7206 12GB External 4mm Tape Drive

Service Guide

Model 110

SA37-0383-01

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SA37-0383-01

Note!

Before using this information and the product it supports, read the information in “Safety and Environmental Notices” on page v and “Appendix B. Notices” on page 41.

Second Edition (August 1999)

This edition replaces SA37-0383-00.

Contents

Safety and Environmental Notices

When using this product, observe the danger, caution, and attention notices contained in this guide. Each danger and caution notice contains a reference number (72XXDxxx or 72XXCxxx). Use the reference number to check the translation in *External Devices Safety Information*, SA26-7003.

Examples of danger, caution, and attention notices follow.

Danger Notice

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people.

The following is a sample danger notice:

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (72XXD201)

Caution Notice

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition.

The following is a sample caution notice:

CAUTION:
Do not attempt to use the handle on the module to lift the entire device (module and enclosure) as a unit. First remove the module; then, use two hands to lift the enclosure. (72XXC356)

Attention Notice

An attention notice indicates the possibility of damage to a program, device, system, or data.

The following is a sample attention notice:

Attention: Do not operate the 7206 Tape Drive in a poor air-quality environment. If your environment contains an excessive amount of particulates, contact your service representative for more information.

End of Life (EOL) Plan

This box is a purchased unit. Therefore, it is the sole responsibility of the purchaser to dispose of it in accordance with local laws and regulations at the time of disposal.

This unit contains recyclable materials. The materials should be recycled where facilities are available and according to local regulations. In some areas IBM® may provide a product take-back program that ensures proper handling of the product. Contact your IBM representative for more information.

Safety Inspection Procedures

DANGER

To prevent a possible electrical shock from touching two surfaces with different electrical grounds, use one hand, when possible, to connect or disconnect signal cables. *(72XXD004)*

DANGER

To prevent a possible electrical shock when adding or removing any devices to or from the system, ensure that the power cords for those devices are unplugged before the signal cables are connected or disconnected. If possible, disconnect all power cords from the existing system before you add or remove a device. *(72XXD203)*

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (72XXD201)

Use the following procedures to identify unsafe conditions. Be cautious of potential safety hazards not covered by the procedures. If unsafe conditions are present, determine how serious the hazards are and whether you should continue before correcting the problem.

Figure 1 on page vii shows the components to review during the service inspection.

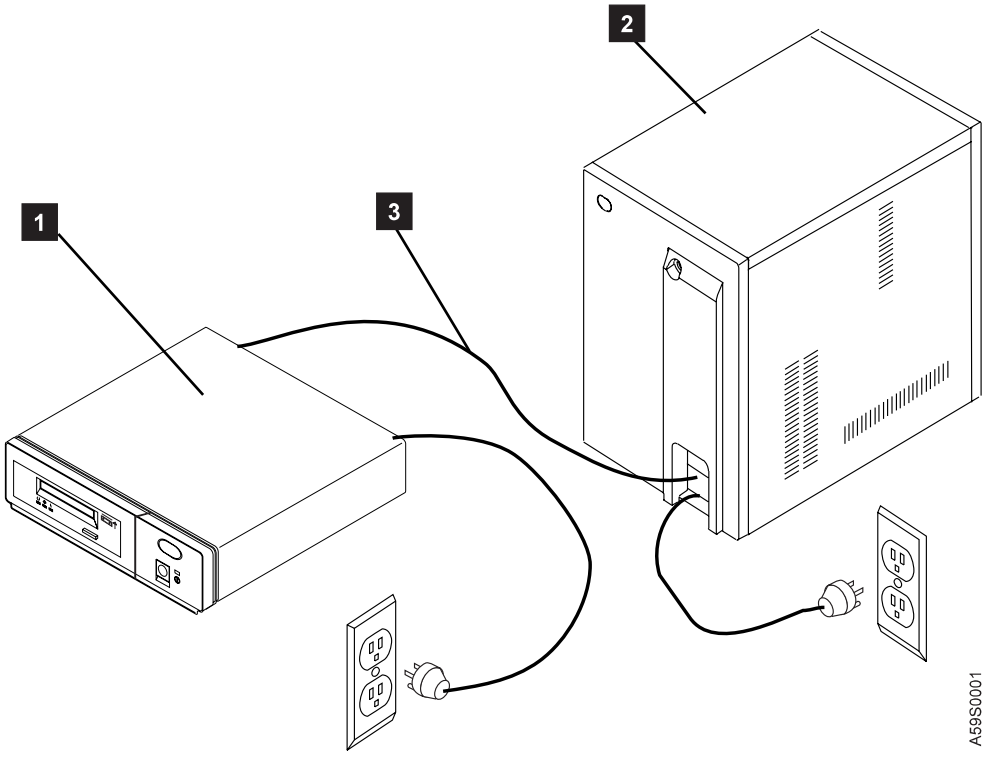


Figure 1. Safety Inspection

Perform the following safety checks.

1. Do a controlled system shutdown (refer to the instructions in Chapter 2, “Setting Up the 7206 Tape Drive,” in the *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*).
2. Turn off the power to all external devices connected to the system unit.
3. Turn off the power to the 7206 Tape Drive (**1** in Figure 1).
4. Turn off the power to the system unit **2** .
5. Unplug the 7206 Tape Drive external power cable from the electrical outlet.
6. Unplug the system unit power cable from the electrical outlet.
7. Check the 7206 Tape Drive external power cable for damage.
8. Check the external SCSI bus (signal) cable **3** for damage.
9. Check the SCSI bus terminator for damage.
10. Check the covers for sharp edges, damage, or alterations that expose the internal parts of the 7206 Tape Drive.
11. Check the covers for proper fit. They should be in place and secure.
12. Check the product label on the bottom of the 7206 Tape Drive to make sure it matches the voltage at your outlet.
13. Check the voltage level at the outlet and also check for proper grounding (see Figure 2 on page viii).

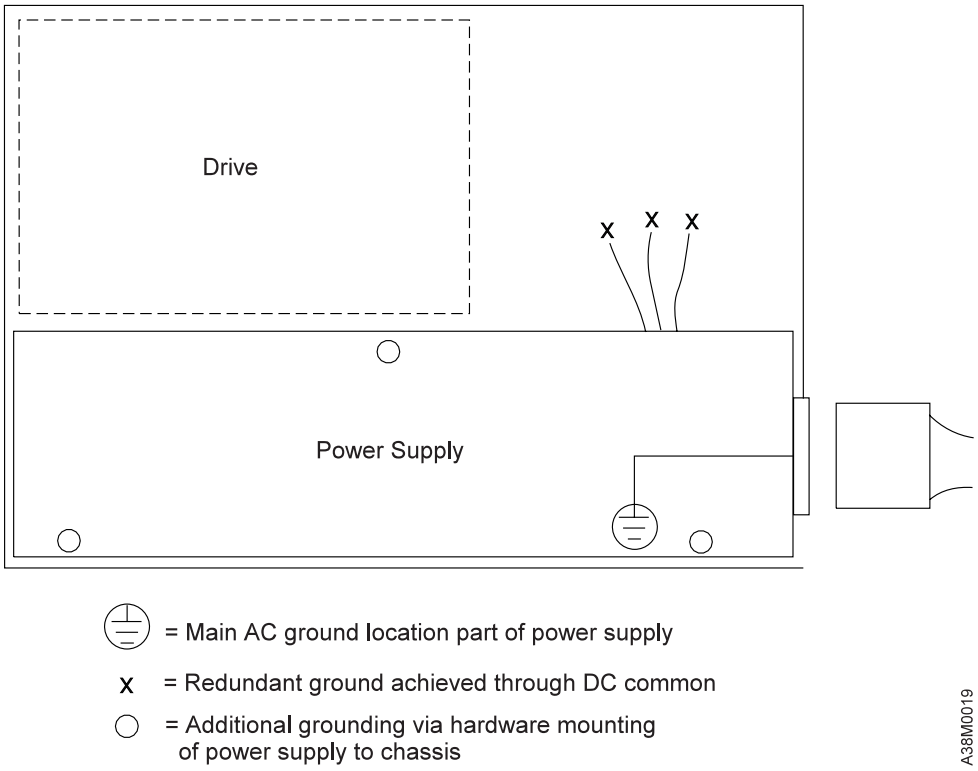


Figure 2. AC Grounding Diagram (50 Hz and 60 Hz)

14. With the external power cable (**1** in Figure 3) connected to the 7206 Tape Drive, check to ensure 1.0 ohm or less resistance between the ground lug on the external power cable plug and the metal frame.

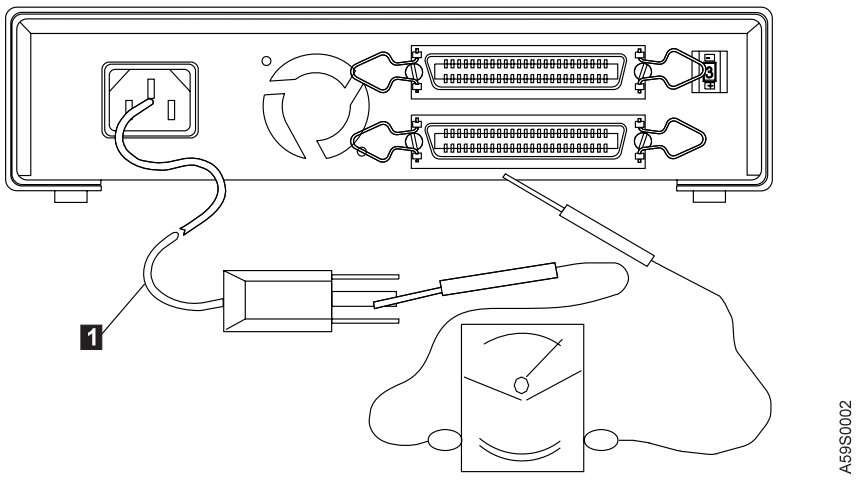
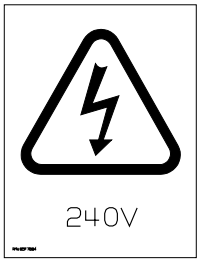


Figure 3. Safety Inspection - Rear View of the 7206 12GB External 4mm Tape Drive Model 110

Note: Use an analog meter to measure grounding resistance; do not use a digital multimeter.

15. If the 7206 Tape Drive passes the test in the previous steps, plug its external power cable into the electrical outlet. If the 7206 Tape Drive does not pass the test, see “Chapter 3. Maintenance Analysis Procedures” on page 15 for more information. If problems persist, contact your service representative.

Note: Safety Information Label, Part Number 85F7884, located on top of the power supply under the top cover, shows the following symbol:



This symbol indicates a hazard arising from dangerous voltage inside. Do not open.

About This Guide

This guide describes how to service the 7206 12GB External 4mm Tape Drive Model 110. It contains the following chapters:

Chapter 1, “Reference Information,” describes the operator controls, indicator lights, connector locations, and hardware specifications of the 7206 Tape Drive. It also tells how to clean the tape drive.

Chapter 2, “Using the Media,” describes the media to use in the 7206 Tape Drive.

Chapter 3, “Maintenance Analysis Procedures,” provides the maintenance analysis procedures (MAPs) required to service the 7206 Tape Drive.

Chapter 4, “Removal and Replacement Procedures,” provides the removal and replacement procedures required to service the 7206 Tape Drive.

Chapter 5, “Parts Diagram and Parts List,” provides a parts diagram and parts list required to service the 7206 Tape Drive.

The appendix, “Power Cables,” provides power cable information for different countries.

Store this guide with your system manuals.

Related Publications

- *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*, SA37-0382, provides information about installing and operating the 7206 Tape Drive.
- *External Devices Safety Information*, SA26-7003, contains translations of danger and caution notices.

How to Send Your Comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments or suggestions for improving this publication, you can send us comments electronically by using these addresses:

- Internet: RCHCLERK@us.ibm.com
- IBM Mail Exchange: IBMMAIL(USIB56RZ)
- Fax from United States and Canada: 1-800-937-3430
- Fax from other countries: 1-507-253-5192

Chapter 1. Reference Information

The 7206 12GB External 4mm Tape Drive Model 110 is an external storage device that connects to the IBM RS/6000® and stores additional data. The unit is a streaming tape drive that uses Digital Audio Tape (DAT) technology and Digital Data Storage (DDS) tape media.

The 7206 Tape Drive:
- Saves and restores system data files
- Archives important records
- Installs operating system software upgrades

The sections that follow describe the operator controls and indicator lights on the 7206 Tape Drive. This chapter also shows the connector locations, lists hardware specifications, and describes how to clean the tape drive.

Front View

Figure 4 shows the front view of the 7206 Tape Drive.

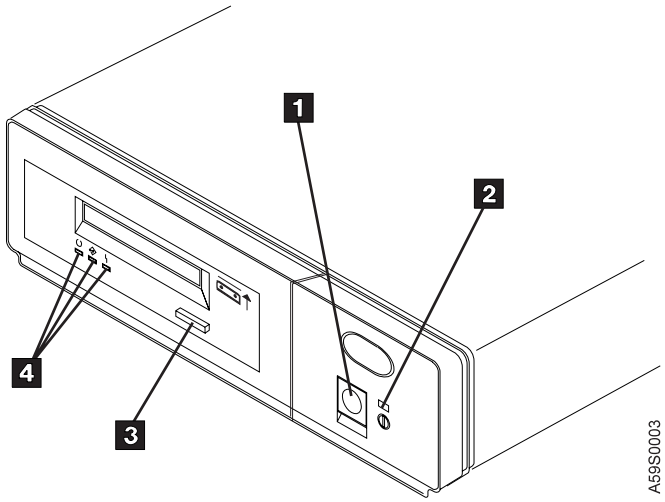


Figure 4. Front View of the 7206 12GB External 4mm Tape Drive Model 110

Operator Controls

The 7206 12GB External 4mm Tape Drive Model 110 has the following operator controls.

Power Switch

The power switch (1 in Figure 4) is a push button switch that enables the power to be turned on or off:

- The power is on when the push button is depressed.
- The power is off when the push button is even with the front cover.

When the 7206 Tape Drive is on, the power-on light 2 is on.

Note: The ⏻ symbol located beside the power switch is an International Organization for Standardization (ISO) symbol for a push button switch.

Unload Button

The unload button **3** enables the tape cartridge to be ejected. The unload button operates only when the 7206 Tape Drive power is on. To remove a cartridge, press and hold the unload button for about one second.

Emergency Eject Feature

Attention: This procedure may result in loss of data.

The 7206 Tape Drive includes an emergency eject and reset feature that releases the tape cartridge and resets the drive. Use the feature if the cartridge does not move properly or if the unload process fails. The reset feature operates only if there is a tape in the drive.

To perform an emergency eject of the tape cartridge or a reset of the drive, press and hold the unload button for 8 seconds. The cartridge automatically ejects without rewinding, and the drive reverts to its default status.

Indicator Lights

The 7206 Tape Drive has the following indicator lights.

Power-On Light

When the 7206 Tape Drive is turned on, the power-on light (**2** in Figure 4 on page 1) comes on and stays on.

Status Lights

Three status lights (**4** in Figure 4 on page 1) and their ISO symbols appear on the 7206 Tape Drive as follows:

○ **Ready** (green)

Activity (green)

Fault (amber)

The combinations of the lights and their definitions are shown in Table 1 on page 3.

Table 1. Definition of Status Light Combinations

Ready ○	Fault ϟ	Activity ⇗	Definition
Flashing	Off	Off	The Power-On Self Test (POST) is running or the test cartridge is running.
Off	Off or On	Off	One of the conditions exists: • The power is off (Fault light is off). • The POST completed successfully, but no tape cartridge has been inserted. • If the Fault light is on, cleaning is required. See “Cleaning the Tape Drive” on page 9.
On	Off or On	Off or Flashing	A data cartridge has been inserted. • The 7206 Tape Drive is ready to receive commands from the system (whether the Fault light is on or off). • If the Fault light is on, cleaning is required. See “Cleaning the Tape Drive” on page 9. • If the Activity light flashes, a tape cartridge is in the drive and tape movement is occurring. If the light is off, no tape movement is occurring.
On	Off or On	Flashing	The tape is in motion, and the 7206 Tape Drive is running an operation or is cleaning.
Off	Flashing	Off	The 7206 Tape Drive detected an internal fault that requires corrective action. • Reset the error by turning the power off to the 7206 Tape Drive, then turning it back on, or by holding down the open/close button for 8 seconds. • If the Fault light still flashes after the reset, contact your service representative.
Off or On	On	Off or Flashing	The tape drive requires cleaning. See “Cleaning the Tape Drive” on page 9. • If the Ready light is on, a tape cartridge is in the drive. If the light is off, a cartridge is not in the drive. • If the Activity light flashes, a tape cartridge is in the drive and tape movement is occurring. If the light is off, no tape movement is occurring.

Table 1. Definition of Status Light Combinations (continued)

Ready	Fault	Activity	Definition
○	ϟ	⬖	

Notes:

1. The 7206 Tape Drive needs cleaning when the tape drive turns on the Fault status light (solid amber). The light turns on when:
   - The 7206 Tape Drive determines that its soft error rate (recovered errors) exceeds a preset soft-error rate limit, or
   - The 7206 Tape Drive has been used for 30 tape motion hours without cleaning. Tape motion hours are defined as the time the tape drive is moving tape.

   When the Fault light turns on (solid amber), the 7206 Tape Drive causes AIX to log an information error (TAPE_ERR6) in the AIX log, indicating that the tape drive needs to be cleaned.
2. IBM recommends the use of IBM media only.
3. The 7206 Tape Drive is designed to operate in normal office environments. Dirty environments or other poor environments may damage the tape drive. It is the customer's responsibility to provide the proper operating environment.
4. When the tape drive indicates that the drive needs to be cleaned, it is the customer's responsibility to clean the tape drive with the recommended cleaning cartridge.
5. If a DDS1 or DDS2 diagnostic cartridge is used in the 7206 Tape Drive, that cartridge will do automatic diagnostics.

Rear View

Figure 5 shows the elements on the rear of the 7206 Tape Drive Model 110.

1	SCSI address switch	3	Cooling fan
2	SCSI bus cable connectors	4	Power cable connector

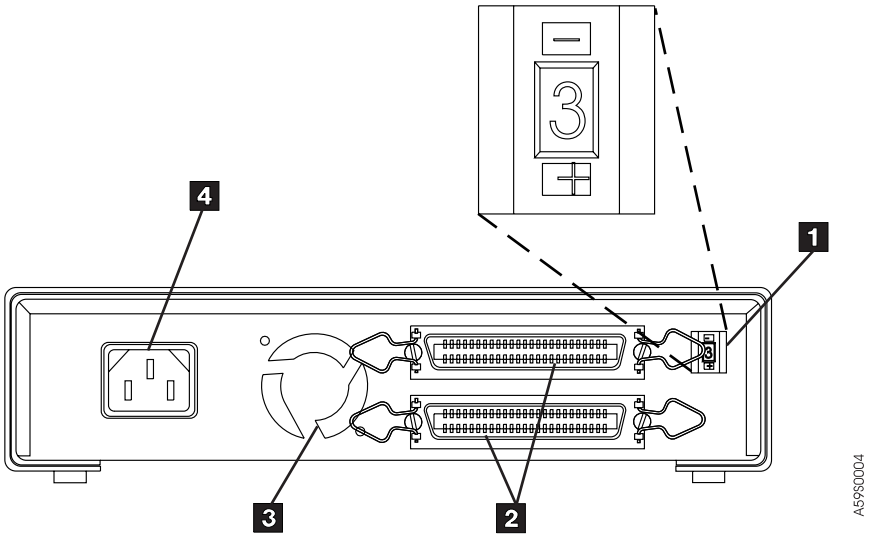


Figure 5. Rear View of the 7206 Tape Drive Model 110

Internal View

Figure 6 shows the inside of the 7206 Tape Drive Model 110.

1	Drive	4	Cooling fan
2	SCSI address switch	5	Power supply
3	SCSI bus cable		

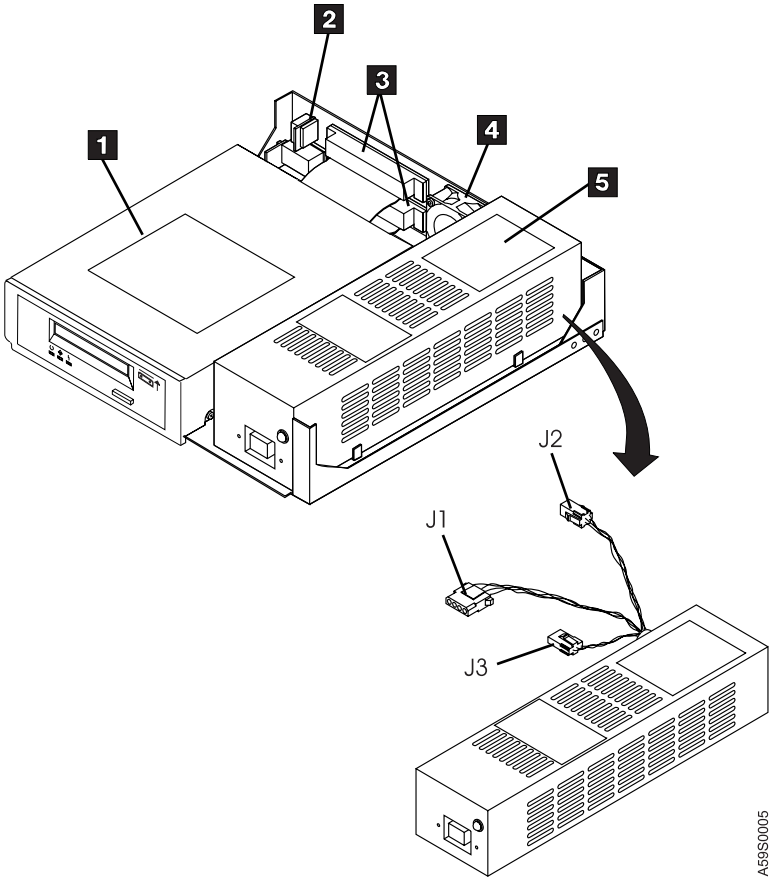


Figure 6. Internal View of the 7206 Tape Drive Model 110

Rear View of the Drive

Figure 7 shows the connector locations on the drive.

1 SCSI address connector
2 SCSI bus connector
3 Power supply connector

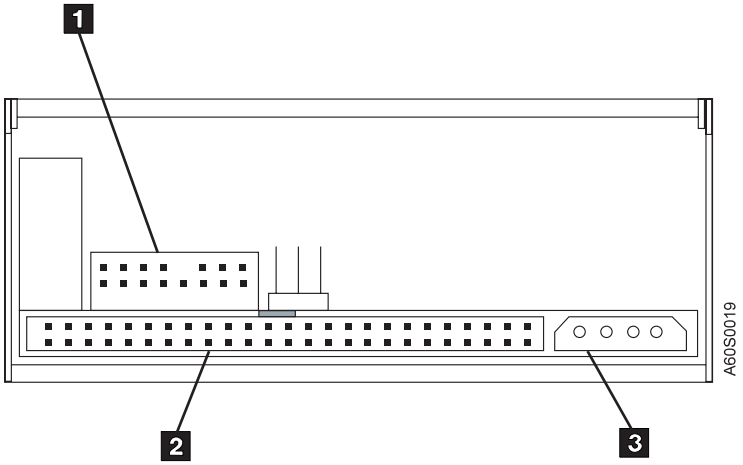


Figure 7. Connector Locations on the Drive

Specifications

Table 2. Specifications for the 7206 12GB External 4mm Tape Drive Model 110

Physical Specifications		
Specification	**Enclosure**	**Module**
Width	280 mm (11 in.)	170 mm (6.75 in.)
Depth	345 mm (13.8 in.)	310 mm (12.2 in.)
Height	160 mm (6.5 in.)	110 mm (4.5 in.)
Weight (355/670MB)	6.5 kg (14 lb)	4.5 kg (10 lb)
Weight (1GB)	6.5 kg (14 lb)	2.0 kg (4.5 lb)
Weight (2GB)	6.5 kg (14 lb)	2.6 kg (5.6 lb)
Weight (4.5GB and 9.1GB)	6.5 kg (14 lb)	2.6 kg (5.8 lb)
Power Specifications		
kVA (typical)	.1 @240 V ac	
V ac Input	100 to 125 @ .6 A (low-voltage range) 200 to 240 @ .4 A (high-voltage range)	
V dc Output	+5 and +12	
Frequency	50 to 60 Hz	
Heat Output	130 Btu/hr (38.3 watts) @ 137.2 V ac	
Power Factor	.4 to .6	
Other Specifications		
Altitude	2135 m (7000 ft)	
Recommended Environment		
Environmental Factor	**Operating**	**Non-operating**
Temperature	16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)
Relative Humidity (noncondensing)	8 to 80%	8 to 90%
Maximum Wet Bulb	23°C (73°F)	27°C (80°F)

Cleaning the Tape Drive

Clean the 7206 Tape Drive whenever the Fault status light comes on or a system I/O error related to that device occurs.

Attention: Make sure that the cleaning cartridges are of good quality. Poor-quality tape cartridges can damage the 7206 Tape Drive.

To clean the 7206 Tape Drive tape drive:

1. Make sure that the power is on to the 7206 Tape Drive. (The power-on light should be on.)
2. Grasp the cleaning cartridge (**1** in Figure 8) by the outer edges, with the window side up and the write-protect switch **2** facing you.
3. Slide the cartridge into the opening on the front of the 7206 Tape Drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.

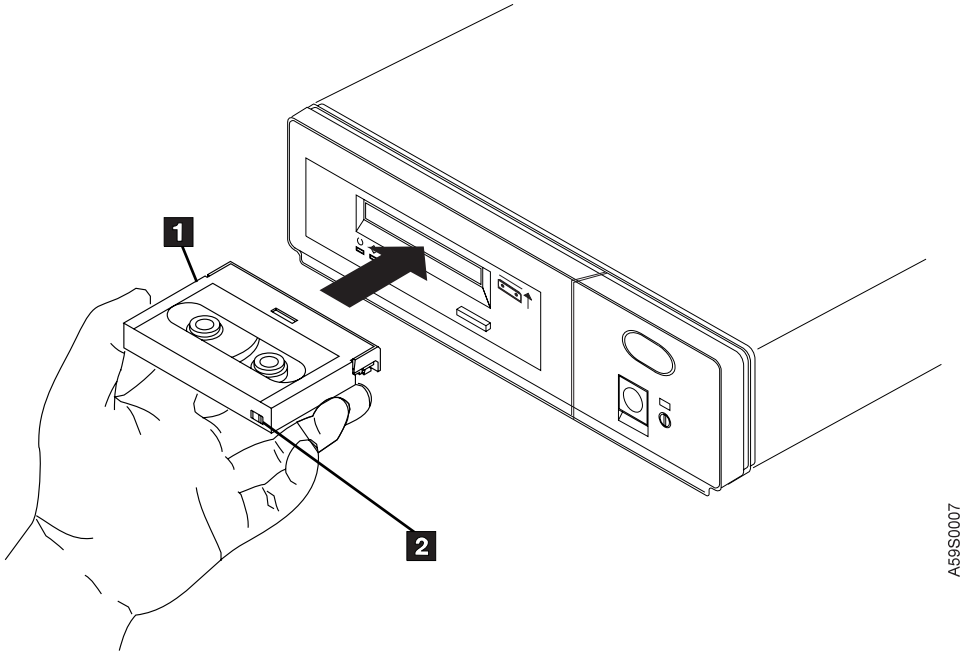


Figure 8. Loading the Cleaning Cartridge

After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The 7206 Tape Drive:

1. Loads the cleaning cartridge into the tape drive
2. Cleans the drive by moving the cleaning tape forward for approximately 30 seconds
3. Unloads the cleaning cartridge and ejects the magazine when the cleaning operation is complete
4. Indicates a successful cleaning operation by turning off the Fault status light (if the Fault light was on prior to the cleaning process; otherwise, the Fault light remains solid to indicate that the cleaning cartridge is no longer usable)

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

To determine how many times a cleaning cartridge may be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the 7206 Tape Drive automatically detects the error and ejects the cartridge. If the Fault status light was on prior to the cleaning process, it stays on; if the Fault light was off, the depleted cartridge causes the light to come on.

Chapter 2. Using the Media

The 7206 Tape Drive uses 4mm data cartridges for saving and restoring system data. It is designed to use only DDS (Digital Data Storage) data cartridges. The cartridges are identified by one of the following three DDS symbols:

Attention: The DDS symbol on the data cartridge must match one of the preceding DDS symbols. If a data cartridge does not bear one of these symbols, the 7206 Tape Drive can read from the cartridge, but cannot write to it.

The 7206 Tape Drive reads and writes data to tape cartridges that have a:
- DDS|||| format and 2GB capacity
- DDS-2 format and 4GB capacity
- DDS-3 format and 12GB capacity

The 7206 Tape Drive has been designed to operate with DDS media that meet the following standards of the European Computer Manufacturers Association (ECMA):
- ECMA-236 DDS-3 format
- ECMA-198 DDS-2 format
- ECMA-170 DDS format (DDS-1)
- ECMA-150 DDS-DC format (DDS format with Data Compression)
- ECMA-151 DCLZ algorithm (Data Compression via Lempel-Ziev)

Types of Tape Cartridges

The 7206 Tape Drive is shipped with the following media cartridges.

Data Cartridge	Use the 4mm data cartridge to save or restore programs or data.
Test Cartridge	Use the specially labeled 4mm test cartridge to run the AIX® system diagnostics (for information about running diagnostics, refer to your AIX manuals). The test cartridge should not be used to save or restore customer programs or data.
Cleaning Cartridge	**Attention:** Use of other than the IBM 4mm cleaning cartridge can damage your 7206 Tape Drive and may void your warranty. Use the specially labeled cleaning cartridge (part number 59H3090) to clean the 7206 Tape Drive. For instructions about how to clean the 7206 Tape Drive, see “Cleaning the Tape Drive” on page 9).

To order additional cartridges, refer to “Ordering Tape Cartridges” on page 14.

Recommendations for Data Cartridge Usage

- Remove the tape cartridge from the drive when the drive is not in use.
- Back up and then discard any tape cartridge that repeatedly produces error messages (the error information is in the System Error Log).
- On the data cartridge, do not open the door that covers the tape. The door protects the tape from dirt, dust, and damage.
- Do not operate in a dusty environment.
- Do not touch the tape. Any substance transferred to the tape by touching could cause loss of data.
- Do not use excessive labels on a tape cartridge. They can clog the drive load mechanism.
- Do not drop the tape cartridge from a height greater than 3 feet (1 meter). Dropping may damage the tape's internal mechanism.

Data Cartridge Erasure

Most bulk eraser devices do not have the capability to erase the 4mm data cartridge. To properly erase a 4mm data cartridge with a bulk eraser device, the erasure coercivity rating must be 3900 oersted minimum.

Storage and Shipping Environments

Before using a tape cartridge, let it acclimate to the operating environment by placing the cartridge in the operating environment for as long as it has been away from the environment or for 24 hours, whichever is less. (To determine the appropriate operating environment, see "Specifications" on page 8.)

Acclimation is necessary for any data cartridge exposed to a different humidity environment or to temperature changes of 11°C (20°F) or more.

The recommended environment for storage and shipment of 4mm data cartridges is shown in Table 3.

Table 3. Recommended Environment for 4mm Data Cartridges

Environmental Factor	Storage	Shipping
Temperature	5°C to 32°C (41° to 90°F)	−40 to 52°C (−40 to 125°F)
Relative Humidity (noncondensing)	20 to 60%	5 to 80%
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)

Operating in Harsh Environments

Do not use as an archival tape any tape that has been used outside of the operating ranges specified in Table 2 on page 8 for an extended period of time. The magnetic and physical strength of the tape will have deteriorated as a result of its exposure to the environment. Do not store important data on such a tape; transfer the data to a newer tape for reliable archiving.

Attention: Do not operate the 7206 Tape Drive in a poor air-quality environment. If your environment contains an excessive amount of particulates, contact your service representative for more information.

Setting the Write-Protect Switch

The position of the write-protect switch on the 4mm tape cartridge determines when you can write to the tape (see Figure 9).

- When the switch is set to the right **1**, data can be written to and read from the tape.
- When the switch is set to the left **2**, data can only be read.

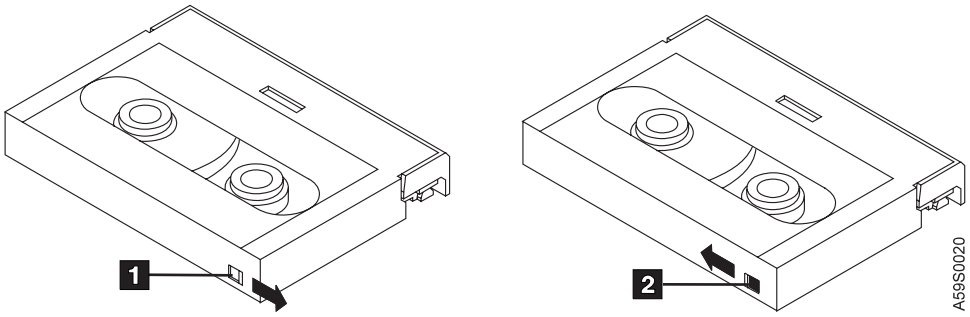


Figure 9. Setting the Write-Protect Switch

Ordering Tape Cartridges

Table 4 lists the tape cartridges that you can order for the 7206 12GB External 4mm Tape Drive Model 110. To order cartridges in the United States and Canada, call 1-888-IBM-MEDIA. To order cartridges in other locations, contact your local provider of IBM storage products.

Table 4. Tape Cartridges for the 7206 12GB External 4mm Tape Drive Model 110

IBM Part Number	Type of Cartridge	Length
59H3465	4mm Data Cartridge	125 m (410 ft)
59H3466	4mm Test Cartridge	11.5 m (38 ft)
59H3090	4mm Cleaning Cartridge	--

Chapter 3. Maintenance Analysis Procedures

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (72XXD201)

DANGER

To prevent a possible electrical shock from touching two surfaces with different electrical grounds, use one hand, when possible, to connect or disconnect signal cables. *(72XXD004)*

Purpose of the MAPs

Maintenance analysis procedures (MAPs) are used to check the:

Power cable	SCSI address	Drive
Power supply	SCSI bus (signal) cable	Fan
Terminator	Configuration	Drive head

If a problem is detected, the procedure isolates the problem to the failing field replaceable unit (FRU), such as the 7206 Tape Drive drive, power supply, or cooling fan. For instructions about removing or replacing a FRU, refer to "Chapter 4. Removal and Replacement Procedures" on page 23.

Figure 10 on page 16 provides a flowchart to be used as a guide to the MAPs. For detailed instructions on how to perform each procedure safely and correctly, refer to the steps in this chapter.

Flowchart of the MAPs

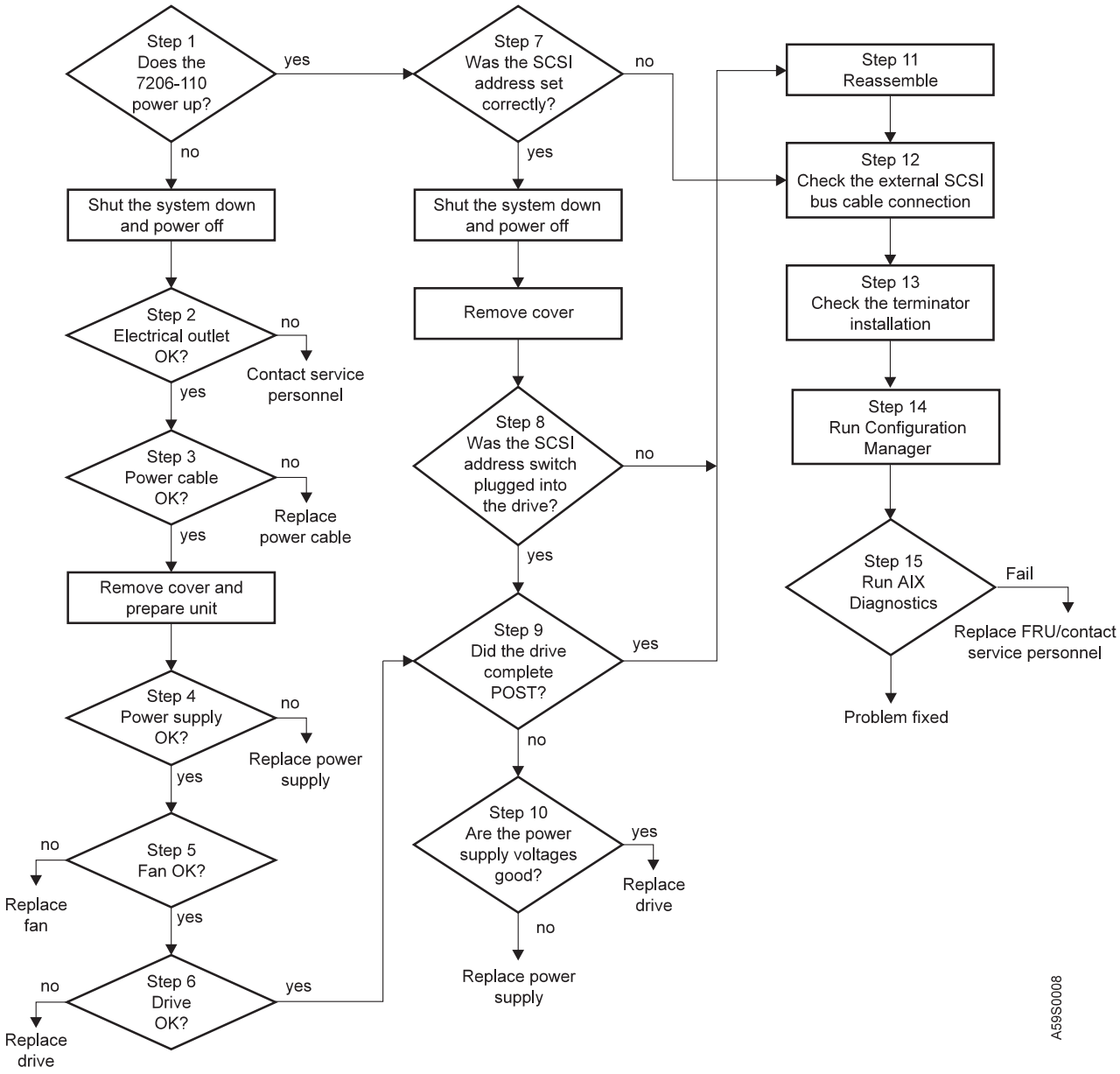


Figure 10. Flowchart of Maintenance Analysis Procedures (MAPs)

Step 1

This step verifies whether the power and the fan operate properly.

1. Make sure that the 7206 Tape Drive power cable is plugged into an electrical outlet.
2. Make sure that the 7206 Tape Drive power is on by checking that:
   - The power-on light is on.
   - There is airflow from the fan at the rear of the unit.

Is the power-on light on and is there airflow from the fan?

NO While watching for the power-on light to come on, press the power switch again. Repeat this procedure several times. If the power-on light fails to come on or there is no airflow from the fan, go to Step 2.

YES Go to Step 7.

Step 2

This step tests the voltage at the electrical outlet.

1. Do a controlled system shutdown (refer to the instructions in Chapter 2, “Setting Up the 7206 Tape Drive,” in the *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*).
2. Ensure that the power to the system unit is off.
3. Press the 7206 Tape Drive power switch to turn off the power.
4. Unplug the 7206 Tape Drive power cable from the electrical outlet and from the 7206 Tape Drive.
5. Check the electrical outlets for proper voltage.

Is the voltage from the electrical outlet correct?

NO Contact your service personnel for further instructions.

YES Go to Step 3.

Step 3

This step determines whether the power cable is functional.

Make sure that all of the conductors in the power cable have continuity, and that there are no short circuits.

Does the power cable have continuity and are there no short circuits?

NO Replace the power cable.

YES Go to Step 4.

Step 4

This step prepares the 7206 Tape Drive to determine whether the power supply, fan, or tape drive is the cause of the problem.

1. Perform the cover removal procedure. Refer to “Removing and Replacing the Cover” on page 24.
2. Plug the 7206 Tape Drive power cable into the 7206 Tape Drive and into the electrical outlet.
3. Press the power switch to turn off the power.
4. Disconnect the power supply connector (J1) from the drive.
5. Disconnect the power supply connector (J2) between the power supply and the cooling fan.
6. Press the power switch to turn on the power.

Does the power-on light come on and stay on?

NO Replace the power supply. Refer to “Removing and Replacing the Power Supply” on page 27.

YES Go to Step 5.

Step 5

This step examines the cooling fan as the possible source of the problem.

1. Press the power switch to turn off the power.
2. Reconnect the power supply connector (J2) to the cooling fan.
3. Press the power switch to turn on the power.

Does the power-on light come on and stay on, and is there airflow from the fan?

NO Replace the cooling fan and verify that the power-on light comes on. Refer to “Removing and Replacing the Cooling Fan” on page 29.

YES Go to Step 6.

Step 6

This step examines the drive as the possible source of the problem.

1. Press the power switch to turn off the power.
2. Reconnect the power supply connector (J1) to the drive.
3. Press the power switch to turn on the power.

Does the power-on light come on and stay on, and is there airflow from the fan?

NO Replace the drive. Refer to “Removing and Replacing the Drive” on page 25.

Note: If the media is still in the drive being replaced, it can be removed manually. See “Manually Removing a Tape Cartridge” on page 30.

YES Go to Step 9.

Step 7

This step checks that the SCSI address switch setting is correct.

Is the SCSI address set correctly?

NO Set the SCSI address switch to the proper address, then go to Step 12. To set the SCSI address switch, refer to the instructions in Chapter 2, “Setting Up the 7206 Tape Drive,” in the *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*.

YES Go to Step 8.

Step 8

This step checks whether the SCSI address switch is plugged into the drive.

1. Do a controlled system shutdown (refer to the instructions in Chapter 2, “Setting Up the 7206 Tape Drive,” in the *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*).
2. Perform the cover removal procedure. Refer to “Removing and Replacing the Cover” on page 24.

Is the SCSI address switch plugged securely into the drive?

NO Ensure that the SCSI address switch is plugged securely into the drive, then go to Step 11.

YES Go to Step 9.

Step 9

This step examines the drive as the possible source of the problem.

While pressing the power switch to turn on the power, watch to see if the three status lights come on for approximately 10 seconds, then go out.

Did the three status lights come on for approximately 10 seconds, then go out?

NO Go to Step 10.

YES Go to Step 11.

Step 10

This step checks the power supply voltage levels as the possible source of the problem.

1. Press the power switch to turn off the power.
2. Perform the cover removal procedure. Refer to “Removing and Replacing the Cover” on page 24.
3. Disconnect the power supply connector (J1) from the drive.
4. Disconnect the power supply connector (J2) between the power supply and the cooling fan.
5. Connect the power cable to both the 7206 Tape Drive and the electrical outlet.
6. Press the power switch to turn on the power.
7. On the power supply connector J1 (see Figure 11), check the following:
   - The +12V signal falls between a minimum of +11.5 volts and a maximum of +12.6 volts
   - The +5V signal falls between a minimum of +4.8 volts and a maximum of +5.25 volts

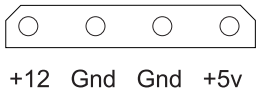


Figure 11. Power Supply Connector J1

8. On the power supply connector J2 (see Figure 12), check that the +12V signal falls between a minimum of +11.5 volts and a maximum of +12.6 volts.

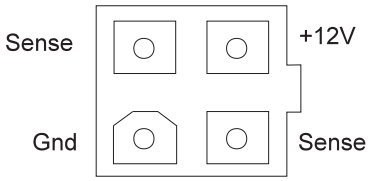


Figure 12. Power Supply Connector J2

Are the voltages good?

NO Replace the power supply. Refer to “Removing and Replacing the Power Supply” on page 27.

YES Replace the drive. See “Removing and Replacing the Drive” on page 25.

Note: If the media is still in the drive being replaced, it can be removed manually. See “Manually Removing a Tape Cartridge” on page 30.

Step 11

This step describes the reassembly process.

1. Press the power switch to turn off the power.
2. Unplug the power cable from the electrical outlet.
3. Make sure that the power supply connector (J1) is plugged into the drive.
4. Make sure that the power supply connector (J2) is plugged into the cooling fan.
5. Make sure that all other cables are properly connected, and that the wires are routed away from the cooling fan.
6. Perform the cover replacement procedure. Refer to “Removing and Replacing the Cover” on page 24.
7. Plug the power cable into the electrical outlet.
8. Press the power switch to turn on the power.

Does the power-on light come and stay on, and is there airflow from the fan?

NO Verify that the 7206 Tape Drive was reassembled correctly. If the power-on light still does not come on and there is no airflow from the fan, go to Step 1.

YES Go to Step 12.

Step 12

This step ensures that the external SCSI bus cable connection is proper.

Ensure that the SCSI bus cable is properly connected to both the system unit and to the 7206 Tape Drive.

Is the SCSI bus cable properly connected to the system unit and to the 7206 Tape Drive?

NO Plug the SCSI bus cable into the system unit and into the 7206 Tape Drive, then go to Step 13.

YES Go to Step 13.

Step 13

This step ensures that the terminator connection is proper.

Ensure that the terminator is properly connected to the last device on the SCSI bus.

Is the terminator properly connected to the last device on the SCSI bus?

NO Ensure that the terminator is properly connected to the last device on the SCSI bus, then go to Step 14.

YES Go to Step 14.

Step 14

This step verifies that the 7206 Tape Drive has been properly configured to the RS/6000.

1. Clean the drive. See “Cleaning the Tape Drive” on page 9.
2. At the system prompt, type `cfgmgr` to configure the 7206 Tape Drive and make it `Available`.

To ensure that 7206 Tape Drive has been correctly configured to the RS/6000, refer to Chapter 2, “Setting Up the 7206 Tape Drive,” in the *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*.

Is the 7206 Tape Drive properly configured to the RS/6000?

NO Go to Step 15.

YES Go to Step 15.

Step 15

This step runs the AIX diagnostics to determine the problem.

Run the diagnostics on the 7206 Tape Drive. Have the test cartridge (part number 59H3466) available for when the diagnostics prompt you to load the cartridge. For instructions on running diagnostics, refer to your AIX manuals.

Do all of the diagnostics routines pass?

NO Replace the FRU isolated by the diagnostics and identified by the service request number.

Note: If the drive is the FRU isolated by the diagnostics, check that the J1 connector is properly seated. If the drive has recently been replaced because of a similar problem, contact your service personnel.

YES The problem is fixed.

This completes the MAPs.

Chapter 4. Removal and Replacement Procedures

This chapter describes the procedures to follow when removing and replacing the field replaceable units (FRUs), such as the drive, power supply, and cooling fan for the 7206 Tape Drive Model 110. It also describes how to manually remove a tape cartridge from the 7206 Tape Drive.

DANGER

To prevent a possible electrical shock from touching two surfaces with different electrical grounds, use one hand, when possible, to connect or disconnect signal cables. *(72XXD004)*

DANGER

To prevent a possible electrical shock when adding or removing any devices to or from the system, ensure that the power cords for those devices are unplugged before the signal cables are connected or disconnected. If possible, disconnect all power cords from the existing system before you add or remove a device. *(72XXD203)*

Before installing any FRU, let it acclimate to the operating environment for as long as it has been away from the environment or for 24 hours, whichever is less.

Handling Static-Sensitive Devices

Attention: Tape drives are sensitive to static electricity discharge. To prevent damage, when handling a tape drive wrap it in an antistatic bag.

Take the following precautions:

- Do not remove the drive from its antistatic bag until you are ready to install it.
- With the drive still in its antistatic bag, touch it to the metal frame of an electrically grounded surface.
- Hold the drive by the frame. Avoid touching the solder joints or pins.
- Handle the drive carefully to prevent permanent damage.

Removing and Replacing the Cover

To remove the cover from the 7206 Tape Drive:

1. If a tape cartridge is in the drive, eject it.
2. Do a controlled system shutdown (refer to the instructions in Chapter 2, “Setting Up the 7206 Tape Drive,” in the *7206 12GB External 4mm Tape Drive Model 110 Setup and Operator Guide*).
3. If it is on, turn off the power to the 7206 Tape Drive.
4. Unplug the 7206 Tape Drive power cable from the electrical outlet.
5. Disconnect the power cable from the 7206 Tape Drive.
6. Disconnect the SCSI bus cable from the 7206 Tape Drive.
7. Tilt the 7206 Tape Drive on its side and remove the four cover mounting screws from the bottom. See Figure 13.
8. Remove the cover by sliding it to the rear (see the directional arrow in Figure 13).

To replace the cover, reverse the removal procedure.

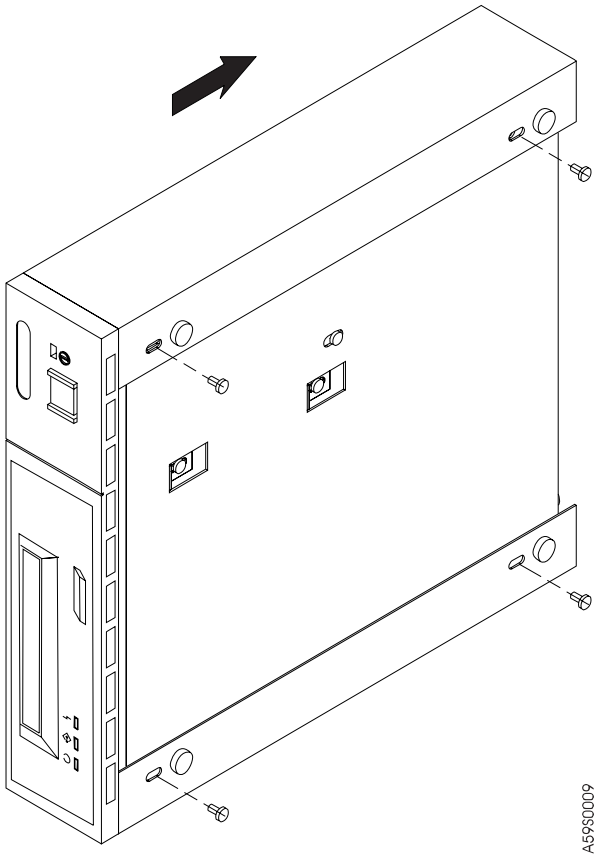


Figure 13. Removing and Replacing the Cover. The 7206 Tape Drive is shown tilted on its side.

Removing and Replacing the Drive

To remove the drive from the 7206 Tape Drive:

1. Perform the cover removal procedure. Refer to “Removing and Replacing the Cover” on page 24.
2. Disconnect the power supply connector (J1) (**1** in Figure 14) from the drive.
3. Disconnect the SCSI bus cable **2** from the drive.
4. Disconnect the SCSI address cable **3** from the drive.
5. Tilt the 7206 Tape Drive on its side (see Figure 14). Support the drive **4** while removing the four screws **5** that secure the drive to the chassis.
6. Support the drive while returning the 7206 Tape Drive to its original position.
7. Slide the drive out the front of the chassis.

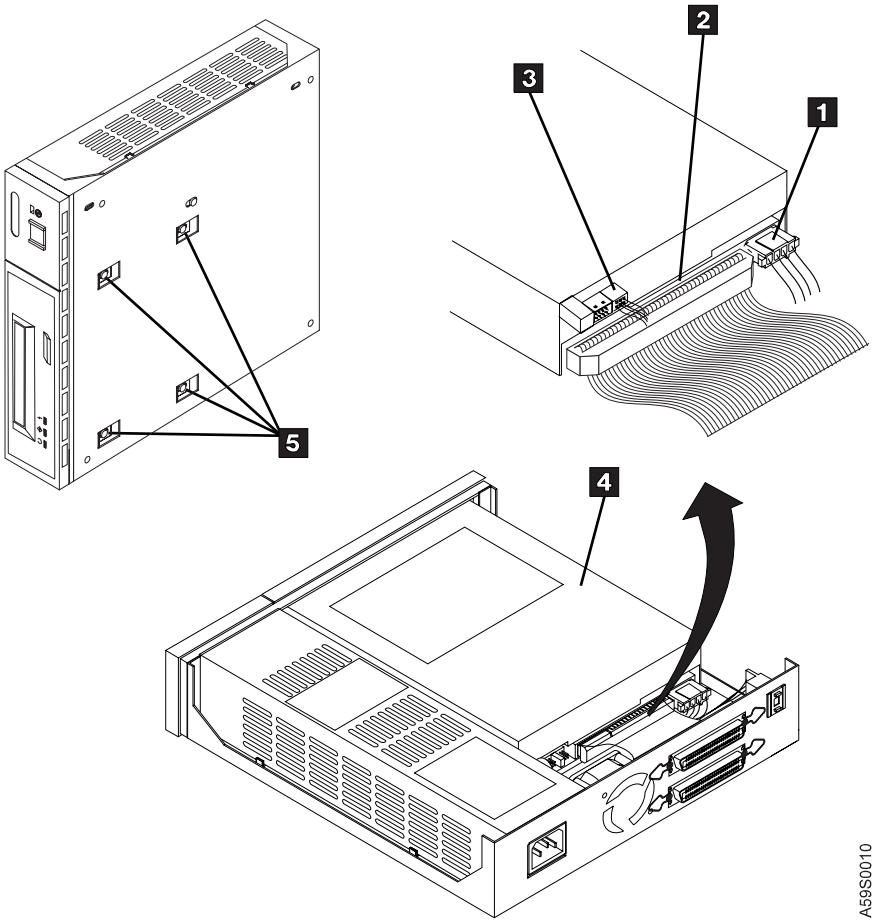


Figure 14. Removing and Replacing the Drive

To replace the drive, reverse the removal procedure. Make sure to

- Correctly insert and engage each cable to its proper connector.
- Arrange the cables so that they do not interfere with the cooling fan blades or the replacement of the cover.

Note: The power supply connector J3 is not used in the 7206 Tape Drive.

Removing and Replacing the Power Supply

DANGER

Do not attempt to open the covers of the power supply. Power supplies are not serviceable and are to be replaced as a unit. *(72XXD300)*

To remove the power supply from the 7206 Tape Drive:

1. Perform the cover removal procedure. Refer to “Removing and Replacing the Cover” on page 24.
2. Tilt the 7206 Tape Drive on its side. Support the power supply (**1** in Figure 15) while removing the power supply mounting screw **2** from the bottom.
3. Support the power supply while returning the 7206 Tape Drive to its original position.
4. Disconnect the power supply connector (J1) (**3** from the drive.
5. Disconnect the power supply connector (J2) **4** between the power supply and the cooling fan.
6. Grasp the rear of the power supply and while pressing it toward the front panel, lift the rear of the power supply from the chassis.
7. Push the power switch push button **5** out of the front panel and set it aside.

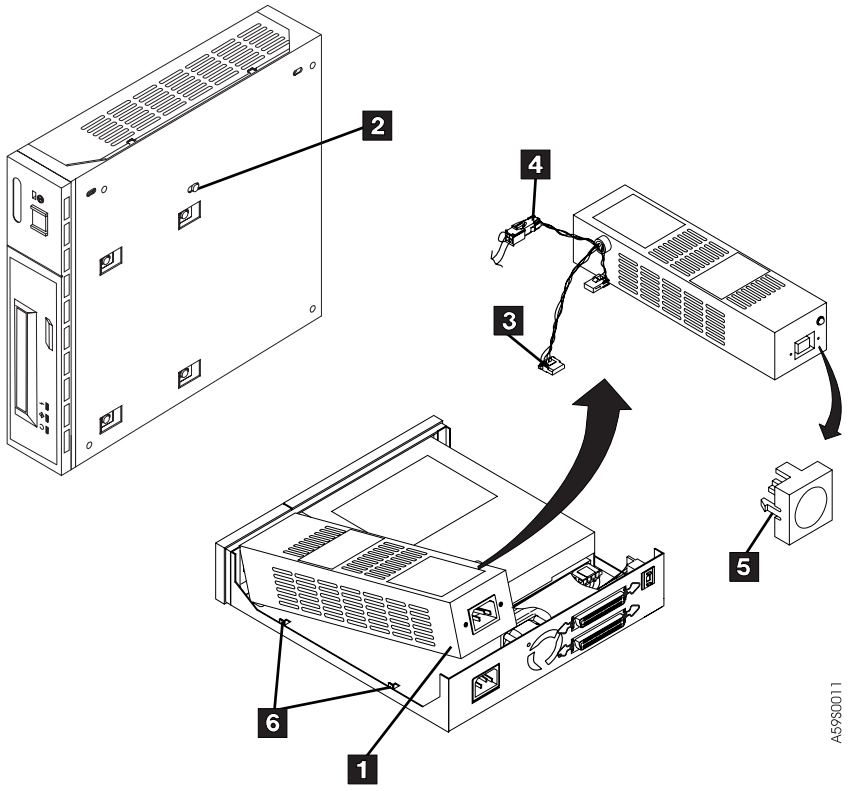


Figure 15. Removing and Replacing the Power Supply

To replace the power supply, reverse the removal procedure. Make sure to:

- Align the power supply inside the two tabs (**6** in Figure 15) on the base of the chassis.

- With its locking features in a horizontal position, insert the power switch push button **5** into the front panel and press until it locks in place.

  Note: If the power switch does not work properly, loosen the power supply mounting screw, slide the power supply to the rear of the chassis, and retighten the mounting screw.
- Arrange the cables so that they do not interfere with the cooling fan blades or the replacement of the cover. Ensure that they do not obstruct airflow through the fan.

Note: The power supply connector J3 is not used in the 7206 Tape Drive.

Removing and Replacing the Cooling Fan

To remove the cooling fan:

1. Perform the cover removal procedure. Refer to “Removing and Replacing the Cover” on page 24.
2. Disconnect the power supply connector (J2) (**1** in Figure 16) between the power supply and the cooling fan.
3. Remove the two screws, lockwashers, and nuts **2** that secure the cooling fan to the rear of the 7206 Tape Drive.
4. Lift the cooling fan out of the 7206 Tape Drive.

To replace the cooling fan, reverse the removal procedure. Make sure that the cooling fan is oriented so that air blows out of the 7206 Tape Drive.

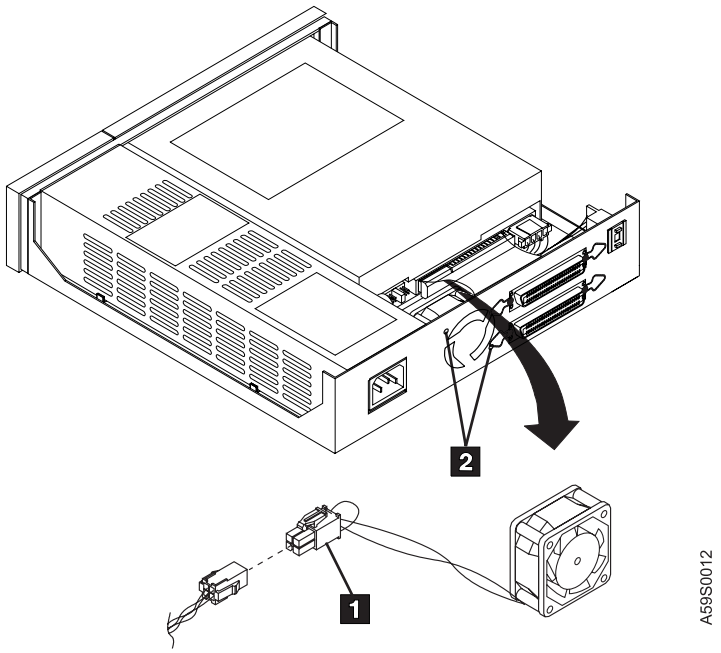


Figure 16. Removing and Replacing the Cooling Fan

Manually Removing a Tape Cartridge

Attention: The procedure for manually removing a tape cartridge could damage your tape cartridge, the 7206 Tape Drive, or both. Use this procedure only after you have:

1. Turned the power to the 7206 Tape Drive off and on again to clear potential hang conditions.
2. If available, issued the `Unload SCSI` command from your system command menu.
3. Disconnected the 7206 Tape Drive from the system, and turned the power to the 7206 Tape Drive on and off again several times.

The following procedure describes how to manually remove a data cartridge from the 7206 Tape Drive.

1. Remove the drive from the 7206 Tape Drive (see “Removing and Replacing the Drive” on page 25).
2. Remove the mounting rails by removing the four screws (**1** in Figure 17) near the lower edge of the drive (two on each side). Access the screws through holes in the side of each rail.
3. Remove the front bezel (the bezel snaps on) by doing the following:
   a. Use a small screwdriver to depress one of the bezel tabs **2** .
   b. Pull the bezel down from the top.
   c. Lift the bezel off the bottom locating tabs.
   d. Remove the bezel from the unit.
4. Remove the top cover by doing the following:
   a. Remove the screws **3** (one on each side) that secure the cover to the drive.
   b. Lift up the rear of the top cover.
   c. Remove the top cover from the drive.

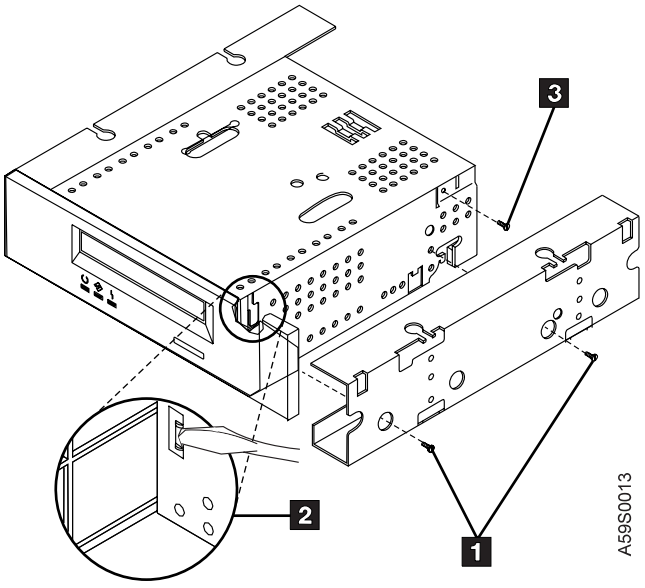


Figure 17. Removing the Mounting Rails from the Drive

5. Locate the access hole (1 in Figure 18) on the right rear of the drive chassis. The hole allows access to the mode motor gear.

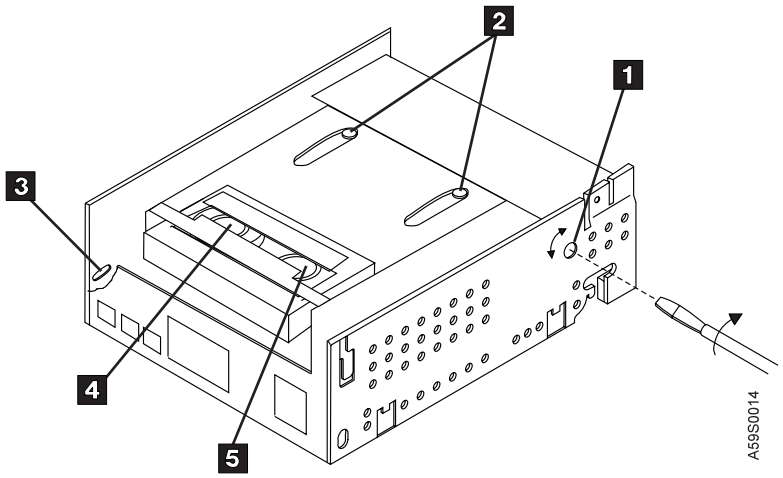


Figure 18. Manually Removing the Tape Cartridge

6. In this step, do not turn the mode motor gear in the wrong direction; it could become damaged. With a small, flat-blade screwdriver, turn the mode motor gear (inside the access hole) clockwise until the two pins 2 in the elongated slots begin to move toward the front of the drive (this can take up to 100 rotations of the screwdriver).

Attention: When inserting the allen wrench in the next step, take care not to disengage the spring inside the slot.

7. Insert a small allen wrench (or a similar tool) into the left slot 3 . Use it to rotate the left spindle 4 in a counterclockwise direction by ratcheting the drive gear on the bottom of the spindle. The rotations pull the excess tape back into the tape cartridge.
8. Continue turning the left spindle until the right spindle 5 begins to move (indicating that the tape is inside the cartridge).
9. Return to the access hole 1 and continue turning the mode motor gear (in a clockwise direction) until the tape cartridge ejects from the drive. This may take another 100 turns of the screwdriver.
10. Reassemble the drive in reverse order.

Chapter 5. Parts Diagram and Parts List

How To Use This Parts List

AR (As Required) in the *Units* column indicates that the quantity is not the same for all machines.

NP (Non-Procurable) in the *Part Number* column indicates that the part is non-procurable and that the individual parts or the next higher assembly should be ordered.

NR (Not Recommended) in the *Units* column indicates that the part is procurable but not recommended for field replacement, and that the next higher assembly should be ordered.

00 (Not Shown) in the *Asm- Index* column indicates that the part is either not shown or not referenced in the illustration.

R (Restricted) in the *Units* column indicates that the part has a restricted availability.

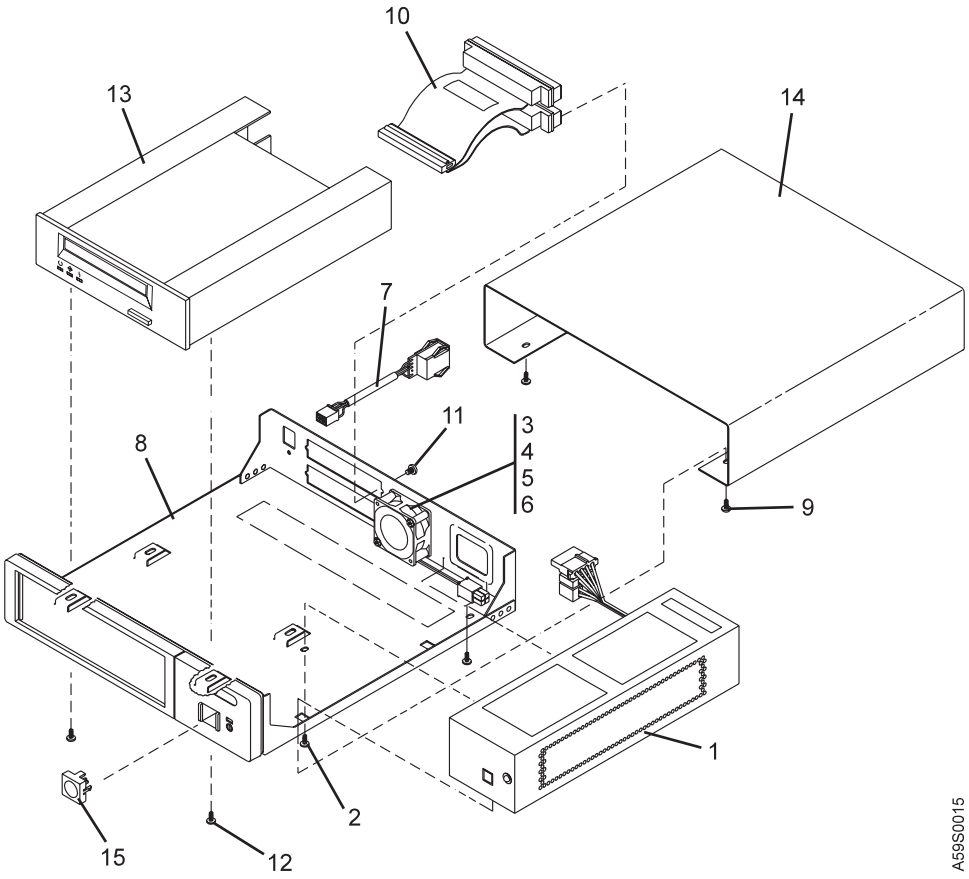
Indenture The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture	**Relationship of Parts**
(No dot)	MAIN ASSEMBLY
(One dot)	• Detail parts of a main assembly
(One dot)	• Sub assembly of the main assembly
(Two dots)	• • Detail part of a one-dot sub assembly
(Two dots)	• • Sub assembly of a one-dot sub assembly
(Three dots)	• • • Detail part of a two-dot sub assembly

Example of Parts Listing

Asm- Index	Part Number	Units	Description
3-	2512667	1	Cover Asm, Rear, Red
	2513714	1	Cover Asm, Rear, White
			For Next Higher Asm, see Assembly 1-2.
-1	5373637	1	•Seal, Top
-2	5356429	2	•Clip, Retaining
-3	1847630	1	•Finger Stock Asm
-4	1847602	NR	••Channel, Finger Stock
-5	5373639	AR	•Seal, Bottom
-6	5356429	2	•Clip, Retaining
-7	NP	1	•Cover, Rear, Without Paint
-5	0416629	R	•Screw, Panel

Assembly 1: Parts Diagram



Assembly 1: (continued)

Asm–Index	Part Number	Units	Description
1–1	59H3760	1	Power supply
–2	46G2677	3	Screw, power supply, M3 x 6mm
–3	42F7300	1	Cooling fan
–4	46G2676	2	Screw, cooling fan
–5	1622401	2	Nut, cooling fan
–6	1622344	2	Washer, cooling fan, optional P/N 0338169
–7	59H4114	1	Cable, SCSI address
–8	59H2913	1	Chassis
–9	46G2677	2	Screw, cover, M3 x 6mm
–10	8191223	1	Cable, SCSI internal
–11	0251970	4	Screw, SCSI connectors
–12	46G2677	4	Screw, drive, M3 x 6mm
–13	59H3879	1	Tape drive, 4mm
–14	59H3847	1	Cover, includes feet
–15	74G8497	1	Push button, power supply
–00	33F4607	1	Device-to-device SCSI cable, .7 meter (2 ft)
–00	06H3037	1	System-to-device SCSI cable, 1 meter (3 ft)
–00	92F2559	1	System-to-device SCSI cable, 1.5 meter (5 ft)
–00	33F4606	1	System-to-device SCSI cable, 1.5 meter (5 ft)
–00	8191425	1	System-to-device SCSI cable, 1.5 meter (5 ft) (for integrated SCSI or SCSI-2 controllers)
–00	52G4260	1	Terminator
–00	59H3465	1	Data cartridge
–00	59H3466	1	Test cartridge
–00	59H3090	1	Cleaning cartridge
–00	94F7860	1	Swab kit

Assembly 1: (continued)

Appendix A. Power Cables

To avoid electrical shock, a power cable with a grounded attachment plug has been provided. Use only properly grounded outlets.

Power cables used in the United States and Canada are listed by Underwriter's Laboratories (UL™) and certified by the Canadian Standards Association (CSA™). The power cables consist of:

- Electrical cables, type SVT or SJT.
- Attachment plugs complying with National Electrical Manufacturers Association (NEMA) 5-15P, that is:

  "For 115 V operation use a UL Listed Cable Set consisting of a minimum 18 AWG, Type SVT or SJT three conductor cable a maximum of 15 feet in length and a parallel blade, grounding type attachment plug rated at 15 A, 125 V."

  "For 230 V operation in the United States use a UL Listed Cable Set consisting of a minimum 18 AWG, Type SVT or SJT three conductor cable a maximum of 15 feet in length, and a tandem blade, grounding type attachment plug rated at 15 A, 250 V."
- Appliance couplers complying with International Electrotechnical Commission (IEC) Standard 320, Sheet C13.

Power cables used in other countries consist of:

- Electrical cables, type HD21.
- Attachment plugs approved by the appropriate testing organization for the specific countries where they are used.

  "For units set at 230 V (outside of U. S.): Use a Cable Set consisting of a minimum 18 AWG cable and grounding type attachment plug rated 15 A, 250 V. The Cable Set should have the appropriate safety approvals for the country in which the equipment is to be installed and marked 'HAR'."

Table 5 on page 38 lists the power cable part number, the country where the power cable can be used, and an index number to be matched with the receptacles shown in Figure 19 on page 39. If your power cable does not match this information, contact your local dealer.

Table 5. Power Cable Information

Part Number	Country	Index
1838574 Japan	Bahamas, Barbados, Bolivia, Brazil, Canada, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Netherlands Antilles, Panama, Peru, Philippines, Taiwan, Thailand, Tobago, Trinidad, U.S.A. (except Chicago), Venezuela	1
6952300 US/Canada	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Saudi Arabia, Suriname, Taiwan, Trinidad, U.S.A. (except Chicago), Venezuela	2
6952301 6 ft Chicago	Chicago, U.S.A.	2
13F9940 Australia	Argentina, Australia, New Zealand, Uruguay	3
13F9979 France	Abu Dhabi, Austria, Belgium, Bulgaria, Botswana, Egypt, Finland, France, Germany, Greece, Iceland, Indonesia, Korea (South), Lebanon, Luxembourg, Macau, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sudan, Sweden, Turkey, Yugoslavia	4
13F9997 Denmark	Denmark	5
14F0015 South Africa	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka	6
14F0033 United Kingdom	Bahrain, Bermuda, Brunei, Channel Islands, Cyprus, Ghana, Hong Kong, India, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Arab Emirates (Dubai), United Kingdom, Zambia	7
14F0051 Switzerland	Liechtenstein, Switzerland	8
14F0069 Italy	Chile, Ethiopia, Italy	9
14F0087 Israel	Israel	10
6952291 Colombia	Colombia, Paraguay	11

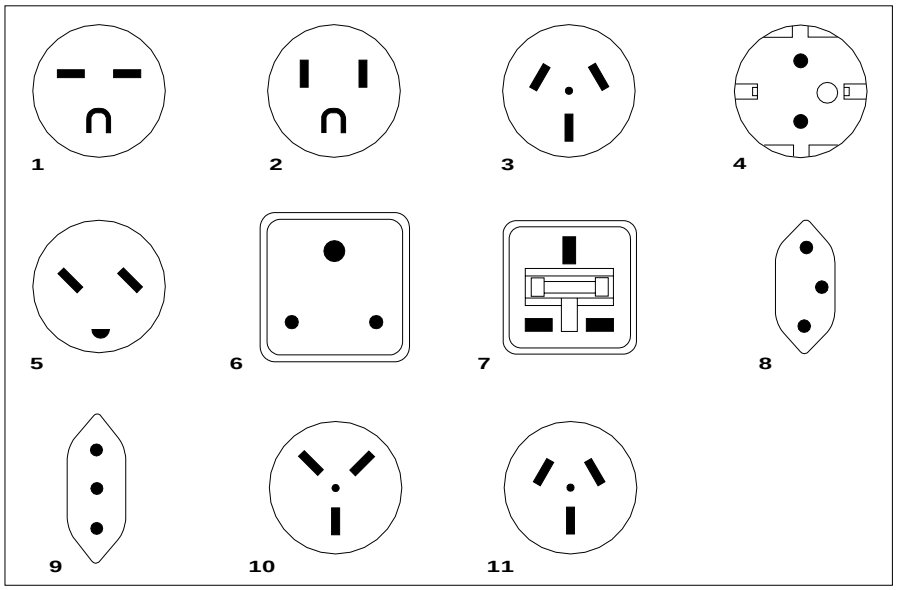


Figure 19. Types of Receptacles

Appendix B. Notices

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Electronic Emission Notices

7206 12GB External 4mm Tape Drive Model 110

Responsible Party:

International Business Machines Corporation
Old Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193

Industry Canada Compliance Statement

This Class B digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

A declaration of Conformity with the requirements of the Directive has been signed by IBM SEMEA S.p.A., Via Tolmezzo, 15, Milano, Italy.

This product satisfies the Class B limits of EN55022.

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Korean Government Ministry of Communication (MOC) Statement

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