off) into the drive and
    close the tape-tray door.

    Note: If the tape-tray door automatically opens, replace the tape
           cassette.

2. Power-off the 3532.
3. Power-on the 3532 and watch the drive and the in-use lights for the
    following responses:
    a. The green and amber lights go on.
    b. The drive runs a POST.
    c. When you push the tape-eject button and the tape-tray door opens,
        the amber light goes off.
    d. The green light remains on.

    If the responses are incorrect, one of the following FRUs failed:
    a. Tape Drive.
    b. SCSI Cable (Internal).

If the responses are correct but you still suspect a problem, go to
"Intermittent Failure" in topic 8.0.

8.0 Intermittent Failure

An intermittent failure can be caused by the following FRUs:

      Power supply
      Tape Drive
      Tape Drive fan.

9.0 Symptom-to-FRU Index

Error symptoms and the FRUs that might be responsible for the 3532 failure
are listed below. The most-likely failing FRU is listed first. If you
are unable to correct the problem using this index, go to "Undetermined
Problems" in the service pamphlet for the system you are servicing.

Note: Supplemental space is available in the system *Hardware Maintenance*
Service pamphlets to add option error-code information.

Subtopics
9.1 Miscellaneous Symptoms
9.2 Numeric Error Codes

9.1 Miscellaneous Symptoms

+---+
| **Symptom/Error** | **FRU / Action** |
+----------------------------------+----------------------------------+
The amber light remains on.	
	Tape Drive
	SCSI Cable (Internal)
	SCSI Adapter
+----------------------------------+----------------------------------+
The green in-use light	
fails to come on.	**Tape Drive**
	SCSI Adapter
	SCSI Cable (Internal)
	SCSI Cable (External)
+----------------------------------+----------------------------------+
The SCSI ID set on the rotary	
switch does not match the SCSI ID	**Rotary Switch Circuit Board**
in the configuration.	Circuit Board Cable
(Verify the drive switches inside	Tape Drive
the cover are set to zero before	
replacing any FRUs.)	
+----------------------------------+----------------------------------+
The tape is automatically ejected	
from the drive.	**Tape Cassette**
	Tape Drive
+----------------------------------+----------------------------------+
The tape sticks or breaks in the	
drive.	**Tape Cassette**
(Verify that the tape used is an	
IBM or equivalent.)	
+---+

9.2 Numeric Error Codes

```
+-------------------------------------------------------------------------+
¦ Symptom/Error                    ¦ FRU / Action                         ¦
+----------------------------------+--------------------------------------¦
¦ 0211XXXX                         ¦                                      ¦
¦ (The internal and external drives¦ Drive                                ¦
¦ have different FRU numbers.)      ¦ SCSI Adapter                         ¦
¦                                  ¦ SCSI Cable                           ¦
¦                                  ¦                                      ¦
+-------------------------------------------------------------------------+
```

10.0 3511 External Storage Enclosure Isolation

To determine the failing FRU, follow the procedure below.
1. If only one external device is missing from the Installed Devices
    List, that device is defective. If more than one device is missing,
    continue with the next step.
2. Each time you connect or disconnect a device, run **Automatic
    configuration** and verify that the Installed Devices List matches what
    is connected to the adapter. If the list does not match, then the
    last device reconnected, or the cable, is defective.

    Follow the isolation sequence below (do not run diagnostic tests
    during this sequence).
    a. To isolate the devices, disconnect the devices one at a time.
    b. Continue the isolation process until you find the failing device.

    If the status of any presence error-reporting device has been changed,
    make sure it is set back to "enabled." After the failing device has
    been isolated, go to "3511 Power-Supply Check" in topic 12.0.

11.0 3511 External Storage Enclosure Power-Supply Fan

An inoperative fan can cause heat to build up, resulting in intermittent
problems.

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

11.0 - 1

12.0 3511 Power-Supply Check

The power-supply check is divided into two parts: "Current Check" and
"Voltage Check." Start with "Current Check," then continue with "Voltage
Check."

Subtopics
12.1 Current Check

12.1 Current Check

 The total-nominal-operating currents available in the Storage Enclosure
to power the media storage devices are listed in the following table:

Warning: If devices exceed these currents, damage to the power supply or
system shutdown may result.

	+5V	+12V
Current	4.6A	7.5A

The following table lists the nominal operating currents for the devices
supported in the Storage Enclosure. The total amount of nominal operating
current required for the devices installed must not exceed the available
current of the storage-enclosure power supply.

Media Storage Device	Current +5V	+12V	Permitted Bay Location
127MB Rewritable Optical Drive Model MD2125A	0.9A	1.4A	E and D (top)
CD-ROM Model XM-3101BME	0.9A	1.7A	E and D (top)
400MB Fixed Disk Drive Type 0661	0.7A	1.2A	All
320MB Fixed Disk Drive Type 0661	0.66A	1.0A	All
160MB Fixed Disk Drive Model WDS-3160	0.5A	0.8A	All
120MB Fixed Disk Drive Model WDS-3158	0.66A	1.0A	E, D (top), D (bottom), C (top), and C (bottom)
80MB Fixed Disk Drive Model WDS-380	0.5A	0.8A	All
60MB Fixed Disk Drive Model WDS-387	0.66A	1.0A	E, D (top), D (bottom), C (top), and C (bottom)

If the voltages are not correct, replace the power supply. If the
voltages are correct, replace the failing device. If the problem remains,
replace the load distribution card.

PICTURE 4

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

14.0 3511 Storage Enclosure Overview

PICTURE 5

Index	3511 Storage Enclosure	
1	Base Assembly	33F8417
2	Rear Bezel	33F8419
3	Cover Assembly	33F8427
	Rear Cover Plate	64F4121
4	Power Supply	15F6636
5	Power Switch Cable	64F0125
6	Load Distribution Card	64F0139
7	Pedestal Assembly	64F0215
8	3.5 Inch Drive Tray	64F0141
9	SCSI Fixed Disk Drive	
	60MB Fixed Disk Drive	56F8854
	80MB Fixed Disk Drive	56F8854
	120MB Fixed Disk Drive	6128298
	160MB Fixed Disk Drive	56F8851
	320MB Fixed Disk Drive	85F0011
	400MB Fixed Disk Drive	85F0012
	Internal CD ROM (without rails)	81F7930
	CD-ROM Drive Bezel	64F0138
	CD ROM Grounding Spring	81F0067
	127MB Rewritable Optical Drive	85F0015
	Drive Bezel (for 85F0015)	85F0018
	SCSI Tape Drive (internal only)	85F0055
	SCSI Tape Drive (3532 only)	02G7402
	Framing Bezel (for 85F0055)	64F4138
	Rail Kit (for 85F0055)	34F0041
	Media Kit	59F3907
	Cleaning Tape	
	Blank Tape	
	Cleaning Tape	21F8593
	Blank Tape (Qty. 5)	21F8595
10	Drive Retainer	64F4135
11	Front Bezel	64F4137
12	Power Switch Bezel Assembly	64F0131
13	Power Switch / Speaker Assembly	64F0143
	Power Switch Kit	33F8442
	Power Switch Plate	
	Power Switch Knob	
	Blank Bezel (for bays A and B)	33F8437
	Blank Bezel (for bay D-bottom)	64F4136
	Blank Bezel (for bays D-top and E)	33F8425
	Keylock Assembly	33F8433
	Option Device Guide	33F8441
	SCSI Cable	64F0127
	Device Power Cable (two devices)	34F0014
	Device Power Cable (three devices)	64F0197
	5.25 Inch Device Rail Kit	33F8443
	Rail Kit (for bays A and B)	64F0152
	Base Ground Strap	33F8418
	Base Ground Bracket	64F0129
	Miscellaneous Parts Kit	33F8435
	I/O Bracket Kit	64F0196
	System-to-Device Cable (50 to 60 pin)	34F0017
	Power Cord	68X3071

15.0 3510 Overview

PICTURE 6

Index	3510 (Locking and non locking types)	
1	External Cover (non locking type)	64F0135
	External Cover (WT) (non locking type)	64F0136
	(exchange basis only)	
	Base	
	Tray	
	Internal Cables	
	Phono Jack	
6	External CD-ROM (without rails)	81F7730
	Rail Kit (for 81F7730) Drive	34F0041
	CD-ROM Drive Assembly (WT)	34F0021
	Headphones (CD-ROM)	59F3655
	Cleaning Kit (CD-ROM)	59F3562
	Disc Kit	
	Test Disc	
	Disc Caddy	
1	Top Cover (locking type)	85F0027
	(exchange basis only)	
	Bezel	
	Logo	
	Keylock Assembly	
	Keylock Assembly	33F8433
2	Base (for 85F0027)	85F0072
	(exchange basis only)	
	Information Label	
	Base Feet (Qty. 4)	
8	Fan Assembly	92F0008
3	Power Supply (for 85F0027)	85F0051
3	Power Supply (for 64F0135)	34F0042
7	Fixed Disk Drive	
	60MB Fixed Disk Drive	6128296
	80MB Fixed Disk Drive	56F8854
	120MB Fixed Disk Drive	6128298
	160MB Fixed Disk Drive	56F8851
	320MB Fixed Disk Drive	85F0011
	400MB Fixed Disk Drive	85F0012
4	Fixed Disk Drive Tray with Bezel	64F4108
	Tray Shield Enclosure Kit	92F0007
	Fixed Disk Drive Cable	92F0009
	SCSI Remote Address switch and cable	64F4107
	127MB Rewritable Optical Drive	85F0015
5	Tray with Bezel	85F0021
	Objective Lens Cleaning Cartridge	
	(for 85F0015)	85F0043
	Prism Lens Cleaning Cartridge	
	(for 85F0015)	85F0054
	Miscellaneous Parts Kit (for 85F0027)	92F0010
	Power Supply Knob	
	Base Feet (Qty. 4)	
	System-to-Device Cable (60 to 50 pin)	34F0017
	Device-to-Device Cable (50 to 50 pin)	34F0018
	50-Pin Terminator	92F0057
	Power Cord	68X3071

16.0 3532 Overview

PICTURE 7

Index	**3532 SCSI Tape Drive**	
1	Top Cover (exchange basis only)	00G0988
	Bezel	
	Logo	
	Cover Screw	42F6707
	Cover Wrench	31F4220
2	Base (exchange basis only)	42F6874
	Base Foot Pad	02G7413
3	SCSI Tape Drive (3532 only)	02G7402
	SCSI Tape Drive (internal only)	85F0055
	Drive Screw	0055726
4	Power Supply	81F9128
	Power Supply Screw	1621171
	Power Supply Cable Torroid	59F4585
5	Remote Address Switch Cable	42F7299
6	Remote Address Switch Board	53F3872
7	Rear Chassis	02G7398
	Logo	
	Rear Chassis Screw	42F6707
8	SCSI Cable	53F3861
	SCSI Cable Screw	0251970
9	Drive Tray Cover	42F7270
	Drive Tray Cover Screw	1621170
	Foam Spacer	71F0734
10	Drive Fan Assembly	42F7300
	Drive Fan Screw	0438553
11	Drive Tray	53F3113
	Base Flat Washer	1091414
	Base Star Washer	0060646
	Drive Tray screw	1621171
	System-to-Device Cable (60 to 50 pin 3532 only)	31F4221
	Device-to-Device Cable (50 to 50 pin 3532 only)	31F4222
	Device-to-Device Cable (50 to 50 pin)	34F0018
	50-Pin Terminator	92F0057
	Power Cord	6952300
	Media Kit	59F3907
	Cleaning Tape	
	Blank Tape	
	Cleaning Tape	21F8593
	Blank Tape (Qty. 5)	21F8595

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