

## **SCSI Multi-Storage Enclosure (Type 3517)**

February 1996

This package contains SCSI Multi-Storage Enclosure (Type 3517) supplemental information to the IBM Personal System/2 *Hardware Maintenance Manual* (part number 83G8990, form number S52G-9971) and the IBM PC Server *Hardware Maintenance Manual* (part number 30H2501, form number S30H-2501).

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## Note

Before using this information and the product it supports, be sure to read the general information under "Notices" in your manual.

### First Edition (February 1996)

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## Features

### Important

For additional information about the 3517, refer to the *3517 Model 001 SCSI Multi-Storage Enclosure Service Guide*, SY32-0400.

### Media Bays

Two media bays support 8-bit, 4-mm tape drives.

### Hot-Swap Bays

Five hot-swap bays support 1.1 gigabyte (GB), 2.2GB, and 4.5GB single-ended SCSI-2 disk drives mounted on easily removable carriers.

### Hot-Swap Carriers

Each carrier contains the following features, as shown at the bottom of the illustration on page 10.

- A pushbutton power switch that allows power to be removed from and returned to the disk drive.
- A green light to indicate that power is being supplied to the disk drive. (The green light will flash if the power switch on the carrier is pushed off or if the cooling fan is malfunctioning.)
- A yellow light to indicate that the 3517 is connected to the system and the disk drive is available.
- A latch to lock the disk drive into the hot-swap bay to maintain connection with the bus. (The carrier is locked into the bus when the latch is in the horizontal position.)

### Power Supply

- Non-autoranging (see **Attention** on page 14)
- Low voltage (115 volts setting)
  - 90–137 V ac
  - 6.3 Amps
  - 0.76 kVA
  - 378 Watts
- High voltage (230 volts setting)
  - 180–265 V ac
  - 4.0 Amps
  - 0.96 kVA
  - 480 Watts

### Servers Supported

The 3517 can be attached to any PC Server that supports a SCSI-2 adapter.

## Symptom-to-FRU Index Supplement

The information in this supplemental index supports the SCSI Multi-Storage Enclosure (Type 3517).

The index lists symptoms and the possible causes. The most likely cause is listed first. Use the index to help you decide which FRUs to have available when servicing this unit.

### Important

The information in this manual is intended for service representatives who are trained to repair the IBM 3517 SCSI Multi-Storage Enclosure.

Before servicing an IBM product, be sure to review "Safety Information" on page 19.

For additional information, refer to the *3517 Model 001 SCSI Multi-Storage Enclosure Service Guide, SY32-0400*.

Symptom	FRU/Action
The green light for the power switch is not on, and/or the power supply fan is not running.	<ol style="list-style-type: none"><li>1. <b>Verify that the power cord to the 3517 has continuity.</b></li><li>2. Verify that the power source has been wired correctly and has the correct voltage.</li><li>3. Verify that the voltage selection switch is set to match the power source.</li><li>4. Verify that the power cord is plugged into the 3517 and the power source.</li><li>5. Verify that the power switch is on.</li><li>6. If the problem still exists, replace the power supply.</li></ol>
The green light is flashing, and the yellow light is off for all hot-swap hard disk drives.	<ol style="list-style-type: none"><li>1. <b>Press the power switch on the hot-swap hard disk drive in hot-swap bay 0.</b></li><li>2. If the green light on the hot-swap hard disk drive continues to flash, replace the cooling fan.</li><li>3. If the green light on the hot-swap hard disk drive is on and not flashing, press the power switch on the remaining hot-swap hard disk drives to turn their green lights on. The green light should not be flashing.</li></ol>

Symptom	FRU/Action
<p>The green light for the power switch is on, and the green light on all hot-swap hard disk drives is not flashing, but no devices are available to the system.</p>	<ol style="list-style-type: none"> <li>1. <b>Verify that the system SCSI cable is correctly connected to the 3517 storage unit and the system.</b></li> <li>2. Verify that the internal SCSI cable and all power cables to the backplane are correctly connected.</li> <li>3. Send the command from the system to spin-up the drives. Refer to the system publications for more information. Remove the following FRUs; then run the system diagnostics after each FRU is replaced. <ol style="list-style-type: none"> <li>a. System SCSI Cable.</li> <li>b. Internal SCSI cable.</li> <li>c. Backplane.</li> </ol> </li> <li>4. If there is still a problem after all the FRUs have been replaced, one of the hot-swap hard disk drives may be defective. <ol style="list-style-type: none"> <li>a. Unseat all of the hot-swap hard disk drives except the one in hot-swap bay 0.</li> <li>b. Disconnect the internal SCSI cable, if installed, from the manual-plug devices.</li> <li>c. Send the command from the system to spin-up the drives. Refer to the system publications for more information.</li> </ol> </li> <li>5. If the command is successful, reseat the next hot-swap hard disk drive and send the command from the system to spin-up the drive.</li> <li>6. Repeat step 5 on page 4 until the failure symptom returns. Then remove and replace the FRUs in the following order, and run the system diagnostics after each FRU is replaced. <ol style="list-style-type: none"> <li>a. Hot-swap hard disk drive carrier.</li> <li>b. Hot-swap hard disk drive.</li> </ol> </li> </ol>

Symptom	FRU/Action
<p>One hot-swap hard disk drive is not available to the system.</p>	<ol style="list-style-type: none"> <li>1. <b>Verify that the hot-swap hard disk drive carrier cables are correctly connected.</b></li> <li>2. If the green light on the hot-swap hard disk drive is flashing, press the power switch on the drive.</li> <li>3. Send the command from the system to spin-up the drive. Refer to the system publications for more information.</li> <li>4. If the hot-swap hard disk drive is still not available to the system, remove and replace the FRUs in the following order, and run the system diagnostics after each FRU is replaced. <ol style="list-style-type: none"> <li>a. Hot-swap hard disk drive carrier address cable.</li> <li>b. Hot-swap hard disk drive carrier.</li> <li>c. Hot-swap hard disk drive.</li> <li>d. Backplane.</li> </ol> </li> </ol>
<p>One manual-plug device is not available to the system.</p>	<ol style="list-style-type: none"> <li>1. <b>Verify that all cables are properly connected.</b></li> <li>2. Send the command from the system to start the drive.</li> <li>3. If the manual-plug device is still not available to the system, exchange the FRUs in the following order; then run the system diagnostics after each FRU is replaced. <ol style="list-style-type: none"> <li>a. Interposer on the manual-plug tape drives.</li> <li>b. Manual-plug device.</li> <li>c. Internal SCSI cable.</li> </ol> </li> </ol>

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## Address Settings

### **Manual-Plug Tape Drive (8-Bit, 4-mm)**

Two types of manual-plug tape drives (8-bit, 4-mm) can be used in the 3517: type 1 and type 2. They can be identified by the location of the SCSI signal cable connector on the rear of the drive assembly, as shown under "Type 1" on page 7 and "Type 2" on page 8. (When viewing the rear of a type-1 tape drive, the SCSI signal cable connector is located on the top-half of the rear of the drive assembly. When viewing the rear of a type-2 tape drive, the SCSI signal cable connector is located on the bottom-half of the rear of the drive assembly.)

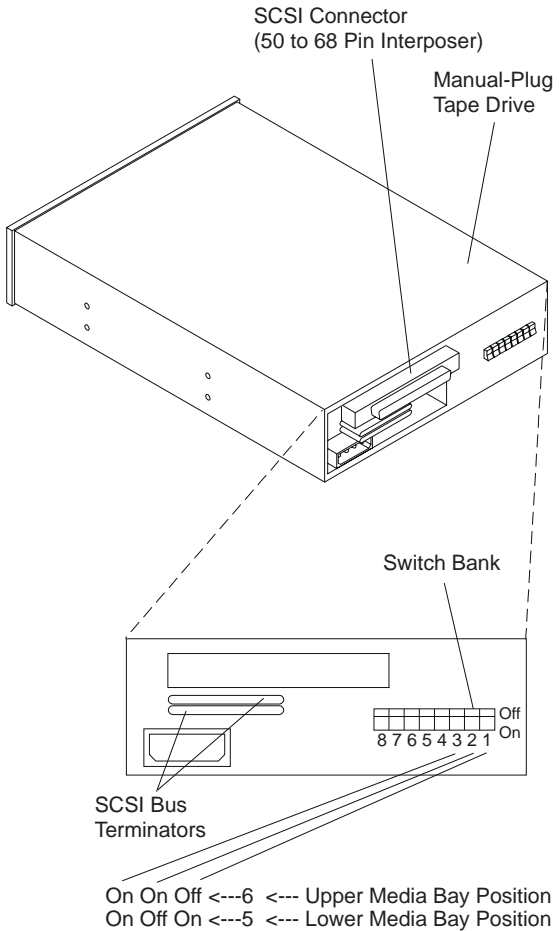
Set the address switches or pins (as applicable) on the manual-plug tape drives before installing the drives in the media bays. See pages 7 and 8.



## Type 1

To set the address on a type-1 tape drive:

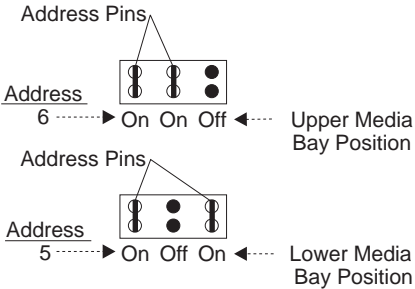
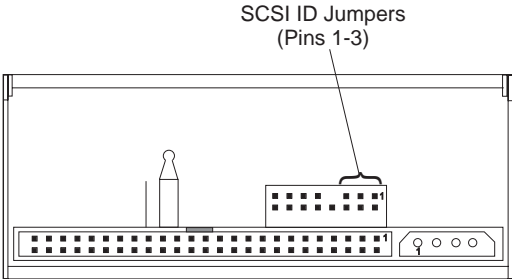
1. Remove the SCSI bus terminators if they are installed.
2. Move the switches on the switch bank, as illustrated.



# Type 2

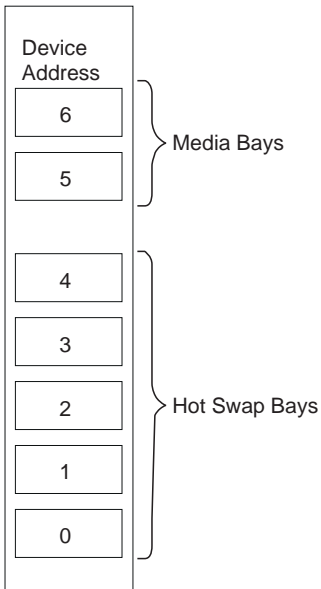
To set the address on a type-2 tape drive:

1. Remove the SCSI bus terminator jumpers (pins 6 and 8).
2. Use the address pin jumpers provided with the tape drive to connect the upper and lower pins that correspond to the SCSI ID you want to use, as illustrated.



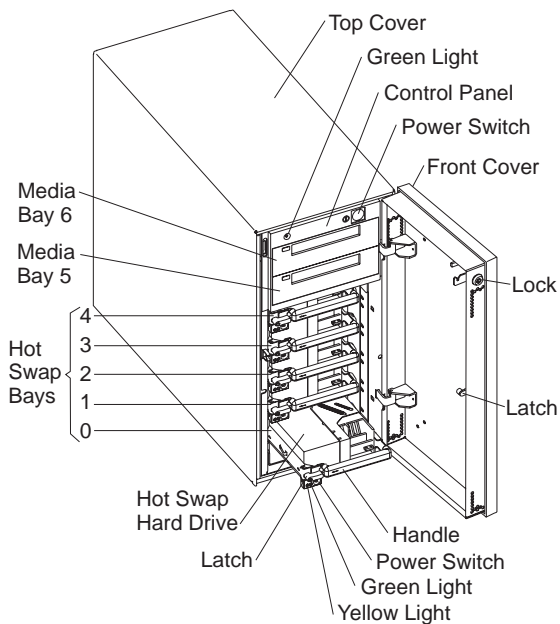
## Devices

The following illustration shows the seven device addresses for the 3517 storage unit.

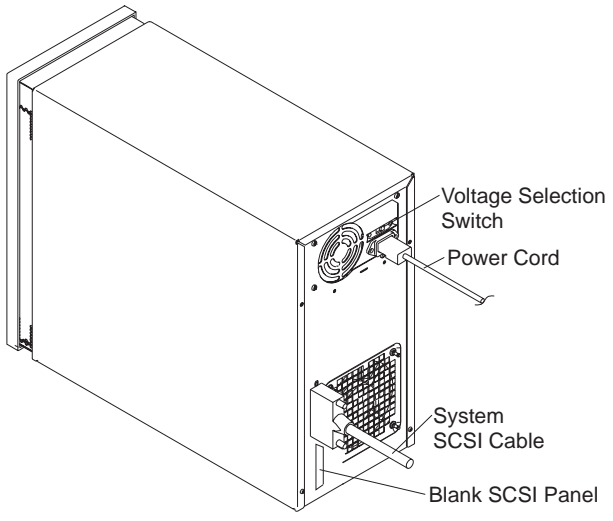


# Locations

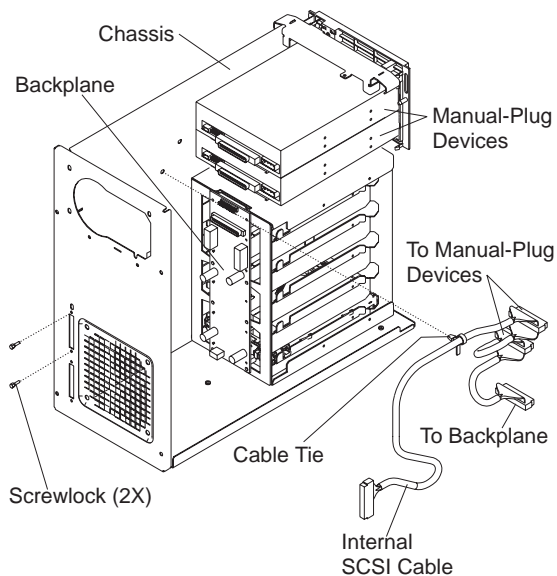
## Front View



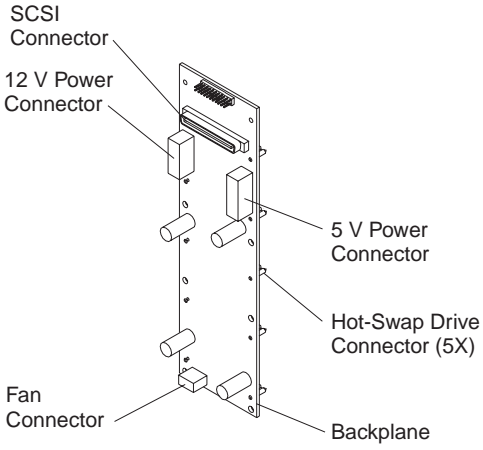
# Rear View



# Internal View

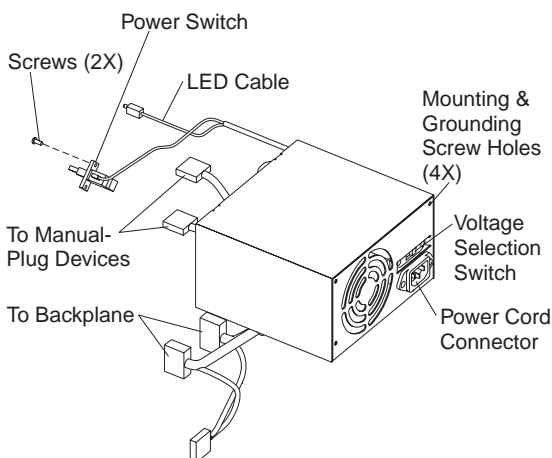


# Backplane



## Power Supply

The power supply is mounted at the top back of the 3517.

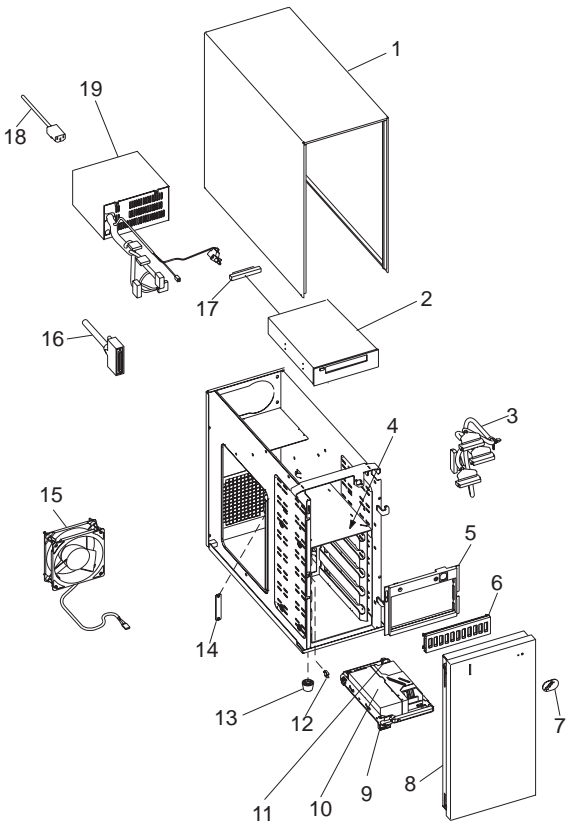


### Attention

The Voltage Selection Switch is a two-position switch on the power supply. The switch can be set to 115 V ac (in USA) or 230 V ac (in some other countries). The switch must be set to match the input voltage at the wall outlet before connecting the power cord. If the 3517 is connected to the wrong level of voltage input, the 3517 will not operate and the power supply can be damaged. The power supply is not autoranging.



# Parts Listing



**Index SCSI Multi-Storage Enclosure (Type 3517)**

<b>1</b>	Top Cover Assembly	05H4680
	Screws, Top Cover Assembly (4 each)	27H2338
<b>2</b>	4GB/8GB 4-mm Tape Drive	16G8454
	Screws, 4-mm Tape Drive (4 each)	27H2338
<b>3</b>	SCSI Cable Assembly, Internal	05H4827
	Screwlocks, SCSI Cable (2 each)	27H0863
	Cable Tie	1159519
<b>4</b>	Backplane Assembly (with 5-bay, hot-swap cage)	26H9180
	Screws, Backplane Assembly (8 each)	27H0840
<b>5</b>	Control Panel Assembly	26H9191
<b>6</b>	Blank Media-Bay Panel	06H2187
<b>7</b>	IBM Logo	44H7627
<b>8</b>	Front Cover Assembly	26H9206
<b>9</b>	16-Bit Power Carrier, Hot-Swap Hard Disk Drive	06H8631
	Screws, Hot-Swap Hard Disk Drive to Carrier (4 each)	1147429
<b>10</b>	16-Bit 1.1GB Hot-Swap Hard Disk Drive	06H8560
	16-Bit 2.2GB Hot-Swap Hard Disk Drive	06H8561
	16-Bit 4.5GB Hot-Swap Hard Disk Drive	06H8563
<b>11</b>	Cable, 16-Bit Address, Disk Drive to Carrier	06H8631
<b>12</b>	Latch	26H9207
<b>13</b>	Feet (4 each)	26H9234
	Screws, Feet (4 each)	49G5445
<b>14</b>	Blank SCSI Panel	27H0862
	Screws, Blank SCSI Panel (2 each)	27H2338
<b>15</b>	Fan Assembly, includes Isolators and Finger Guard	27H0922
	Cable Tie	1159519
<b>16</b>	SCSI Fast/Wide 1X Cable	06H3231
	SCSI Wide 1X Cable	70G9857
<b>17</b>	Interposer, 2 x 25 to 68 Pin	92F0324
<b>18</b>	Power Cord (See page 17.)	
<b>19</b>	Power Supply	26H9205
	Screws, Power Supply (4 each)	34H8186
	Screws, Power Switch (2 each)	34H8186
	Cable Tie	1159519
	Media Kit, 4GB/8GB 4-mm Tape Drive	8191149
	• 4GB/8GB 4-mm Tape Drive Data Cartridge (8191160)	
	• 4GB 4-mm Tape Drive Diagnostic Cartridge (8191146)	
	• 4-mm Tape Drive Cleaning Cartridge (21F8763)	

**Power Cords**

Arabic	14F0033
Belgium	13F9979
Bulgaria	13F9979
Czechoslovakia	13F9979
Denmark	13F9979
Finland	13F9979
France	13F9979
Germany	13F9979
Hungary	13F9979
Israel	14F0087
Italy	14F0069
Latvia	13F9979
Netherlands	13F9979
Norway	13F9979
Poland	13F9979
Portugal	13F9979
Serbia	13F9979
Slovakia	13F9979
South Africa	14F0015
Spain	13F9979
Switzerland	13F9979
Switzerland (French/German)	14F0051
U.S. English	6952301
U.K./Ireland	14F0033
Yugoslavia	13F9979

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## Specifications

### Note

If more than one 3517 is installed, you must leave a minimum space of 2.5 cm (1 in.) between them, and 15 cm (6 in.) in the back, to meet cooling requirements.

### Size

- Depth: 483 mm (19 in.)
- Height: 407 mm (16 in.)
- Width: 197 mm (7.75 in.)

### Weight

- Minimum configuration (2 devices): 20 kg (44 lb.)

### Note

The weight of the 3517 is between 18 and 32 kg (39.7 and 70.5 lb.). It takes two persons to safely lift the unit.

### Operating Environment

- Air temperature: 16° to 32° C (60.8° to 89.6°F)
- Relative Humidity: 20% to 80%
- Wet Bulb: 23.0° C (73.4°F) maximum
- Voltage: 115/230
- Maximum altitude: 2135 m (7000 ft)

### Electrical Input

- Input voltage
  - Low range
    - Minimum: 90 V ac
    - Maximum: 137 V ac
  - High range
    - Minimum: 180 V ac
    - Maximum: 265 V ac
  - Input kilovolt-amperes (kVA) approximately
    - Low range input: 0.76 kVA
    - High range input: 0.96 kVA

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## Safety Information

The following section contains the safety information that you need to be familiar with before servicing an IBM mobile computer.

### General Safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

**Remember:** Metal objects are good electrical conductors.

- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

## Electrical Safety

Observe the following rules when working on electrical equipment.

### Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.

**Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

**Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators

and similar units. (This practice ensures correct grounding of the units.)

- If an electrical accident occurs:
  - **Use caution; do not become a victim yourself.**
  - **Switch off power.**
  - **Send another person to get medical aid.**

## Safety Inspection Guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
  - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
  - b. The power cord should be the appropriate type as specified in the parts listings.
  - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.



## Handling Electrostatic Discharge-Sensitive Devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

### Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

**Note:** The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the AC plug on AC-operated computers.

## Grounding Requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

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