7331 and 3449 8mm Tape Library

# Model 3xx

Service Guide

IBM

7331 and 3449 8mm Tape Library

# Model 3xx

Service Guide

IBM

> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information under "Notices" on page ix.

## First Edition (October 1997)

The following paragraph does not apply to any country where such provisions are inconsistent with local law.

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Some states do not allow disclaimer of express or implied warranties in certain transactions; therefore, this statement may not apply to you.

Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.

A reader's comment form is provided at the back of this publication.  Either mail the completed form or fax it to (520) 799-2906. If the form has been removed, address your comments about this book to:

IBM Corporation, Department 61C, 9000 South Rita Road, Tucson, AZ 85744-0001, U.S.A.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

# Contents

# Figures

# Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates.

Any reference to an IBM program or other IBM product in this publication is not intended to state or imply that only IBM's program or other product may be used. Any functionally equivalent program that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the IBM Director of Licensing, IBM Corporation, 500 Columbus Avenue, Thornwood, NY 10594, U.S.A.

## Safety Notices

Listed below are the safety requirements for operating this product.

Each danger and caution notice contains a reference number (RSFTxxxx). Use the reference number to check the translation in *External Devices Translated Safety Notices*, SA26-7192.

## Danger Notices

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

The following danger notices appear in this publication:

**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.** *(RSFTD004)*

**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.**
> *(RSFTD201)*

**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.**

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

# Caution Notices

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

The general caution symbol identifies conditions where caution must be used.

The electrical caution symbol identifies electrical hazards where extreme caution must be used.

The weight caution symbol indicates that the 7331 Tape Library weighs 42 kilograms (92.5 pounds). It takes three persons to safely lift the unit.

The laser caution symbol indicates a laser device is present. Handling laser devices requires trained and knowledgeable personnel. Extreme caution is required.

### Laser Safety Cautions

The following laser safety cautions appear in this document:

**CAUTION:**
**The bar-code reader contains a Class II laser component. Only trained service personnel may repair the bar-code reader.** *(RSFTC237)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

## Attention Notices

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

## Safety Inspection Procedures

Perform the following safety inspection prior to the normal maintenance agreement inspection. **Suspect the 8mm Tape Library is unsafe until verified it is safe.** If unsafe conditions are present, decide how serious the hazard is and whether you can continue without correcting the problem. Possible safety hazards are:

***Electrical*** An electrically charged frame can cause serious or lethal electrical shock.

***Mechanical*** Hazards, such as a missing safety cover, are potentially harmful to people.

***Chemical*** Do not use solvents, cleaners, or other chemicals not approved for use on the product.

Use Figure 1 to perform the following safety procedures. Before starting the procedures, unsure the existing room and electrical conditions are safe.
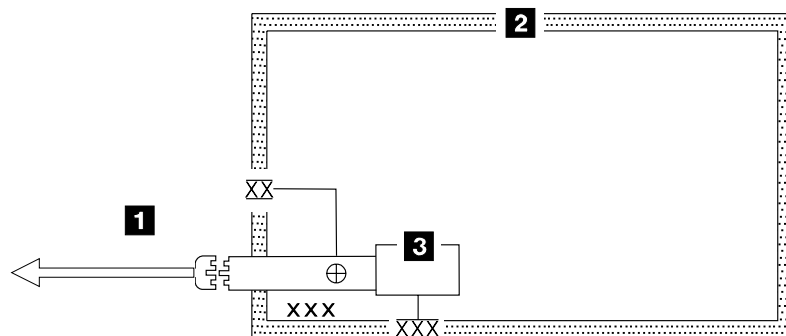


Legend:

XX   External tooth lock washer
     Green/yellow ground wire terminated to chassis or ground

⊕    Green/yellow ground wire terminated with slip-on spade terminal

XXX  Redundant ground path to frame

XXX  External tooth lock washer

*Figure 1. AC Grounding Diagram (50 Hz and 60 Hz)*

1. Power off the 8mm Tape Library.

2. Disconnect the channel cables.

3. Disconnect the power cord  1  from its source.

4. Check that no voltage exists between the housing on the power source and the building ground.

5. Verify that resistance is less than 0.1 ohm from the building ground to the power supply enclosure  3 .

6. Inspect the power cable  1  for visible cracks, wear, or damage.

7. Check that resistance between the power cable ground and the Tape Libraryframe  2  is less than 0.1 ohm.

8. Inspect the power supply enclosure covers 3 to ensure that all screws are installed and are tight.

## Environmental Notices

The following is environmental information pertaining to the Tape Library

## Product Recycling

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

## Product Disposal

This unit may contain batteries. The batteries must be removed and discarded, or recycled according to local regulations and where facilities exist. Specific information per battery type will be referenced throughout the manual where applicable.

## Environmental Design

The environmental efforts that have gone into the design of this unit signifies IBM's commitment to improve the quality of its products and processes. Some of these activities include elimination of the use of CFCs, development of reusable or recyclable packaging, and reductions in manufacturing wastes.

## Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

IBM
AIX
IBMLINK
RS/6000
AIX System Backup and Recovery/6000

The following terms are trademarks of other companies:

CSA         Canadian Standards Association
UL           Underwriter's Laboratories

# IBM Agreement for Licensed Internal Code

You accept the terms of this Agreement by your initial use of a machine that contains IBM Licensed Internal Code (called "Code").

These terms apply to Code used by certain machines IBM or your reseller specifies (called "Specific Machines"). International Business Machines Corporation or one of its subsidiaries ("IBM") owns copyrights in Code or has the right to license Code. IBM or a third party owns all copies of Code, including all copies made from them.

If you are the rightful possessor of a Specific Machine, IBM grants you a license to use the Code (or any replacement IBM provides) on, or in conjunction with, only the Specific Machine for which the Code is provided.  IBM licenses the Code to only one rightful possessor at a time.

Under each license, IBM authorizes you to do only the following:

1. Execute the Code to enable the Specific Machine to function according to its Official Published Specifications (called "Specifications");

2. Make a backup or archival copy of the Code (unless IBM makes one available for your use), provided you reproduce the copyright notice and any other legend of ownership on the copy. You may use the copy only to replace the original, when necessary; and

3. Execute and display the Code as necessary to maintain the Specific Machine.

You agree to acquire any replacement for, or additional copy of, Code directly from IBM in accordance with IBM's standard policies and practices. You also agree to use that Code under these terms.

You may transfer possession of the Code to another party only with the transfer of the Specific Machine. If you do so, you must 1) destroy all your copies of the Code that were not provided by IBM, 2) either give the other party all your IBM-provided copies of the Code or destroy them, and 3) notify the other party of these terms. IBM licenses the other party when it accepts these terms. These terms apply to all Code you acquire from any source.

Your license terminates when you no longer rightfully possess the Specific Machine.

# Actions You May Not Take

You agree to use the Code only as authorized above. You may not do, for example, any of the following:

1. Otherwise copy, display, transfer, adapt, modify, or distribute the Code (electronically or otherwise), except as IBM may authorize in the Specific Machine's Specifications or in writing to you;

2. Reverse assemble, reverse compile, or otherwise translate the Code unless expressly permitted by applicable law without the possibility of contractual waiver;

3. Sublicense or assign the license for the Code; or

4. Lease the Code or any copy of it.

# Electronic Emission Notices

The following statement applies to this IBM product.  The statement for other IBM products intended for use with this product will appear in their accompanying manuals.

## Federal Communications Commission (FCC) Statement

**Note:**  This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.  These limits are designed to provide reasonable protection against harmful interference in a residential installation.  This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.  However, there is no guarantee that interference will not occur in a particular installation.  If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits.  Proper cables and connectors are available from IBM authorized dealers.  IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment.  Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules.  Operation is subject to the following two conditions:  (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Industry Canada Compliance Statement**

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

**Avis de conformité à la réglementation d'Industrie Canada**

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

**European Community Compliance Statement**

This product is in conformity with the protection requirements of EC 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.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

Properly shielded and grounded cables and connectors (IBM part number 21H1955 or its equivalent) must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables and connectors are available from IBM authorized dealers. IBM cannot accept responsibility for an interference caused by using other than recommended cables and connectors.

**Germany Only:** This product is in conformity with the EN55022 class B emission limits.

**Japanese Voluntary Control Council for Interference (VCCI) Statement**

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の
基準に基づく第一種情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な
対策を講ずるよう要求されることがあります。

**Korean Government Ministry of Communication (MOC) Statement**

Please note that this device has been approved for non-business purposes and may be used in any environment including residential areas.

# About This Guide

This Service Guide provides information on how to service the 8mm Tape Library. Store this book with your system unit maintenance manuals.

**Note:** Figures of the operator panels display **7331–3xx**. These are for reference only. Panels on the actual product will display **7331–305**, **3449–355**, or **3449–356**.

It contains the following information:

**Chapter 1, Reference Information** , highlights physical and power specifications; the recommended environment; and an overview of the operator control panel; and an introduction to UEC displays.

**Chapter 2, Service Operations** , describes the control panel operation for service and diagnostic procedures.

**Chapter 3, Removal and Installation Procedures** , describes the removal and installation procedures required to service 8mm Tape Library assemblies.

**Chapter 4, Problem Analysis Procedures (PAPs)** , lists the problem analysis procedures (PAPs) required to service the 8mm Tape Library.

**Appendix A, Error Codes and Related Service Actions** , lists the library Unit Error Codes, FRU Group codes, and failing part number items with related service action.

**Appendix B, Accessing the System Error Log for RS/6000 (7331 Model 305 only)** , gives direction to view the error log in the following formats: SMIT, TCTL, ERRPT, and TAPEUTIL.

**Appendix C, Parts Diagram and Parts List** , provides a parts diagram and parts list required to service the 8mm Tape Library.

**Appendix D, Power Cables for Model 305** , provides power cable information for different countries.

**Appendix E, Statement of Limited Warranty** , is the 7331 and 3449 8mm Tape Library Model 3xx Service Guide warranty.

## Related Publications

*External Devices Translated Safety Notices*, SA26-7192 provides translations of danger and caution notices.

*7331 and 3449 8mm Model 3xx  Installation Guide* provides installation information for the Tape Library.

*7331 and 3449 8mm Tape Library Model 3xx Operator Guide* provides information about operating the Tape Library.

# Related Webpage Sources

**HTTP://WWW.US.PC.IBM.COM\Server** for information regarding the current
IBM PC Company Compatible Systems and Applications for 3449 Models 355
and 356.

# Chapter 1.  Reference Information

This chapter provides information about the specifications, indicator lights, and operator controls for the Tape Library.

## Specifications

| Figure 2. Physical Specifications for the Tape Library | |
|---|---|
| Width: | 323mm (12.7 inches) |
| Depth: | 723mm (28.5 inches) |
| Height: | 637mm (25.1 inches) |
| Weight: | 42kgm (92.5 pounds) |

| Figure 3. Power Specifications for the Tape Library | |
|---|---|
| Kv A: | 0.34 |
| Vac: | 100 to 127, or 200 to 240 |
| Hertz: | 50 to 60 |
| Btu maximum: | 580 |
| Watts: | 320 |
| Power Factor: | 0.95 |
| Maximum Altitude: | 2135m (7000 feet) |
| Maximum In-rush Current: | 60 amps |

| Figure 4. Recommended Environment for the Tape Library | | | |
|---|---|---|---|
| | **Operating** | **Storage** | **Shipping** |
| Temperature | 16 to 32°C (60 to 90°F) | 1°C to 60°C (34° to 140°F) | −40 to 60°C (−40 to 140°F) |
| Relative Humidity | 20 to 80% | 10 to 80% | 10 to 90% |
| Maximum Wet Bulb | 23°C (73°F) | 29°C (84°F) | 29°C (84°F) |
| **Note:** The operating limits include media. The storage and shipping limits do not include media. For media storage and shipping limits, refer to the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide GA32-0376* | | | |

# Operator Control Panel



Cancel Button
Up Button
Down Button
Power Switch
Power-On Indicator
Door Lock Indicator
Key Lock
Display Panel
Select Button
Door Unlock Button
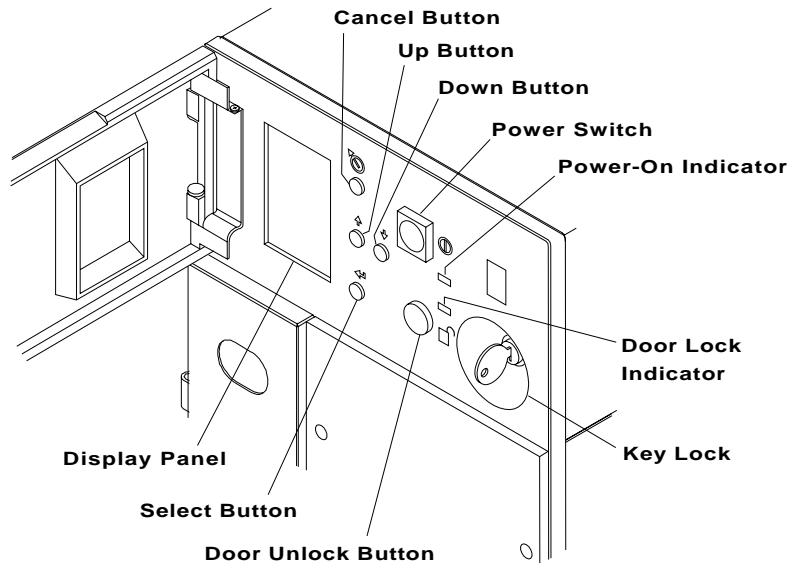
ASOPISX-00

*Figure 5. Operator Control Panel*

The Tape Library operator control panel (see Figure 5) is located behind the small access door on the front of the library and has the following features:

Power switch and power-on indicator
Door unlock button and door lock indicator
Key lock
Control buttons
Liquid crystal display (LCD)

## Power Switch and Power-On Indicator

The power switch ( ⏻ ), located on the control panel, controls power to the tape drives and library.  The power switch is a mechanical switch that retains its state when power is cycled.  The switch does not provide a visual indication of its On or Off state.  When the switch is On the library cooling fan operates and DC power is distributed to the components in the library.

The power-on indicator is a green LED located on the control panel adjacent to the power switch. The power-on indicator is software controlled. During initial power-on, the power-on indicator lights indicating the start of Power-On Self Test (POST). If no errors are detected during POST, the power-on indicator remains lit continuously. If an error is detected during POST, the power-on blinks one of four sequences that indicate a specific error. The only time other than POST when the power-on indicator blinks is following an unsuccessful microcode download command.

**Note:** The power-on indicator blink rate is twice per second with 1 second off between repetitions of the specific error sequence.

# Door Unlock Button

The library provides a software controlled door lock and door lock indicator. When the library power is off, the door lock is unlocked to allow the operator access to the library contents. When initially powering on the library and during POST, the door remains unlocked. At the completion of POST, if the door sensor indicates the door is closed, the door is locked. If the sensor indicates the door is open, the door is not locked until it is closed.

Pressing the door unlock ( ⬚ ) button on the control panel signals the library that the operator wants to open the library front door. When the unlock ( ⬚ ) button is pressed, the control panel display shows the message, `UNLOCK DOOR PRESSED`, indicating that the button was pressed. If there is no system unit command to prevent media removal when the button is pressed, the library completes any move operation in progress and then parks the picker. When the picker is parked the library displays the message, `DOOR UNLOCKED The door may now be opened`.

Whenever the library door is opened, software assumes that the contents of the library have been altered and clears the current inventory. If the unlock button was inadvertently pressed, pressing the cancel button without opening the library door relocks the library and retains the current library inventory.

Library access can be prevented with a software controlled lock from the system unit or by the operator manually locking the door with the key lock. If the unlock ( ⬚ ) button is pressed when a system unit software controlled lock is present the library displays the message, `UNLOCK NOT ALLOWED BY HOST Press any button.`

The library does not accept any move commands from either the system unit or the library control panel while the door is open. The tape drives in the library can operate independent of other library operations and can be accessed directly by the system unit for running a manually inserted tape such as a diagnostics tape. When the door is open and library power is on, the picker can be moved using the Move Picker buttons located on the inside of the front door.

The library door automatically locks when the door is closed. After the door locks, move commands from either the system unit or the control panel will then be accepted by the library.

# Door Lock Indicator

The door lock indicator is a green LED located on the control panel adjacent to the door unlock button. The door lock indicator is software controlled. During initial power-on, the door lock indicator may or may not light. After POST completes the door lock indicator lights if the door is locked. During library operation the software controls the state of the door lock indicator so that it matches the state of the door lock.

# Key Lock

The key lock, located on the right side of the control panel, is a mechanical lock to prevent unauthorized access to the library. The key lock must be unlocked and the control panel unlock ( ⬚ ) button pressed to gain access to the library.

# Control Buttons

There are four control buttons on the control panel to the right of the control panel display; two scroll buttons (Up and Down), a Select button, and a Cancel button. These buttons are functional after the completion of POST. When a button is pressed, an audible beep sounds. The beep is an audio confirmation for the operator that the button was pressed.

The scroll buttons (Up ( ⇧ ) and Down ( ⇩ )) are used to move through the displayed menu list and highlight a menu item for selection or to advance to additional selections not currently displayed.

The Select ( ⏎ ) button is used to choose the highlighted menu item.

The Cancel ( ⦸ ) button moves the highlight back one menu item, returns the control panel display to the previous menu, or cancels the operation.

**Note:** Canceling an operation in progress, may cause an error that displays a UEC. Also, a tape cartridge may be left in a tape drive or the picker.

# Control Panel Liquid Crystal Display (LCD)

The control panel LCD is the primary method of displaying information for the operator. The control panel display brightness and contrast are software controlled. Using the control panel, the operator can adjust the brightness and contrast.

The control panel display (see Figure 6) shows status information, menu options, and operator prompts. The upper portion of the control display shows the current **library state** (item  1 ). When the library is performing a function, such as a host initiated tape cartridge move command, the upper portion of the display changes to indicate the new state. The lower portion of the display shows **drive status** or **user menus** (item  2 ). The right side of the display graphically depicts the **status of the magazines** (item  4 ) and **tape drives** (items  5  and  6 ) as shown in "Magazine and Tape Drive Status Displays" on page 6.



| | |
|---|---|
| 1 | Current Library State |
| 2 | Drive Status/Menu |
| 3 | Cleaning Cartridge Bonus slot |
| 4 | Magazines |
| 5 | Drive 2 |
| 6 | Drive 1 |
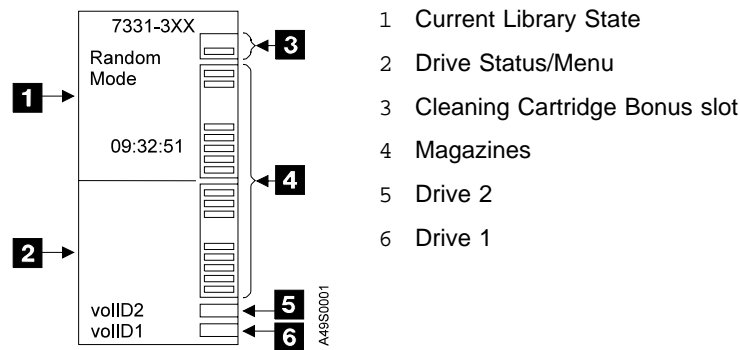
*Figure 6. Control Panel Display*

## Library State

The library state display (see Figure 7) is determined by the current operation mode (**random, sequential**, or **manual**) and the operation in progress.

| Random Mode | | Sequential Mode | | Manual Mode | |
|---|---|---|---|---|---|
| (No Move) | (Move) | (No Move) | (Move) | (No Move) | (Move) |

```
   Random Mode              Sequential Mode              Manual Mode
 (No Move)    (Move)      (No Move)     (Move)       (No Move)      (Move)

 7331-3XX    7331-3XX     7331-3XX     7331-3XX      7331-3XX      7331-3XX

 Random      Moving       SEQ mode     Moving        OFF-LINE      Moving
 Mode        volID1                    volID1                      volID1
             to           Waiting      to            Main          to
             Drive 1      for a        Drive 1       Menu          Drive 1
 09:32:51                 drive to
                          eject

                                                     Modes

 Press       Press        Press        Press         Commands      Press
 to          to           to           to            Config        to
 cancel      cancel       cancel       cancel        Set-up        cancel
                                                     Service
 volID2
 volID1
```

*Figure 7. Operation Modes Display*

When a manual mode operation is initiated, the library state section may display initialization messages to inform the operator that an operation is starting or that a programmed delay is occurring. During the processing of an operation, the control panel display shows messages that provide information about the current operation. If an error occurs during an operation, the error messages are shown on the display.

## Drive Status or User Menu

The drive status or user menu display shows the current status of the tape drives and information about the tape cartridges in the tape drive.

When a menu is displayed, the drive status or user menu section shows the menu items available.

Examples of tape drive status displays and user menus can be seen in any of the procedures under "Service Menu Display" on page 13.

## Magazine and Tape Drive Status

The "Magazine and Tape Drive Status" display illustrates the drives, magazines, and magazine slots (see Figure 8 on page 6).

Although columns  1 ,  2 , and  3  represent different modes, they are identical in their physical make up.

Item  4  represents two bonus slots which, as with the magazines, uses a symbol to indicate the presence of a tape cartridge in each slot location where a tape cartridge is located.

The items  5  and  6  represent the tape cartridge magazines. These magazines use a symbol to indicate the presence of a tape cartridge in each slot location where a tape cartridge is located.

Items  7  and  8  represent the drives A symbol is shown in the rectangle if a tape cartridge is loaded in the tape drive.

### Magazine and Tape Drive Status Displays



Column 1 is Status Unknown (inventory required)

Column 2 is Manual or Random Modes

Column 3 is Sequential Mode

Item 4 is Bonus Slots

Item 5 is Tape Cartridge Magazine

Item 6 is Tape Cartridge Magazine

Item 7 is Tape Drive

Item 8 is Tape Drive

Item 9 is Status Unknown

Items 1 are Empty Slots

Items 11 are Tape Present

Item 12 is Tape in Drive

Item 13 is Drive Empty

Item 14 is Used Cartridges
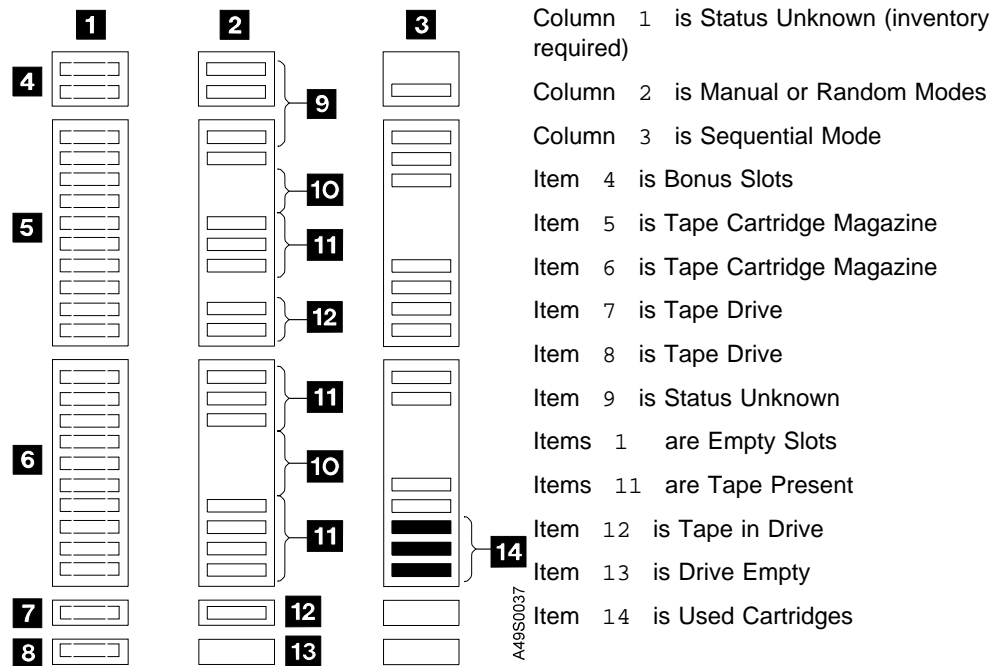
*Figure 8. Magazine and Tape Drive Status Displays*

**Note:** The dashed slots or drives in column 1 represent an unknown status. Column 2 illustrates a known status. The sequential mode column, item 3 , illustrate used tape cartridges in a solid graphic. The column representations are illustrated in Figure 9.



**UNKNOWN**  Indicates the presence of a tape cartridge is unknown (all modes, all configurations)

**PRESENCE KNOWN**  Indicates a cartridge is at the location (all modes, all configurations)

**TAPE USED**  Indicates a cartridge was used during the operation (sequential mode, off-line commands)
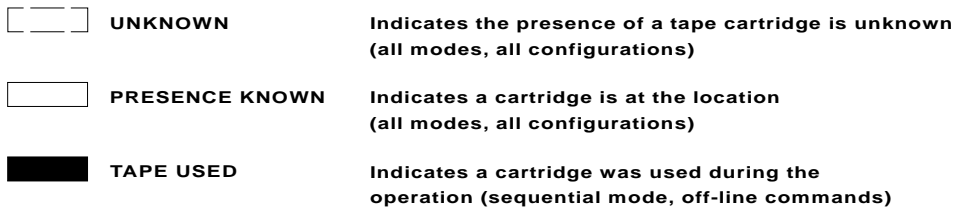
ASICON-01

*Figure 9. Tape Cartridge Display Icons*

# Tape Drive Status Lights and Unload Button
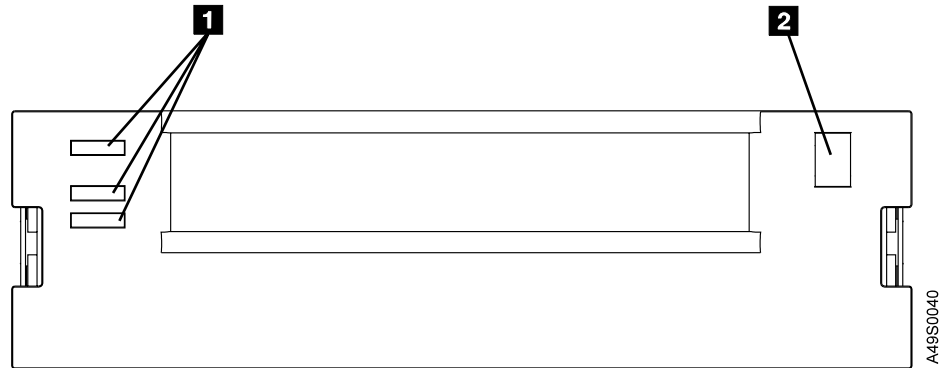


*Figure 10. Tape Drive Status Lights and Unload Button*

In Figure 10, Item `1` is the column of status lights made up of (top to bottom) DISTURBANCE, READY, and READ-WRITE indicators, and

Item `2` is the UNLOAD BUTTON.

## Status Lights

There are three status lights on the tape drive: two green and one amber. These status lights are turned on and off in various combinations to indicate the status of the tape drive.

The symbols located next to the status lights are International Organization for Standardization (ISO) symbols that define the general function of the status lights as follows:

| | |
|---|---|
| ↳ Disturbance | The amber status light flashes whenever the tape drive encounters an unrecoverable fault. It is on solid whenever the tape drive requires cleaning. |
| ○ Ready | The green status light is on solid whenever the tape drive is ready to receive tape backup commands. |
| ⬦ Read-Write | The green status light flashes whenever the tape drive is moving tape. |

The various on/off combinations of the status lights are shown in Figure 11.

## Unload Button

Pressing the unload button unloads and ejects any tape cartridge loaded in the tape drive.

The unload button operates only when power is applied to the tape drive.

| Figure 11. Status Lights on the Tape Drive | | |
|---|---|---|
| **Status Lights** | **State** | **Status** |
| ↳ ☼ <br> ○ ☼ <br> ◈ ☼ | On <br> On <br> On | The Power-on Self Test (POST) is running or the system has issued a reset to the drive. <br><br> **Note:** The POST condition can occur either when the power is first applied or after use of the diagnostic cartridge. |
| ↳ ☐ <br> ○ ☐ <br> ◈ ☐ | Off <br> Off <br> Off | The POST has completed successfully, but no tape cartridge has been inserted. |
| ↳ ☐ <br> ○ ☐ <br> ◈ ◨ | Off <br> Off <br> Flashing | A tape cartridge has been inserted and the tape drive is performing a tape load/unload operation. |
| ↳ ☐ <br> ○ ☼ <br> ◈ ☐ | Off <br> On <br> Off | The tape load operation has completed and the tape drive is ready to receive commands from the system. |
| ↳ ☐ <br> ○ ☼ <br> ◈ ◨ | Off <br> On <br> Flashing | The tape is in motion and the tape drive is busy running a device operation. |
| ↳ ◨ <br> ○ ☐ <br> ◈ ☐ | Flashing <br> Off <br> Off | The tape drive has detected an internal fault that requires corrective action. The flash rate will be fast (4 flashes per second) for any media using the diagnostic cartridge. The flash rate will be slow (1 flash per second) for any other type of failure. Refer to your service guide or system diagnostics. |
| ↳ ☼ <br> ○ ☐ or ☼ <br> ◈ ☐ or ◨ | On <br> Off or On <br> Off or Flashing | The tape path requires cleaning. |

# Definition of Power-Off and Power-On

If **any** of the following indications are present, then the library is considered to be powered on. If **all** of the following indications are not present, then the library is considered to be powered off.

Items requiring an operational power supply:

– Power supply fan

Items requiring an operational power supply and minimal controller card functions:

– Library cooling fan
– Controller card power good LED (green)

Items requiring an operational power supply and most controller card functions:

– Controller card service LED (yellow), continuous or blinking
– Controller card speaker

Items requiring an operational power supply, most controller card functions, the control panel cable, and the control panel:

– Power-On Indicator (green) (duplicates the controller card power good LED (green)
– Control panel display
– Control panel speaker beeps at least once (duplicates the controller card speaker)
– Door lock indicator (green)

The tape drive lights indicate various encoded states, one of which is the all off state. Therefore, drive lights are not a valid indication of the absence of power to the tape drive. Since the tape drives receive power directly from the power supply and other library components receive their power through the controller card, power to the tape drives is not evidence that power is being distributed to the rest of the library.

# Power Distribution

The power supply cooling fan operates and a power supply sense cable provides a low voltage to the controller card anytime the library power cord is plugged into a grounded power outlet. The output of the power supply to the tape drives and the controller card in the library is controlled by a power switch on the control panel and circuitry on the controller card. Additional, circuitry on the controller card senses when the control panel power switch is closed and signals the control circuit in the power supply to output power to the tape drives and the controller card in the library.

A power-switch override jumper on the controller card can override the control panel power switch and activate the library power supply.

Power is distributed from the power supply to both tape drives and the controller card. All library components, other than the tape drives, receive power from cables attached to the controller card. Except for the cooling fan, all power distributed from the controller card is through current limiting resistors which prevent damage in the case of a short in a cable or peripheral component. The cooling fan power is fused on the controller card.

# UEC and FRU Code Displays

When an error condition is encountered during operation of the library the control panel display (see Figure 12) shows the errors, error codes, or condition of the library. the Unit Error Codes (UEC) and Field Replaceable Unit (FRU) codes are displayed as shown in the following figure.

```
 7331-3XX

Random
Mode


09:32:51

0141
UnitAttn
PwrOnRst          1


volID2
volID1
```

Item  1  shows error information:

– UEC

– Additional information
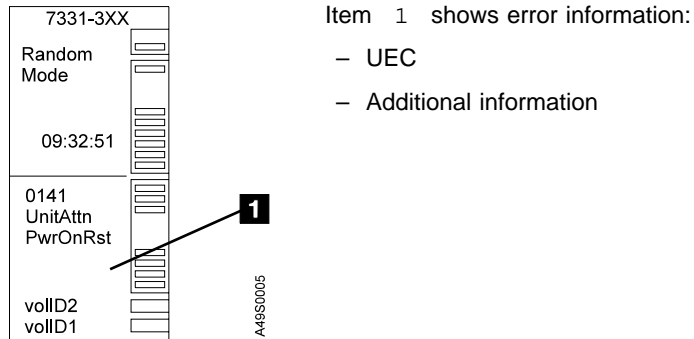
*Figure 12. UEC and FRU Code Display*

# Chapter 2.  Service Operations

This chapter describes how to use the 8mm Tape Library control panel to perform service and diagnostic procedures

## Operator Controls

The service and diagnostic procedures described in this chapter are performed through the 8mm Tape Library control panel. The control panel (see Figure 13) consists of a display (Liquid Crystal Display) panel and a key pad.

## Key Pad



ASOPISX-00
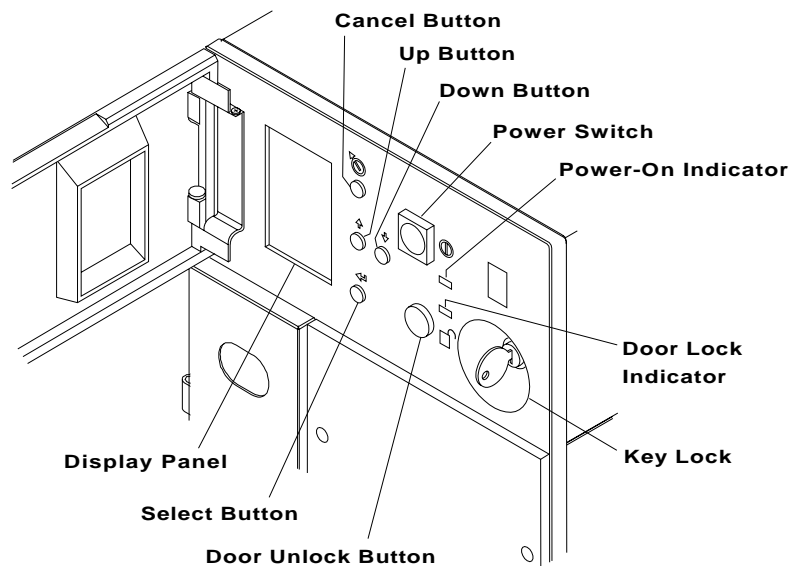
*Figure 13.  Control Panel*

There are four control buttons on the control panel to the right of the control panel display; two scroll buttons (Up and Down), a Select button, and a Cancel button. These buttons are functional after the completion of POST.  When a button is pressed, a beep sounds. The beep is an audio confirmation for the operator that the button was pressed.

The scroll buttons (Up ( ⇧ ) and Down ( ⇩ )) are used to move through the displayed menu list and highlight a menu item for selection or to advance to additional selections not currently displayed.

The Select ( ⏎ ) button is used to choose the highlighted menu item.

The Cancel ( ⃠ ) button moves the highlight back one menu item, returns the control panel display to the previous menu, or cancels the operation.

For a more detailed description of the operator controls see "Operator Control Panel" on page 2.

# Menu Structure for Library Service Operations

```
Main Menu

Modes ──────── Mode Menu ──────→ Refer to
                                  Operator Guide

Commands ───── Command ──────→ Refer to
               Menu           Operator Guide

Configuration ─ Configuration ──→ Refer to
                Menu             Operator Guide

Set-up ─────── Set-up Menu ────→ Refer to
                                  Operator Guide

Service ────── Service Menu ── Log Menu
               Logs
                               Errors ──────── SCSI Errors
                                               Motion Errors
                                               Other Errors

                               History Log ─── SCSI History Log
                                               Front Panel History Log and
                                                         Automatic Log

                               Stats Menu ──── Library ──── Serial #
                                                            uCode
                                                            Pwr Hrs
                                                            Motion
                                                            DoorOpen
                                                            Pick
                                                            Place
                                                            Barcode

                                               Drives ───── Serial #
                                                            Part #
                                                            uCode
                                                            Loads
                                                            Cleaned

                               Sensors

Selftest ───── Selftest

Calibrate ──── Calibrate ───── 5-tape or 4-tape Calibration
                               Full Calibration

CE Menu        CE Menu
(not shown)    (header not   Serial # ─────── Product type
               shown)                          Serial number

                             Tuning ───────── Tuning Parameters

                             Clearing Logs ── Clears History and Error Logs

                             rstNVRAM ─────── Resets values stored in
                                               NVRAM

                             Code Load ────── Clears History and Error Logs
```

A34M0141

# Menu Displays

## Service Menu Display

Service and diagnostics utilities are accessed by selecting `Service` from the Main Menu. Refer to "Menu Structure for Library Service Operations" on page 12 for a detailed flow of the Service Menu structure and Figure 14 for the display. Utilities available from the Service Menu are:

> Logs
> Selftest
> Calibrate

To display the Service Menu, do the following:

1. Open the control panel access door on the front of the tape library.

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:

```
┌──────────────┐    ┌──────────────┐
│ 7331-3XX   ▭ │    │ 7331-3XX   ▭ │
│            ▭ │    │            ▭ │
│ OFF-LINE   ▤ │    │ OFF-LINE   ▤ │
│            ▤ │    │            ▤ │
│   Main     ▤ │    │  Service   ▤ │
│   Menu     ▤ │    │   Menu     ▤ │
│            ▤ │    │            ▤ │
│ ───────────  │    │ ───────────  │
│ Modes      ▤ │    │ ▮Logs      ▤ │
│ Commands   ▤ │    │ Selftest   ▤ │
│ Configuration▤│    │ Cali-      ▤ │
│ Set-up     ▤ │    │   brate    ▤ │
│ ▮Service   ▤ │    │            ▤ │
│            ▭ │    │            ▭ │
└──────────────┘    └──────────────┘
```
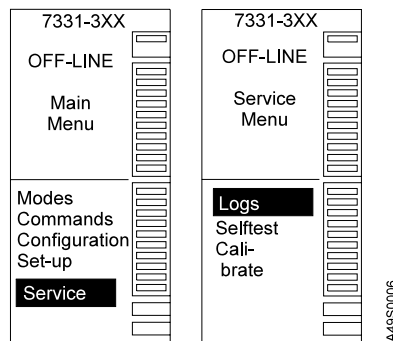
`Service` on the Main Menu.

Press the Select ( ⏎ ) button to display the Service Menu.

*Figure 14. Main Menu/Service Menu Display*

# Log Menu Display

The `Logs` option on the service menu is used to view the following:

**Errors**     A record of SCSI errors and motion errors.

**History**     A record of all SCSI commands, front panel move commands, and automatic operations.

**Statistics**     A record of tape drive and library statistics.

**Sensors**     A record of library sensor settings.

To display the Log Menu (see Figure 15), use the following procedure:

1. Display the Service Menu. See "Service Menu Display" on page 13.
2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:



`Logs` on the Service Menu.
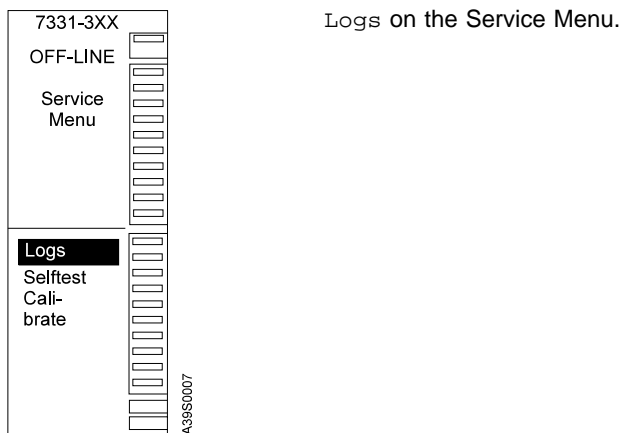
*Figure 15. Service Menu/Log Display*

3. Press the Select ( ⏎ ) button (see Figure 16) to display:



`Log Menu`

Go to the procedure for the option desired:

– Errors - "Error Log Display" on page 15

– History - "History Log Display" on page 19

– Statistics - "Library and Tape Drive Statistics Display" on page 21

– Sensors - "Library Sensor Information Display" on page 24
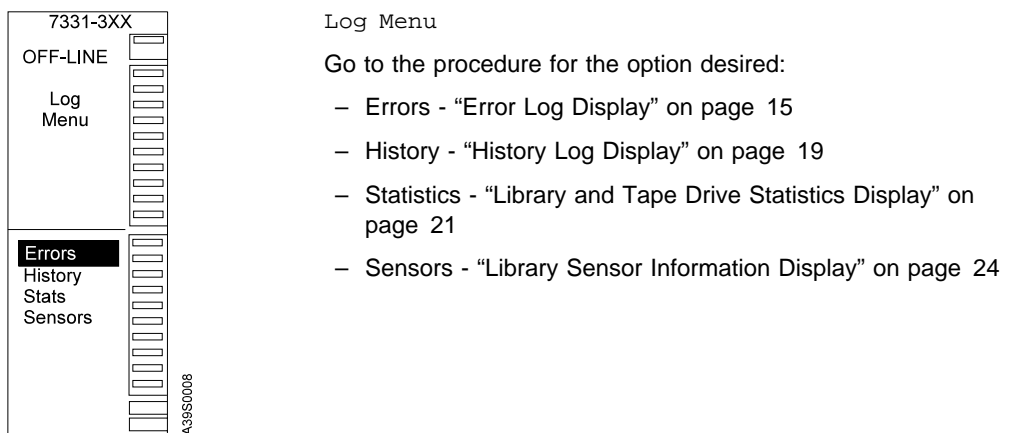
*Figure 16. Log Display*

4. Pressing the Cancel ( ⃠ ) button returns the display to the Set-up Menu.

# Error Log Display

Errors detected during the library operation are logged in error logs. All logged errors contain the following basic information:

Time the error occurred (24-hour clock format)

Date the error occurred

Unit Error Code (UEC) (see Figure 109 on page 155)

Error log type

The `Errors` selection on the Log Menu is used to view the following:

**SCSI Errors (type 00)**  Errors that occur during SCSI commands and contain the base sense information returned to the system unit.

**Motion Errors (type 01)**  Errors that occur during motion commands and contain specific information about the type of motion in progress and the failure.

**Other Errors (type 02)**  Errors that do not fall into one of the above categories.

To display the errors, refer to Figure 17 and use the following procedure:

1. Display the Log Menu. See "Log Menu Display" on page 14.

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:

```
7331-3XX

OFF-LINE

   Log
  Menu



Errors
History
Stats
Sensors




A39S0008
```
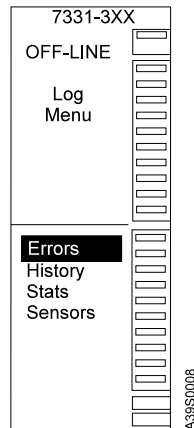
`Errors` on the Log Menu.

Press the Select ( ⏎ ) button to display the first error in the error log.

*Figure 17. Log/Errors Display*

3. Errors are displayed in the following formats (see Figure 18).

**SCSI Errors (type 00)**

```
  7331-3XX

  OFF-LINE


   Error
    Log
     1



  122025
  11/07/94
  01CA00
  TTuuVVww
  XXyyZZ
```

Item **1** is TIME.

Item **2** is DATE.

Item **3** is UEC and log type (00 for SCSI ERR)
Base fields of REQUEST SENSE Information

Item **4** (bytes 00, 0F, 10, 11, 12, 13, 14)
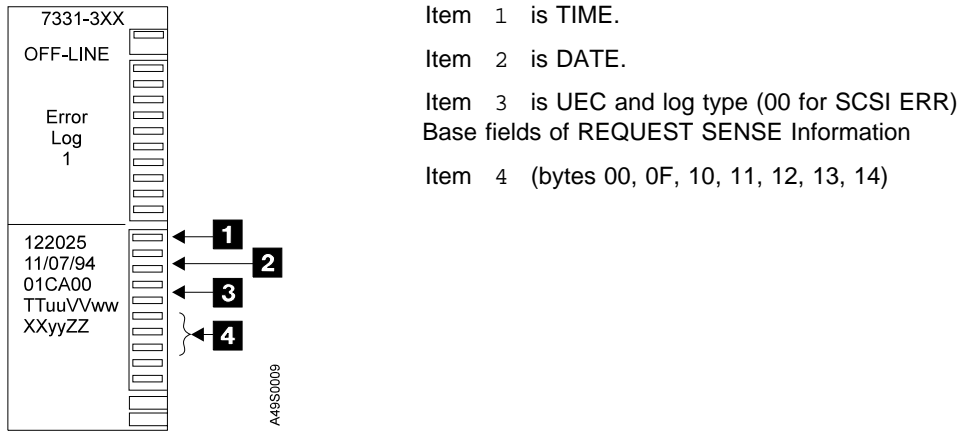
*Figure 18. SCSI Errors (type 00) Display*

Errors that occur during the communication between the system unit and the library are logged as SCSI errors. The error log also contains the information required to build the request sense information that is returned to the system unit when the error occurred.

The request sense information returned is largely based on the UEC. The information that is not contained in the UEC is stored in the log in the form of the returned request sense bytes (bytes 00, 0F, 10, 11, 12, 13, and 14 of the request sense information).

**Motion Errors (type 01)**

Refer to Figure 19.

```
  7331-3XX

  OFF-LINE



   Error
    Log
     1


  122025
  11/07/94
  018401
  MoveTape
  FeedBelt
  05030811
```

Item **1** TIME.

Item **2** DATE.

Item **3** UEC and log type (01 for Motion Error)

Item **4** Function being performed

Item **5** Failed function step

Item **6** Source, destination, internal function step number, and internal error code.
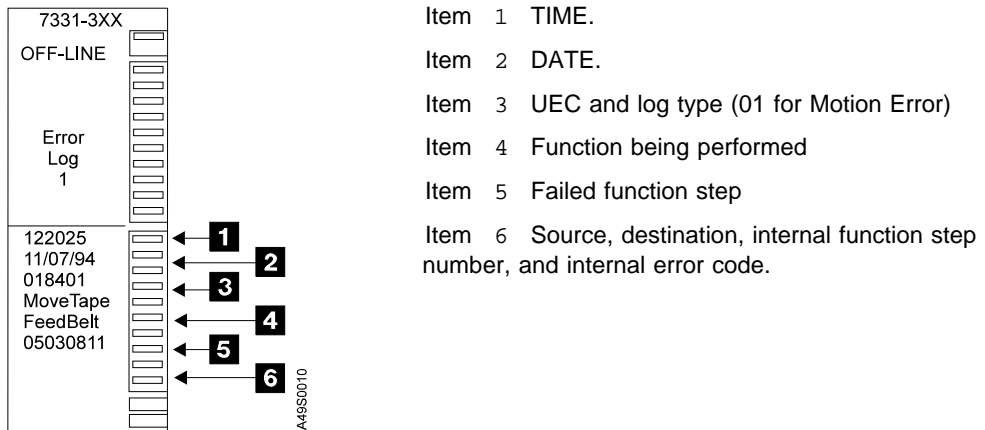
*Figure 19. Motion Errors type (01) Display*

When an error occurs during a motion process, the process information and specific error information is logged in an eight digit error code. This motion error code is shown in the bottom line of the above motion error display. The error code information is displayed in hexadecimal format (base 16).

The first four digits of the motion error code represent the source and destination of the move as shown in Figure 20
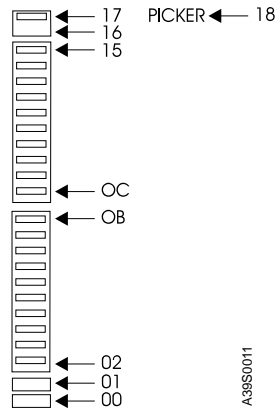


*Figure 20. Source and Destination Locations for Move Commands*

The next two digits of the error code are an internal process step number. The last two digits of the error code indicate the motion error code as listed in Figure 21.

| Figure 21 (Page 1 of 2). Library Motion Error Codes | |
|---|---|
| **Error Description** | **Error Code** |
| ABORT | |
| Cancel pressed | 00 |
| Door unlock pressed | 01 |
| Reset | 02 |
| Abort message | 03 |
| TIMEOUT | |
| Accessor motor | 10 |
| Feedbelt motor | 11 |
| Pinch motor | 12 |
| OVERCURRENT | |
| Accessor motor | 20 |
| Feedbelt motor | 21 |
| Pinch motor | 22 |
| UNEXPECTED SENSOR | |
| Generic | 30 |
| Accessor top limit | 33 |
| Accessor bottom limit | 34 |
| Accessor blocked | 35 |
| Feedbelt rear travel limit | 39 |
| Feedbelt tach count limit | 3A |
| Pincher | 3C |
| Door open | 3E |

| Figure 21 (Page 2 of 2). Library Motion Error Codes | |
| --- | --- |
| **Error Description** | **Error Code** |
| ERROR DETECTED IN MOTION | |
|     Detected in SCSI routine | 40 |
|     Detected in motion routine | 41 |

### Other Errors (type 02)

Refer to Figure 22.

```
 ┌─────────────┐
 │ 7331-3XX    │
 │             │
 │ OFF-LINE    │
 │             │
 │             │
 │ Error       │
 │ Log         │
 │  1          │
 │             │
 │             │
 │ 122025      │  ◄── 1
 │ 11/07/94    │  ◄── 2
 │ 018402      │  ◄── 3
 │             │
 │             │
 │             │
 │        A49S0012
 └─────────────┘
```

Item  1   TIME.

Item  2   DATE.

Item  3   UEC and log type (01 for Motion Error)

(02 for Other Error)
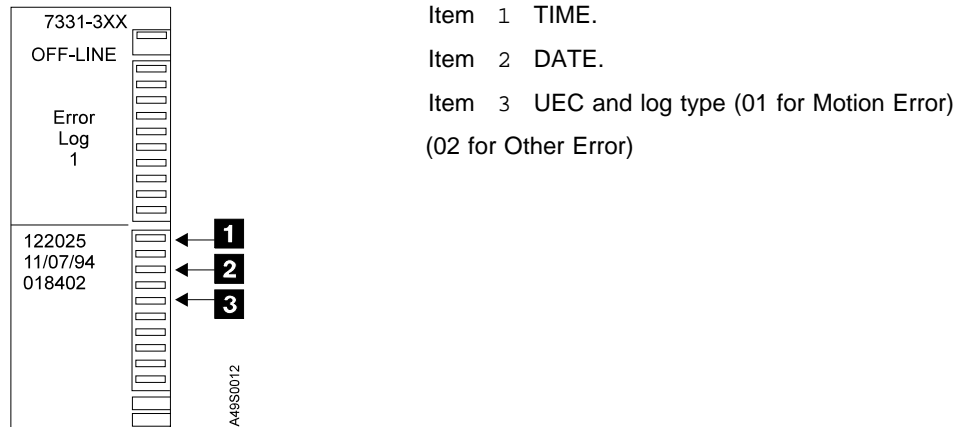
Figure 22. Other Errors type (02) Display

> **Note:** New errors are added to the beginning of the log (error log 1 is the most recent error that occurred). When the error log reaches its maximum capacity the oldest errors logged are discarded as new errors are logged.

4. Press the Up ( ⇧ ) and Down ( ⇩ ) buttons to step through the error log from the most recent error log to the oldest error.

5. Press the Cancel ( ⌽ ) button at anytime to return to the Log Menu.

# History Log Display

All SCSI commands, control panel move operations and automatic operations are logged in the History Log. There are three types of history log entries: SCSI history logs, control panel history logs, and automatic history logs.

To display the History Log, refer to Figure 23 and use the following procedure:

1. Display the Log Menu. See "Log Menu Display" on page 14.
2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:
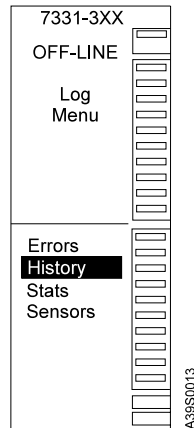


`History` on the Log Menu.

Press the Select ( ⏎ ) button to display the first history entry.

*Figure 23. Log/History Display*

3. The history entries are displayed in the following formats.

   **SCSI History Log**

   See Figure 24.
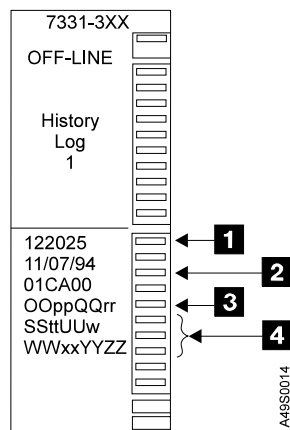


Item 1 TIME.

Item 2 DATE.

Item 3 UEC (or 'good' if no error) and log type (00 for SCSI)

Item 4 Command Descriptor Block (CDB)

*Figure 24. SCSI History Display*

## Front Panel History Log and Automatic History Log

Refer to Figure 25.



Item 1 TIME.

Item 2 DATE.

Item 3 UEC (or 'good' if no error) and log type (01 for Front Panel)

(02 for Automatic)

Item 4 Command
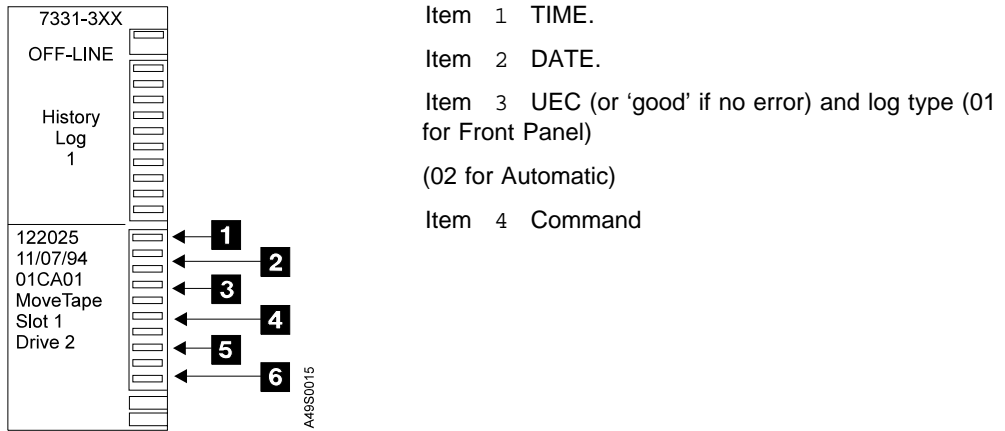
*Figure 25. Front Panel and Automatic History Display*

> **Note:** New history entries are added to the beginning of the history log (history log 1 is the most recent operation that occurred). When the history log reaches its maximum capacity the oldest operations logged are discarded as new operations are logged.

4. Press the Up ( ⇧ ) and Down ( ⇩ ) buttons to step through the history log from the most recent operation logged to the oldest operation logged.

5. Press the Cancel ( ⊘ ) button at anytime to return to the Log Menu.

# Library and Tape Drive Statistics Display

Library statistics are available for viewing from the Log Menu. There are two categories of statistics available: library statistics and drive statistics.

To display the library or tape drive statistics, use the following procedure:

1. Display the Log Menu. See "Log Menu Display" on page 14 and refer to Figure 26.

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:
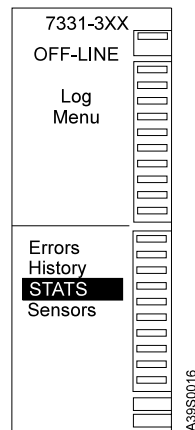


Stats on the Log Menu.

Press the Select ( ⏎ ) button to display the Stats Menu.

*Figure 26. Log/STATS Display*

3. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight the desired statistics for viewing.

4. Press the Select ( ⏎ ) button to display the first statistics display for the selection chosen in the previous step (see Figure 27).
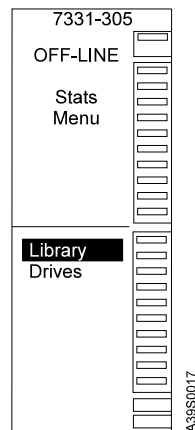


*Figure 27. STATS Menu Display*

5. Press the Up ( ⇧ ) and Down ( ⇩ ) buttons to step through the statistics log.

6. The statistics are displayed in the following formats (refer to Figure 28 and Figure 29 on page 23).

   **Library Statistics**:
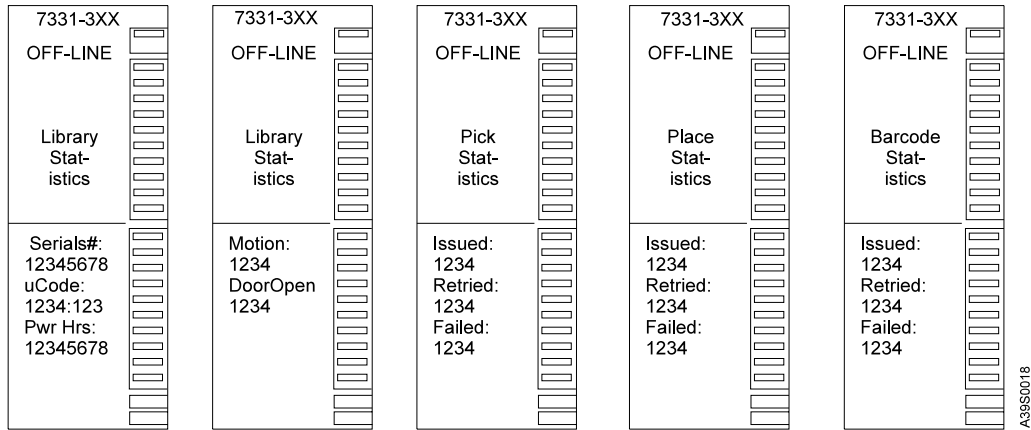


*Figure 28. Library Statistics Display*

| **Serial Number** | Library serial number |
|---|---|
| **uCode** | Library uCode currently loaded |
| **Power Hours** | Total power on hours for the library |
| **Motion** | Number of move tape, inventory, calibrate, and accessor park operations |
| **DoorOpen** | Number of times the door has been opened and closed |
| **Pick** | `issued`: Number of pick operations started |
| | `retried`: Number of pick operations retried |
| | `failed`: Number of pick operations not completed |
| **Place** | `issued`: Number of place operations started |
| | `retried`: Number of place operations retried |
| | `failed`: Number of place operations not completed |
| **Barcode** | `issued`: Number of scans started |
| | `retried`: Number of scans retried |
| | `failed`: Number of scans not completed |

**Tape Drive Statistics**:
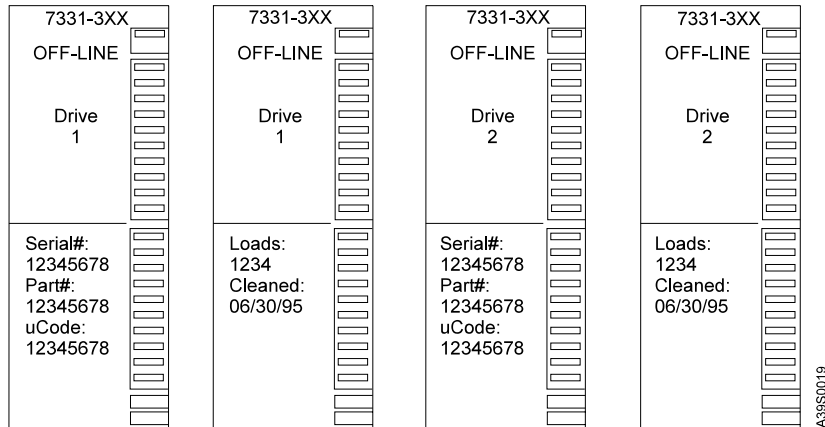


*Figure 29. Tape Drive Statistics Display*

All tape drives will be unknown if no statistics are available.

**Serial Number** Serial number for drive number shown in top section of display

**Part Number** Part number for drive number shown in top section of display

**uCode** Library card uCode currently loaded

**Loads** The number of load operations to the tape drive

**Cleaned** The date the drive was last cleaned using either the control panel or an automatic scheduled cleaning

# Library Sensor Information Display

The library sensor information for the following sensors is available through the Log Menu.

| Sensor | Location |
|---|---|
| Accessor Down Button | inside front door |
| Accessor Up Button | inside front door |
| Door Unlock Button | control panel |
| Cancel Button | control panel |
| Select Button | control panel |
| Down Button | control panel |
| Up Button | control panel |
| Accessor Locked sensor | top of accessor |
| Cartridge Present in Drive/Magazine sensor | on picker |
| Door Open sensor | on the library door |
| Accessor Obstructed Sensor | on frame, top & bottom |
| Pinch Cam Position Sensor | on the picker |
| Cartridge in Picker sensor/Cartridge Travel Warning Sensor | on the picker |
| Feed Belt Warning sensor | on the picker |
| Accessor Bottom Travel Limit Sensor | on the accessor assembly |
| Accessor Top Travel Limit Sensor | on the accessor assembly |

To display the library sensor information, use the following procedure:

1. Display the Log Menu. See "Log Menu Display" on page 14 and refer to Figure 30.

2. Using the Up ( $\Uparrow$ ) and Down ( $\Downarrow$ ) buttons, highlight:

```
7331-305

OFF-LINE

Log
Menu

Errors
History
STATS
Sensors

A39S0020
```
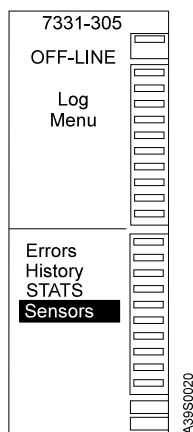
Sensors on the Log Menu.

Press the Select ( $\hookleftarrow$ ) button to display the library sensor information.

*Figure 30. Log/Sensors Display*

3. The sensor information (see Figure 31) displayed is in hexadecimal format (base 16). Use Figure 32, Figure 33 on page 26, and Figure 34 on page 26 to determine the specifics of the displayed sensor information.
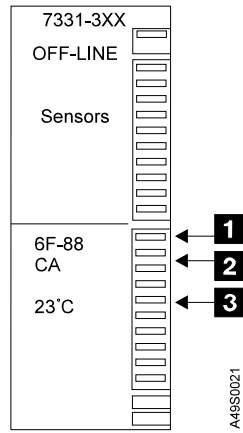
The information shown is a snapshot of the current sensor status. Each time the select button is pressed the information is updated.

1   Sensor group 1 setting and sensor group 2 setting

2   Sensor group 3 setting

3   Temperature



*Figure 31. Sensors Display*

4. Press the Cancel ( ✎ ) button to display the Log Menu.



```
x  -  -  -      -  -  -  -
                         └── Front Panel ACCESSOR DOWN Button
                        ──── Front Panel ACCESSOR UP Button
                     ─────── Front Panel DOOR UNLOCK Button
                  ────────── Front Panel CANCEL Button

            ───────────────── Front Panel SELECT Button
         ──────────────────── Front Panel DOWN Button
      ─────────────────────── Front Panel UP Button
   ────────────────────────── Reserved
```
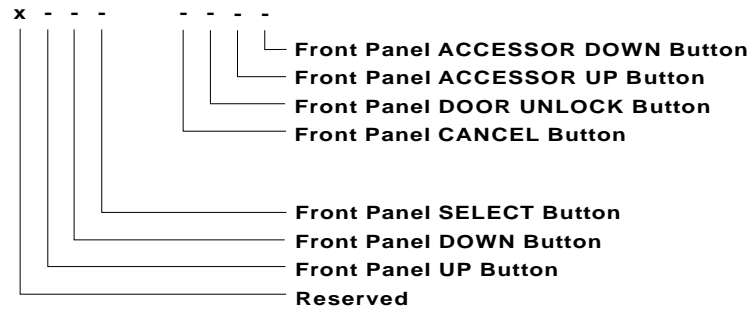
**Polarity     [ - ] = bit is 0 when button is pressed (- polarity)**
**              [ + ] = bit is 1 when button is pressed (+ polarity)**

AS040

*Figure 32. Sensor Group 1*
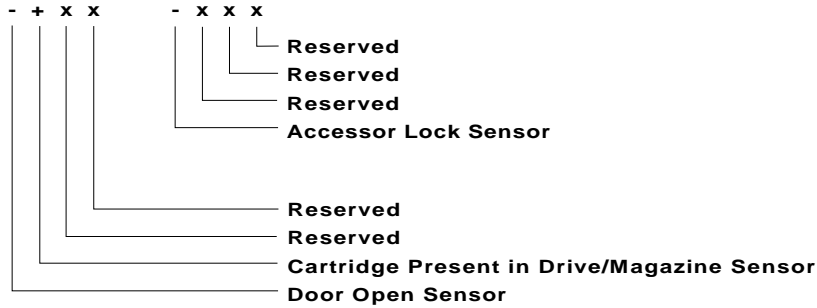
```
- + x x      - x x x
                        └── Reserved
                      ──── Reserved
                    ────── Reserved
                  ──────── Accessor Lock Sensor

                ────────── Reserved
              ──────────── Reserved
            ────────────── Cartridge Present in Drive/Magazine Sensor
          ──────────────── Door Open Sensor
```

**Polarity**     **[ - ] = bit is 0 when the sensor is active (- polarity)**
               **[ + ] = bit is 1 when the sensor is active (+ polarity)**
               **[ x ] = no polarity**

AS040A-00

*Figure 33. Sensor Group 2*

```
x x + +      + + - +
                        └── Accessor Obstructed Sensor
                      ──── Pinch Cam Position Sensor
                    ────── Cartridge In Picker Sensor/Cartridge Travel Warning Sensor
                  ──────── Feed Belt Warning Sensor

                ────────── Accessor Bottom Travel Limit Sensor
              ──────────── Accessor Top Travel Limit Sensor
            ────────────── Reserved
          ──────────────── Reserved
```

**Polarity**     **[ - ] = bit is 0 when the sensor is active (- polarity)**
               **[ + ] = bit is 1 when the sensor is active (+ polarity)**
               **[ x ] = no polarity**

AS040B

*Figure 34. Sensor Group 3*

# Perform a Library Selftest

The Selftest is a diagnostic tool to exercise the library by randomly moving tape cartridges from slot to slot. The tape cartridges are also moved to and from the library tape drives during the Selftest. Any number of tape cartridges can be used providing that one slot remains empty.

To perform Selftest (see Figure 35 on page 27 and Figure 36 on page 27), use the following procedure:

1. Display the Service Menu. See "Service Menu Display" on page 13.

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:

```
7331-3XX

OFF-LINE


Service
Menu




Logs
Selftest
Cali-
brate
```

A39S0022

*Figure  35.  Service/Selftest Menu Display*
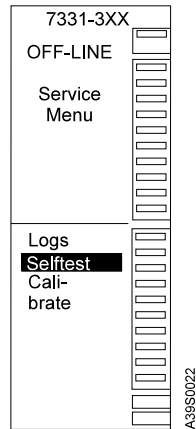
Selftest on the Service Menu.

The library picks and places tape cartridges in the library tape drive during the Selftest. It is the operators responsibility to ensure the system unit does not use a library tape drive while the Selftest is being performed.

Press the Select ( ⏎ ) button to run Selftest.

```
7331-3XX

OFF-LINE


Command
Menu




Inventory
Move Tape
Cleaning
```

A39S0023

*Figure  36.  Move Tape Display*

3. The Selftest runs continuously until one of the following conditions occur:

An error occurs. The Selftest stops when an error occurs and posts a UEC code on the control panel display.

If an error occurs, record the UEC and go to "Analysis Starting Point" on page  107.

**Note:**  When an error occurs during Selftest, the error information is displayed and logged in the error log.

4. The operator presses the Cancel ( ✎ ) button to stop the Selftest, see Figure 37.

   **Note:** Canceling an operation in progress, may cause an error that displays a UEC. Also, a tape cartridge may be left in a tape drive or the picker.
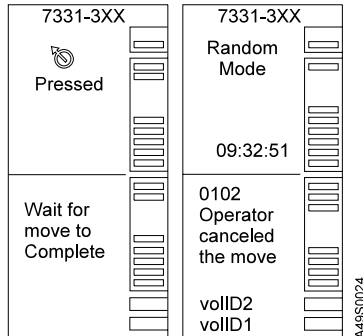


*Figure 37. Move Tape Display*

5. The operator presses the door Unlock ( ⊓ ) button. After the library finishes current operation the library door is unlocked, the door lock indicator goes Off, and the control panel display shows the message, `The door may now be opened`.

6. To stop the Selftest (recommended way) press the door Unlock ( ⊓ ) button. After the library finishes current operation the library door is unlocked, the door lock indicator goes Off, and the control panel display shows the message, `The door may now be opened`.

7. Press the Cancel ( ✎ ) button to relock the door and display the Service Menu.

# Library Calibration

The `calibrate` option on the Service Menu is used to perform library calibration. The library determines where each element and drive location is during calibration. Calibration should be performed when the calibration required UEC (01CE) is displayed. Additionally, calibration is run when any of the following assemblies are replaced:

   Accessor assembly

   Magazine mounting plate assembly

   2-slot cartridge holder

   Controller card

   Tape drive assembly

   Picker assembly

**5-Tape Calibration**

The library is calibrated using only five tape cartridges (four, if only one tape drive is installed).

The tape cartridges for a 5-tape calibration (see Figure 38 on page 29) are placed in the following locations:

   Tape drive 1 (in the unload position)

   Tape drive 2 (if installed, in the unload position)

Slot 1 (bottom slot of bottom magazine)

Slot 11 (bottom slot of top magazine)

Bonus slot 1 (bottom bonus slot)



ASCRT6-00
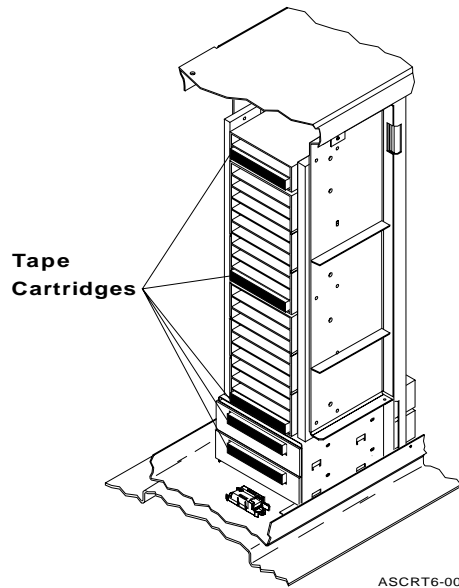
*Figure 38. Tape Cartridge Placement for 5-Tape Calibration*

During the 5-tape calibration the picker is moved in front of the tape cartridges and the calibration values for the library are calculated from the location of the tapes cartridges. **Full Calibration**

**Note:** A full calibration is only required if the 5-tape calibration is unsuccessful.

For a full calibration the operator places a tape cartridge in every location in the library. Twenty-four tape cartridges are required when both tape drives are installed in the library (one in each bonus slot, 20 in the two magazines, and, in the unload position, one in each tape drive). Only 23 tape cartridges are required when just one tape drive is installed in the library.

During a full calibrate the picker is moved in front of the tape cartridges and the location of each tape cartridge is recorded as the calibrate value.

To perform calibration, use the following procedure:

1. Display the Service Menu. See "Service Menu Display" on page 13 and refer to Figure 39 on page 30.
2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight:

```
7331-3XX

OFF-LINE

  Service
   Menu




Logs
Selftest
Cali-
brate
```
A49S0025
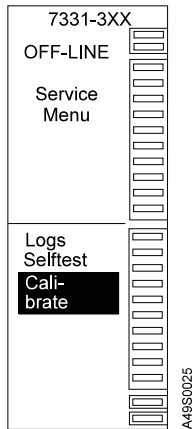
`Calibrate` on the Service Menu.

*Figure 39. Service/Calibrate Menu Display*

3. The control panel display (see Figure 40) shows the message:

```
7331-3XX          7331-3XX

MustHave          OFF-LINE
a tape
in each             Cali-
location            brate



Press ⏎          Press
to                to
continue          cancel
Press
to
cancel
```
A49S0026
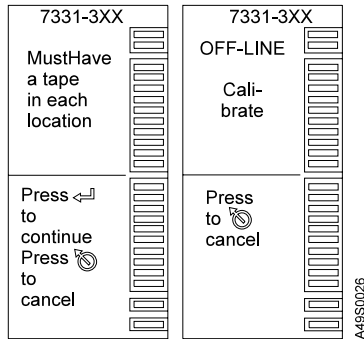
`MustHave a tape in each location.`

Ensure tape cartridges required for the calibrate desired (5-tape calibrate or full calibrate) are in the required positions. Ensure, also, tape cartridges in tape drives locations are in the eject position (sticking out of the drive).

Press the Select ( ⏎ ) button to perform calibrate.

*Figure 40. MustHave/Calibrate Menu Display*

> **Note:** During calibration the library moves the picker across all the tape cartridge positions. The magazine present sensors on the picker determine the location of each element. During the calibrate process, the library also determines the number of tape drives configured in the library

4. After calibrate is complete the control panel display shows a completion message (see Figure 41) that states the number of drives detected in the library.

```
7331-3XX              7331-3XX

OFF-LINE              OFF-LINE

Complete              Complete
with two              with one
drives                drives
                OR

Press ⏎              Press ⏎
to                    to
continue              continue
```
A49S0027
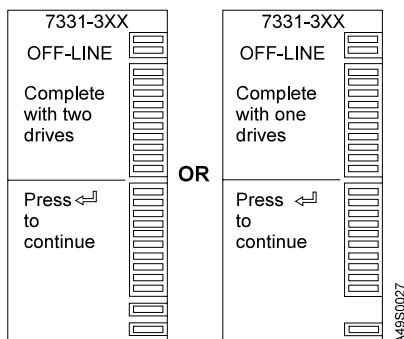
*Figure 41. Number Drives in Library Display*

5. An error message will be displayed (see Figure 42 on page 31) if the library did not detect the correct number of tape cartridges, or if the locations do not match expected values.
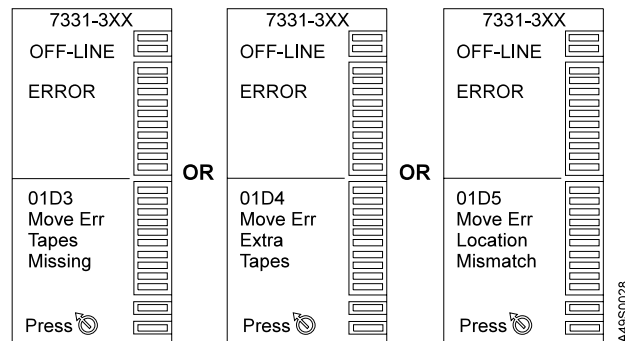


*Figure 42. Error Types in Library Display*

    a. If an error message is displayed, press the Cancel ( ) button to cancel calibrate.

    b. When the error is corrected, calibrate can be run.

6. Press the Select ( ) button to continue and display the Service Menu.

7. Return to the library service procedure that sent you here.

# Enable the CE Menu

The CE Menu is only available when enabled during the power-on sequence and is used by the Customer Engineer (CE) to perform the following:

    Selecting the product type and serial number

    Setting the tuning parameters

    Clearing the history and error logs

    Resetting NVRAM

    Loading library internal code from a Code Load Tape

To enable the CE Menu, use the following procedure:

1. Make sure the library power is Off.

2. Press and hold the Up ( ) and Down ( ) buttons on the library control panel. Hold these buttons until instructed to release them in step 5 on page 32.

3. Press the power switch ( ) on the control panel to power on the library.

4. Continue to hold the Up ( ⇧ ) and Down ( ⇩ ) buttons, and refer to Figure 43 as the library performs the: (POST).

```
7331-3XX

Power On
Selftest
in
Progress
                                    Power-On Self Test



A49O001
```
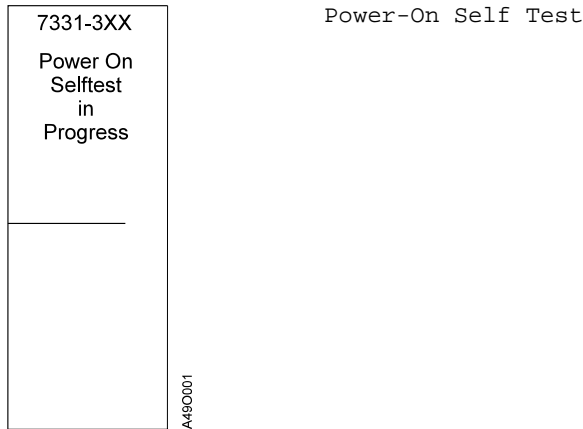
*Figure 43. Power On/Selftest in Progress Display*

5. When the control panel display (refer to Figure 44) shows the message:

```
7331-3XX

Power On
Selftest

Complete
                                    Power On Selftest Complete, release

                                    the Up ( ⇧ ) and Down ( ⇩ ) buttons.



A49O004
```
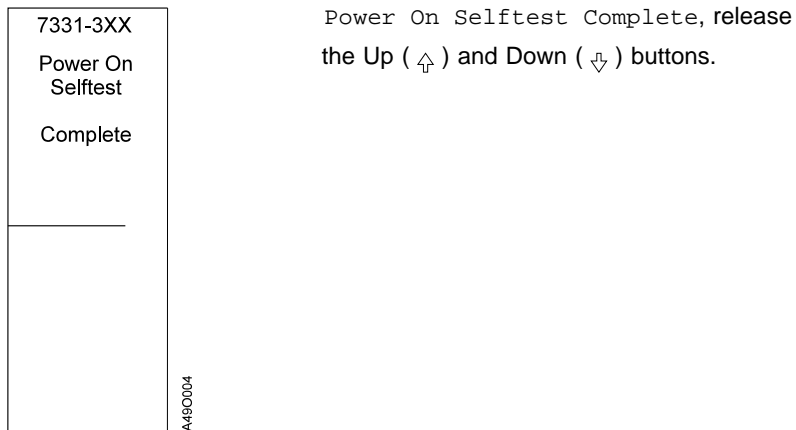
*Figure 44. Power On/Selftest Complete Display*

6. The CE Menu is now active and can be accessed through the Service Menu.

# Set the Library Product Type and Serial Number

The library product type and serial number must be set in the library memory when the controller card is replaced or when the library memory is erased.

To initially set the library product type and serial number in the library memory, use the following procedure:

1. With the CE Menu enabled as described in "Enable the CE Menu" on page 31, display the Service Menu. See "Service Menu Display" on page 13.

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons on the library control panel (refer to Figure 45) and highlight the:
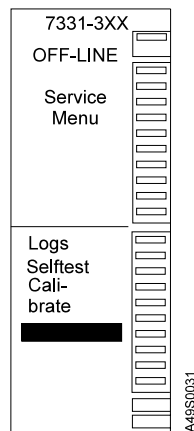


```
7331-3XX

OFF-LINE

Service
Menu



Logs
Selftest
Cali-
brate
```

Blank Line under Calibrate on the Service Menu.

Press the Select ( ⏎ ) button to display the CE Menu.

*Figure 45. Service/Blank Line Display*

3. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons (refer to Figure 46) and highlight:



```
Serial #
Tuning
Cir LOGs
rstNVRAM
CodeLoad
```
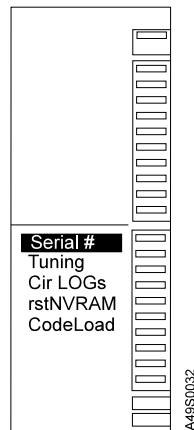
Serial # on the CE Menu.

*Figure 46. Serial Number Display*

4. Press the Select ( ⏎ ) button and the product type (refer to Figure 47) and the serial number selection display is shown.
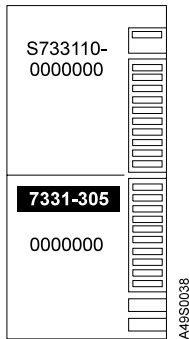


The product types available for selection is a list of all valid product types (7331-305, 3449-355, 3449-356) for the library.

*Figure 47. Serial Number Selection Display*

The format of the serial number is:

**Stttttpp#######**



**unique seven character number**

**plant of manufacture (10 for Rochester, MN)**

**Product type (7331)**

**'S'**
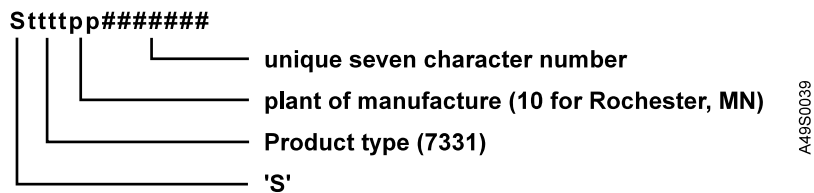
5. Using the Up ( ⬆ ) and Down ( ⬇ ) buttons, sequence through the available product types until the product type shown matches your library.

6. Press the Select ( ⏎ ) button to choose your product type. The product type selected is shown on the top line of the display during normal operation and in the information returned by the INQUIRY command.

7. The first digit of the library serial number (refer to Figure 48) is now highlighted.
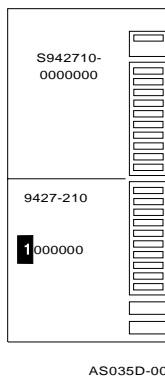


When installing a new controller card, the serial number shown is all zeros. During this procedure the serial number digits are set one at a time, starting with the first digit on the left.

Use the Up ( ⬆ ) and Down ( ⬇ ) buttons to display the first number of the serial number, then press the Select ( ⏎ ) button to select that digit and advance to the next digit. Repeat this step until all digits of the serial number are selected. When the last digit is selected, the CE Menu is displayed and the product type and serial number are stored in the library.

*Figure 48. Serial Number Selected Display*

8. Return to the library service procedure that sent you here.

# Set Library Tuning Parameters

Library tuning parameters are used to adjust the picker vertical position or the picker feed belts for differences in library pickers, magazines, tape drives, and bar code readers. The adjusted parameters are used when the library places tape cartridges into or picks tape cartridges from tape drives or magazine slots, or when the bar code reader reads bar code labels.

The following definitions apply to the library tuning parameters.

**PS**  The picker (PS) tuning value is used to correct for differences in picker sensor positions. While setting the PS value, the picker is positioned at slot 9 to allow the operator to observe how changes to the PS value affect the picker position.

The PS sets the position where the picker is located when picking a tape cartridge from a magazine slot. The PS should be set so that the tape cartridge is centered vertically between the ends of the picker.

**SS**  The slot (SS) tuning value is used to correct for differences in magazines.

The SS determines where the picker is located when placing a tape cartridge into a magazine slot.

**BS**  The bar code (BS) tuning value is used to correct for differences in the location of the bar code scanners.

The BS determines where the picker is located when reading the tape cartridge bar code label. The BS should be set so the bar code scan beam hits the center of the tape cartridge.

**FS**  The feed-to-slot (FS) tuning value is used to correct for differences in the distance between the picker and the magazine slots. This value is used when the picker is picking a tape cartridge from a slot.

**PD**  The pick-from-drive (PD) tuning value is used to correct for differences in the distance between the picker and the tape drives. This value is used when the picker is picking a tape cartridge from a tape drive.

**FD**  The feed-to-drive (FD) tuning value is used to correct for differences in the distance between the picker and the tape drives. This value is used when the picker is placing a tape cartridge into a tape drive.

**Attention:**  These values are set when the unit is manufactured. They should only be adjusted after all other service routines have been performed and the next level support has been called.

To set the library tuning parameters, use the following procedure:

1. With the CE Menu enabled as described in "Enable the CE Menu" on page 31, display the Service Menu. See "Service Menu Display" on page 13 and Figure 49.
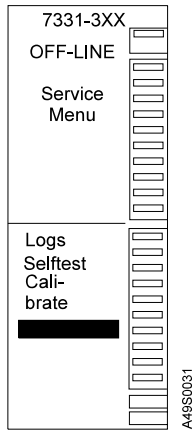
```
7331-3XX

OFF-LINE


Service
Menu



Logs
Selftest
Cali-
brate
```

A49S0031

`Blank Line` under Calibrate on the Service Menu.

Press the Select ( ⏎ ) button to display the CE Menu.

*Figure 49. Service/Blank Line Display*

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons (refer to Figure 50), highlight:

```
Serial #
Tuning
Clr LOGs
rstNVRAM
CodeLoad
```

AS036-00
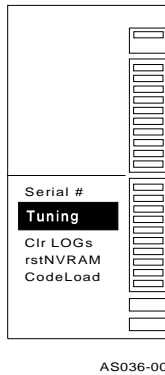
`Tuning` on the CE Menu.

*Figure 50. Tuning Display*

3. Press the Select ( ⏎ ) button to display the list (refer to Figure 51), of tuning parameters.
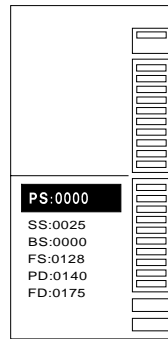
Pressing the Cancel ( 🚫 ) button while in a menu moves the highlight back one menu item or if on the first item it will return the display to the previous menu.

```
PS:0000
SS:0025
BS:0000
FS:0128
PD:0140
FD:0175
```

AS036A-00

*Figure 51. Tuning Parameters Display*

4. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, change the tuning parameter to the desired setting.

   **Note:** When the last tuning parameter is selected the display will return to the CE Menu.

   To ensure parameter changes are saved, use the Select ( ⏎ ) button to advance through all tuning parameters when exiting the tuning parameter menu.

5. Press the Select ( ⏎ ) button to advance to the next tuning parameter or press the Cancel ( 🚫 ) button to move back to the previous parameter.

6. When a parameter is changed, the library places the picker or the feed belts at the location specified in the changed parameter.

7. If an error occurs during positioning (for example, the accessor is obstructed), refer to Figure 52 illustrating a displayed message:

```
Move Err

PS:0000
SS:0025
BS:0000
FS:0128
PD:0140
FD:0175
```
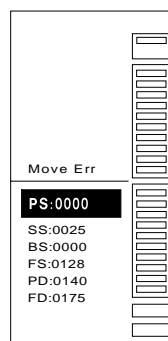
`Move Err`. The error message indicates the picker or feedbelt is not positioned at the new parameter location.

AS036B-00

*Figure 52. Move Error Display*

# Clear History and Error Logs

To clear the history and error logs, use the following procedure:

1. With the CE Menu enabled as described in "Enable the CE Menu" on page 31, display the Service Menu. See "Service Menu Display" on page 13 and refer to Figure 53.
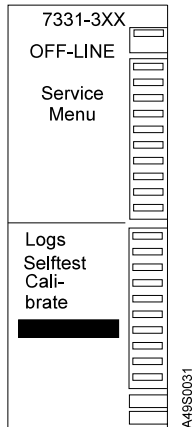


Blank Line under Calibrate on the Service Menu.

Press the Select ( ⏎ ) button to display the CE Menu.

*Figure 53. Service/Blank Line Display*

2. Using the Up ( ⬆ ) and Down ( ⬇ ) buttons see Figure 54 and highlight:
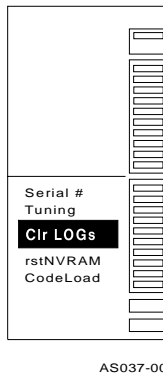


Clr LOGs on the CE Menu.

Press the Select ( ⏎ ) button to clear the library History and Error Logs. The library responds with a long beep to indicate the logs have been cleared.

*Figure 54. Clear Logs Display*

3. Press the Cancel ( ⃠ ) button to display the Service Menu.

# Clear the Library NVRAM

**Attention:** Clearing the library non-volatile memory (NVRAM) should only be done if absolutely required. The library stores calibration values in NVRAM and these values are reset when selecting `rstNVRAM` on the CE Menu. Calibration must be performed after clearing NVRAM. Other library operations may also be affected, since values such as the tuning values are reset during NVRAM clearing.

To clear the library NVRAM, use the following procedure:

**Note:** The product data, such as the product type and serial number, are not reset during NVRAM clearing.

1. With the CE Menu enabled as described in "Enable the CE Menu" on page 31, display the Service Menu. See "Service Menu Display" on page 13.

2. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons on the library control panel (see Figure 55), highlight:
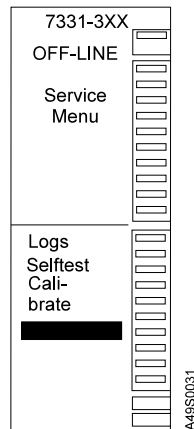


`Blank Line` under Calibrate on the Service Menu.

Press the Select ( ⏎ ) button to display the CE Menu.

*Figure 55. Service/Blank Line Display*

3. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons (see Figure 56), highlight:
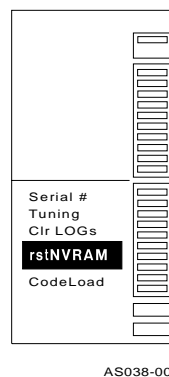


`rstNVRAM` on the CE Menu.

Press the Select ( ⏎ ) button to clear the library NVRAM. The library responds with a long beep to indicate the NVRAM has been reset.

After the NVRAM is reset, the library must be powered down then powered on to use the reset values.

*Figure 56. Reset NVRAM Display*

4. Perform calibration. Go to "Library Calibration" on page 28.

5. Set any tuning parameters that were lost when the NVRAM was reset. Go to "Set Library Tuning Parameters" on page 35.

# Load Library Internal Code from a Code Load Tape

The library internal code is loaded whenever there is a code update or the library memory is erased.

To load library internal code from a code load tape, use the following procedure:

1. Load the code load tape into Tape Drive 1. Go to the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for instructions on loading a tape cartridge into a tape drive.

   **Note:** If the code load tape is not in the drive when `CodeLoad` is selected in step 3, an error message displays indicating that the tape drive did not correctly load the code load tape.

2. With the CE Menu enabled as described in "Enable the CE Menu" on page 31, display the Service Menu. See "Service Menu Display" on page 13.

3. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons (see Figure 57), highlight:
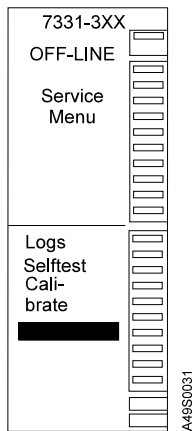


`Blank Line` under Calibrate on the Service Menu.

Press the Select ( ⏎ ) button to display the CE Menu.

*Figure 57. Service/Blank Line Display*

4. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons (see Figure 58), highlight:
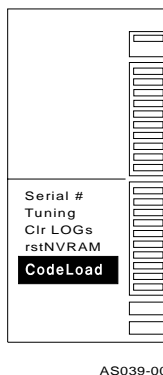


Highlight `CodeLoad` on the CE Menu.

Press the Select ( ⏎ ) button to start the code load.

*Figure 58. CodeLoad Display*

5. If the code load tape is not in the tape drive (see Figure 59) when `CodeLoad` is selected, an:
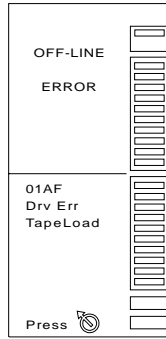


`Error` message is displayed indicating the tape drive did not correctly load the code load tape. If this error condition occurs, make sure a code load tape is loaded in the tape drive and repeat the step necessary to load the code.

```
          ┌──┐
          ├──┤
OFF-LINE  ├──┤
          ├──┤
ERROR     ├──┤
          ├──┤
          ├──┤
          ├──┤
01AF      ├──┤
Drv Err   ├──┤
TapeLoad  ├──┤
          ├──┤
          ├──┤
          ├──┤
Press 🚫  ├──┤
          └──┘
```

AS039A-00

*Figure 59. Drive Error Message Display*

6. The library begins to read the error (see Figure 60).
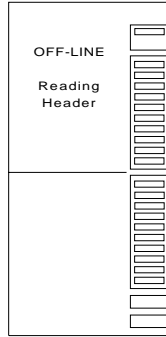


`Reading Header` information at the start of the tape.

AS039B-00

*Figure 60. Reading Header Display*

7. If there is only one code load on the tape (see Figure 61), the library automatically displays:
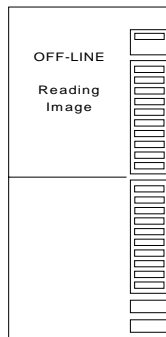


`Reading Image`. The library reads the image and loads it into memory. Go to 11 on page 42.

AS039C-00

*Figure 61. Reading Image Display*

8. If multiple code load images are on the tape, the library (see Figure 62) automatically displays:

List of available code load images.

Tape:
12345678

Select
Image

**GREY XXXX**
GREY YYYY

A49S0058
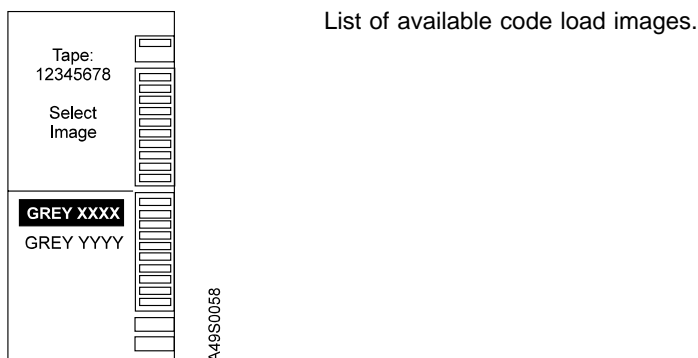
*Figure 62. Available Code Images Display*

9. Using the Up ( ⇧ ) and Down ( ⇩ ) buttons, highlight the code load image to be loaded.

10. Press the Select ( ↵ ) button (see Figure 63) to load the highlighted code load image.

OFF-LINE

Reading
Image

AS039C-00
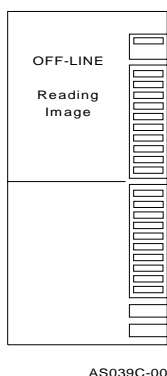
*Figure 63. Reading Code Image Display*

11. Once the code load image is read, the library verifies the image is correct, transfers the image to the code load area, and resets the library to perform a power-on selftest and start using the new code image. The tape is then unloaded from the tape drive.

12. When the power-on selftest is complete:

a. Open the library door.

**Note:** If the picker is located in front of the tape drive, the picker can be moved with the Move Picker buttons on the inside of the front door.

b. Remove the tape from the tape drive.

13. Verify the code load was successful by checking the uCode level in the library statistics. Go to "Library and Tape Drive Statistics Display" on page 21 to verify the library statistics.

14. Return the library to normal operations.

# Chapter 3.  Removal and Installation Procedures

This chapter describes the procedures you should follow when removing and installing the following 8mm Tape Library assemblies.

## Handling Static-Sensitive Devices

**Attention:**   The following Tape Library assemblies are sensitive to static electricity discharge.

> Control panel
> Tape drives
> Controller card
> Picker assembly
> Bar code reader (optional assembly)

During installation of these assemblies, assure they are handled as outlined below. When removed from the Tape Library, they must be placed in an antistatic bag.

Take the following precautions:

Do not remove the assemblies from their antistatic protective bag until they are to be installed.

With the assembly still in its antistatic bag, touch it to the metal frame of the Tape Library.

Handle the assembly carefully in order to prevent permanent damage.

# Library Cover Set Removal and Installation

Removal and installation of the cover set (refer to Figure 64) or specific covers is done when the covers are damaged or to obtain access to internal assemblies during maintenance procedures.
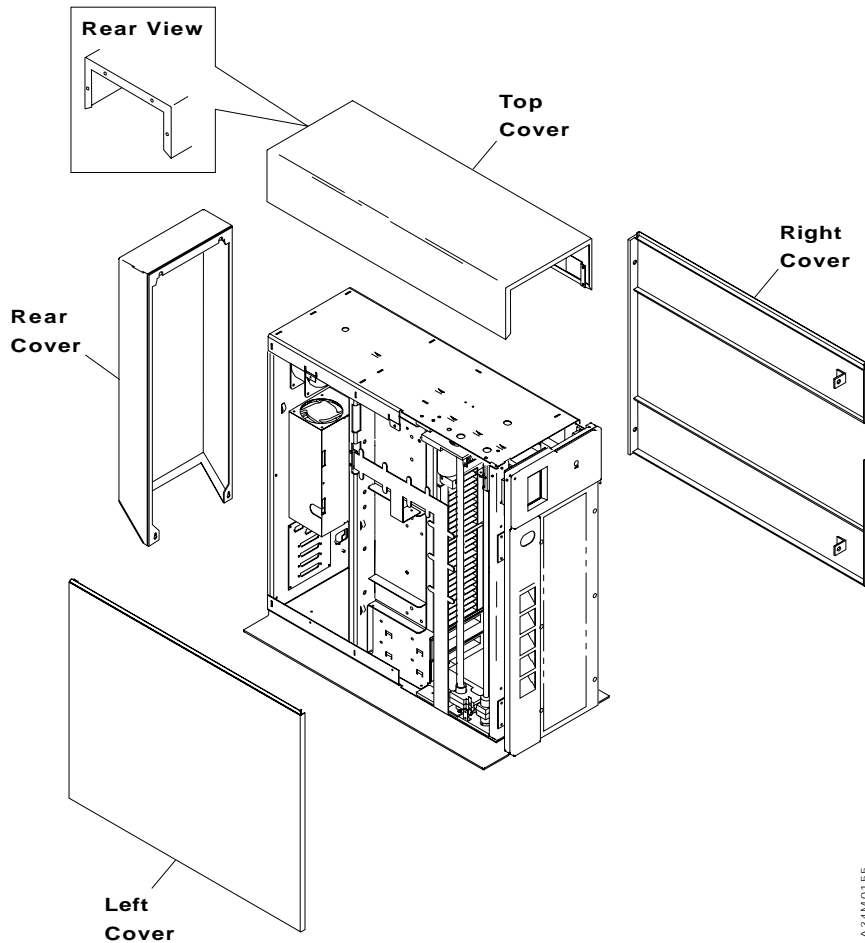


*Figure 64. Library Cover Set*

**Note:** The above symbols indicate appropriate cautions to address in this "Library Cover Set Removal and Installation" section of the manual.

## Removal

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

**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.**

**CAUTION:**
**The weight of this part or unit is between 32 and 55 kilograms (70.5 and 121.2 pounds). It takes three persons to safely lift this part of unit.** *(RSFTC205)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

## Rear Cover

To remove, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

4. Unplug the library power cable from the power outlet.

   **Note:** The rear cover is attached with M3X6 panhead screws.

5. Loosen 2 screws at the bottom of the rear cover and lift the cover to remove it from library.

6. Store the cover where it will not get damaged during further maintenance.

## Top Cover

To remove, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

4. Unplug the library power cable from the power outlet.

5. Remove the library rear cover. See steps on rear cover removal at the beginning of this removal section.

6. Remove the library front door. See "Front Door Assembly Removal and Installation" on page 48.

   **Note:** The top cover is attached with M3X6 panhead screws. The two screws at the top location on the back have spacers on the screw to provide clearance for mounting the rear cover.

7. Remove 2 screws at the front and 4 screws at the back of the top cover. Make sure the spacers removed with the 2 screws at the back are retained for installation.

8. Remove the top cover from the library.

9. Store the cover and screws where they will not get damaged during further maintenance.

## Side Covers

To remove, use the following procedure:

1. If the 8mm Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

4. Unplug the library power cable from the power outlet.

5. Remove the library rear cover. See steps on rear cover removal at the beginning of this removal section.

6. Open the library front door. If the left cover is being removed, remove the library front door. See "Front Door Assembly Removal and Installation" on page 48.

   **Notes:**

   a. In the following step, Do Not remove the screw at the bottom on the back of the library that the rear cover mounts on. The hole in the side cover is sized to slide over the rear cover mounting screw.

   b. The side covers are attached with M3X4 panhead screws.

7. Remove 2 screws from the front and 2 screws from the back for the side cover requiring removal. Remove the cover from the library.

8. If both of the side covers require removal, repeat steps 6 - 7 to remove the other side cover.

9. Store the covers and screws where they will not get damaged during further maintenance.

# Installation

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

**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.**

**CAUTION:**
**The weight of this part or unit is between 32 and 55 kilograms (70.5 and 121.2 pounds). It takes three persons to safely lift this part of unit.** *(RSFTC205)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

To install the covers, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the covers to be installed.

   **Note:** In the following step, install the top and side covers before installing the rear cover.

3. Position the covers on the library.

   **Note:** Make sure the spacers are installed with the 2 screws at the top location at the back of the library when installing the top cover.

4. Install the screws required to the secure covers in position.

5. Make sure the library front door is installed.

6. Return to the library service procedure that sent you here.

# Front Door Assembly Removal and Installation

Removal and installation of the front door assembly is done when the door assembly is damaged or when performing other maintenance procedures.
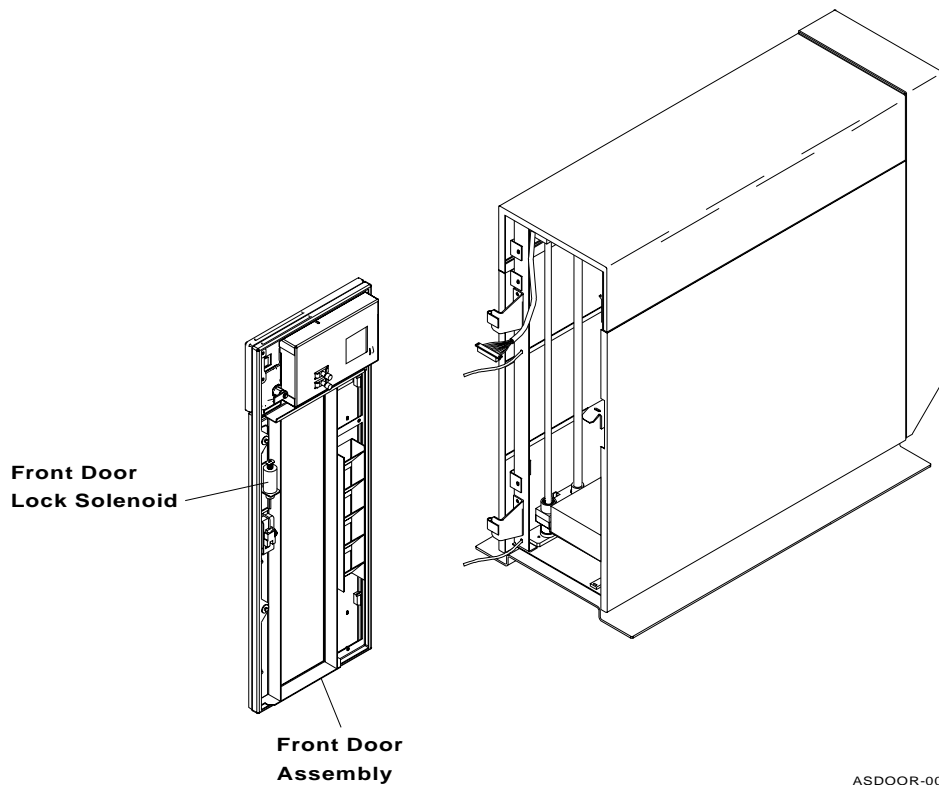


Figure 65. Front Door Assembly

**Note:** The above symbols indicate appropriate cautions to address in this "Front Door Assembly Removal and Installation" section of the manual.

## Removal

To remove the front door assembly, use the following procedure:

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

4. Unplug the library power cable from the power source.

5. Open the library front door.

6. Remove the cable restraint securing the control panel cable to the safety cover.

7. Disconnect the control panel signal cable from the control panel.

8. On the inside of the front door, remove the screw securing each frame-to-door ground strap. There are two ground straps. See Figure 65 on page 48.

9. Grasp the front door assembly and lift it off the hinges.

10. If door assembly is being removed because it is defective, remove the control panel assembly for installation on the new door assembly. See "Control Panel Assembly Removal and Installation" on page 51.

## Installation

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

To install the front door assembly, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the front door assembly to be installed.

3. If required, install the control panel on the door assembly. See "Control Panel Assembly Removal and Installation" on page 51.

4. Align the door assembly hinge pins with the library hinges and lower the door assembly into position.

5. Attach each frame-to-door ground strap to the inside of the front door with a screw. See Figure 65 on page 48.

6. Connect the control panel signal cable to the control panel.

7. Install a cable restraint to secure the control panel cable to the safety cover.

   **Note:** The door does not lock in the following step. The library door solenoid locks the door when library power is turned On.

8. Close the library front door. Make sure it operates correctly.

9. Return to the library service procedure that sent you here.

# Control Panel Assembly Removal and Installation

Removal and installation of the control panel assembly (see Figure 66) is done when the control panel has failed or when replacing the front door assembly.
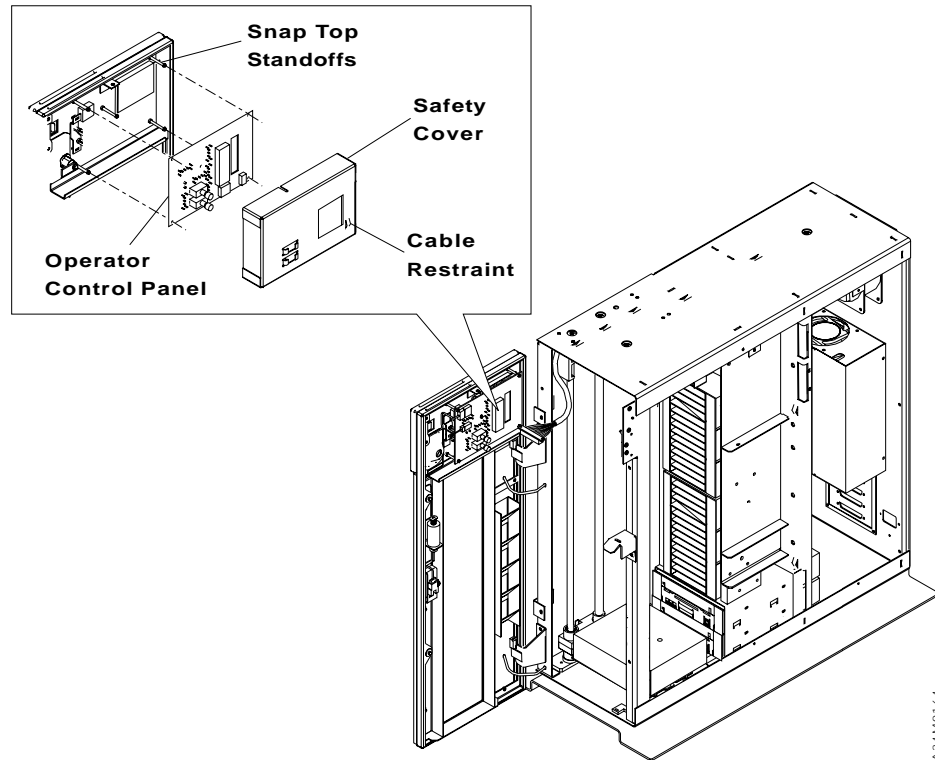


*Figure 66. Control Panel Assembly*

⚠️

**Note:** The above symbol indicates appropriate cautions to address in this "Control Panel Assembly Removal and Installation" section of the manual.

## Removal

To remove the control panel assembly, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **DANGER**

   **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Open the library front door.

   **Attention:**   The control panel assembly is sensitive to static electricity discharge.  During the following steps, make sure it is handled as outlined in "Handling Static-Sensitive Devices" on page 43 and placed in an antistatic bag when removed from the Tape Library.

6. Remove the cable restraint securing the control panel cable to the safety cover.

7. Disconnect the control panel signal cable from the control panel.

8. Loosen or remove the screw at the top of the safety cover and remove the safety cover.

9. Disconnect the door lock solenoid cable and the door lock sensor cable from the bottom of the control panel circuit card.

   **Note:**   When removing the control panel assembly card in the following step, pull where the mounting holes are located on the card. Pulling at other locations may flex the card and damage the card circuits.

10. Carefully remove the control panel by pulling at the edges where the snap-top standoffs (6) are located.

## Installation

To install the control panel assembly, use the following procedure.

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

   **Attention:**   The control panel assembly is sensitive to static electricity discharge.  During the following steps, make sure it is handled as outlined in "Handling Static-Sensitive Devices" on page 43 and not removed from the antistatic bag until ready for installation in the 7331 Tape Library.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.**  *(RSFTD204)*

**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.** *(RSFTD004)*

2. Obtain the control panel assembly to be installed. Make sure antistatic precautions are observed when handling the control panel assembly.

   **Note:** When installing the control panel assembly card in the following step, press where the mounting holes are located on the card. Pressing at the center of the card or at other locations on the card may flex the card and damage the card circuits.

3. Remove the control panel from the antistatic bag and position it on the library door with the card mounting holes over the snap-top standoffs. Carefully push at mounting locations to snap panel into place.

4. Connect the door lock solenoid cable and the door lock sensor cable to the bottom of the control panel circuit card.

5. Position the safety cover over the control panel and install or tighten screw at top to secure the cover in place.

6. Connect the control panel signal cable to the control panel.

7. Install a cable restraint to secure the control panel cable to the safety cover.

   **Note:** The door does not lock in the following step. The library door solenoid locks the door when library power is turned On.

8. Close the library front door.

9. Return to the library service procedure that sent you here.

# Control Panel Cable Removal and Installation

Removal and installation of the control panel cable (see Figure 67) is done when the cable has failed or when replacing the front door assembly.
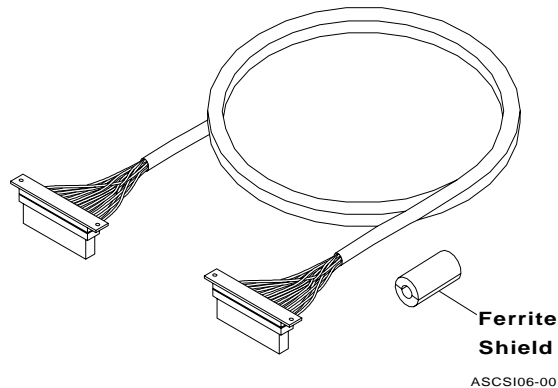


Figure 67. Control Panel Cable



**Note:** The above symbol indicates appropriate cautions to address in this "Control Panel Cable Removal and Installation" section of the manual.

## Removal

To remove the control panel cable, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, top, and left side covers. See "Library Cover Set Removal and Installation" on page 44.

6. If not already open, open library front door.

**Attention:** The control panel assembly is sensitive to static electricity discharge.  Make sure antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43 during the following removal steps.

7. Remove the cable restraint securing the control panel cable to the safety cover.

8. Disconnect the control panel signal cable from the control panel.

9. Measure and record the length of cable extending out of the front of the library.

10. Disconnect the control panel signal cable from P6 on the controller card.

11. Remove cable ties securing control panel cable inside the library frame.  Note routing of cable.

    **Note:** In the following step, use care so the control panel cable is not damaged when pulling the cable through the slot in the middle stiffener plate.

12. Carefully remove cable from library.

13. Retain cable and do not remove the ferrite shield from the cable until ready to transfer it to the new cable during installation.

## Installation

To install the control panel cable, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the control panel cable to be installed.

    **Attention:** The control panel assembly is sensitive to static electricity discharge.  Make sure antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43 during the following installation steps.

3. Position the removed control panel cable and the new cable next to each other. Remove the ferrite shield from the removed cable and install it on the new cable in the same position as it was installed on the removed cable.

    **Note:** In the following step, use care so the control panel cable is not damaged when routing the cable through the slot in the middle stiffener plate.

    **DANGER**

    > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.**  *(RSFTD204)*

    **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.** *(RSFTD004)*

4. Position the control panel cable in the library for connection to the controller card and the control panel.

5. Route the cable as follows (see Figure 68):

   From the front of the frame along underside of the top to the location indicated in the figure,

   Then to the left side and down a short distance,

   Then towards the rear of the library through the upper slot in the middle frame panel to the controller card.

   **Note:** Make sure the control panel end of the cable extends out of the front of the library the same distance as the removed cable did. Do not allow it to extend out farther than the removed cable did. Excess cable interferes with the picker operation when the door is closed.
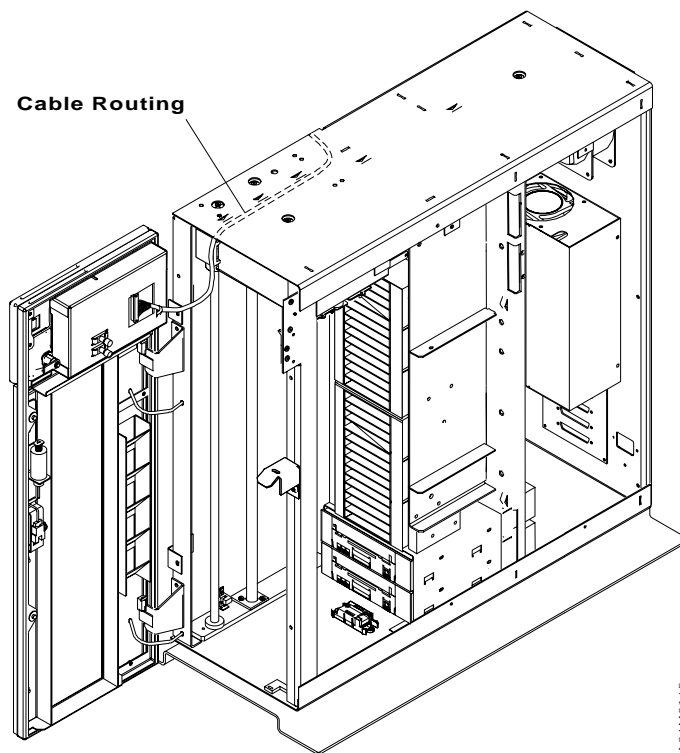


*Figure 68. Control Panel Cable Routing*

6. Secure the cable in position with cable ties.

7. Connect the control panel cable to the controller card. See Figure 79 on page 76 for location of connector.

8. Connect the control panel cable to the control panel.

9. Install a cable restraint to secure the control panel cable to the safety cover.

10. Close the library front door.

11. Return to the library service procedure that sent you here.

# Tape Cartridge Magazine Removal and Installation

Both tape cartridge magazines can be removed from the Tape Library (see Figure 69). If neither magazine is installed, the library operates with one of the slots in the 2-slot cartridge holder.

**Tape Cartridge Magazine**

ASMAG10-00
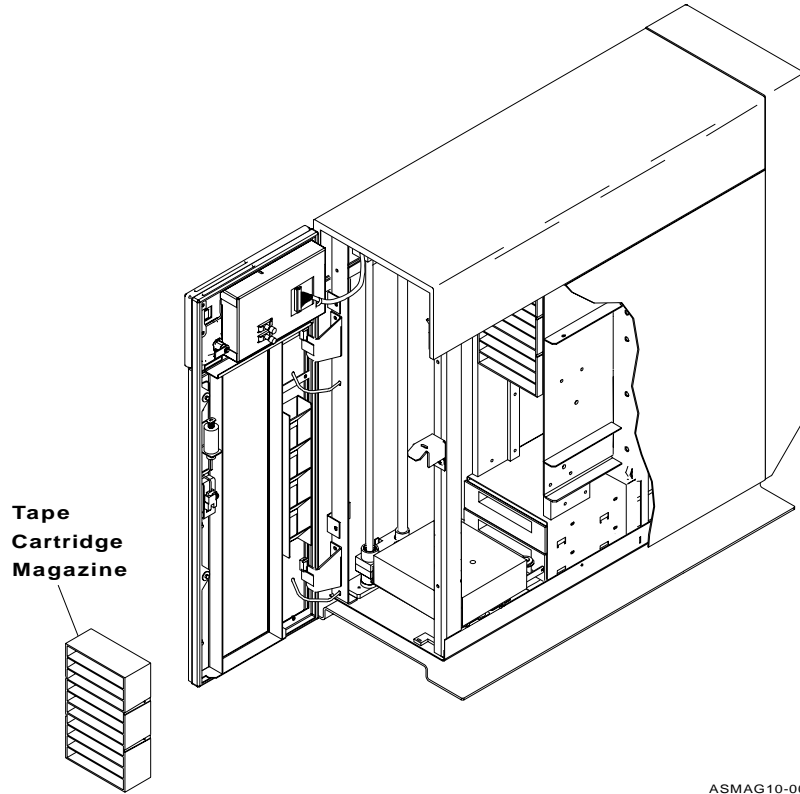
*Figure 69. 10-Slot Tape Cartridge Magazine*

## Removal

To remove a tape cartridge magazine, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*.

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

3. Either magazine can be removed at this time. If the picker is in front of the tape cartridge magazine to be removed, use the Move Picker buttons to relocate the picker.

4. Grasp the magazine by the sides and pull straight out to remove it from the library. If both magazines are to be removed, repeat this step.

5. If the magazine is to be stored with the cartridges installed, place a dust cover on the magazine.

6. If the tape cartridge magazine will not be installed at this time, close the library front door.

## Installation

To install a magazine, use the following procedure:

1. If required, open library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*.

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

2. Make sure there is an empty location for installing the tape cartridge magazine. If the picker is in front of the location where the magazine is to be installed, use the Move Picker buttons to relocate the picker.

3. Obtain the tape cartridge magazine to be installed.

4. Remove and store the magazine dust cover.

5. Holding the tape cartridge magazine by the sides, position the magazine on the mounting plates and push firmly until the magazine seats on the mounting plates.

6. Make sure all of the tape cartridges are fully inserted into the magazine.

7. Close the library front door.

8. Return to the library service procedure that sent you here.

# Magazine Mounting Plates Removal and Installation

Magazine mounting plates can be replaced as individual items or as a pair. Two sensors are positioned on the right mounting plate to detect whether a magazine is or is not installed. The sensors and the right mounting plate are an assembly and are removed as a unit.

**Note:** The right and left magazine mounting plates are not interchangeable.
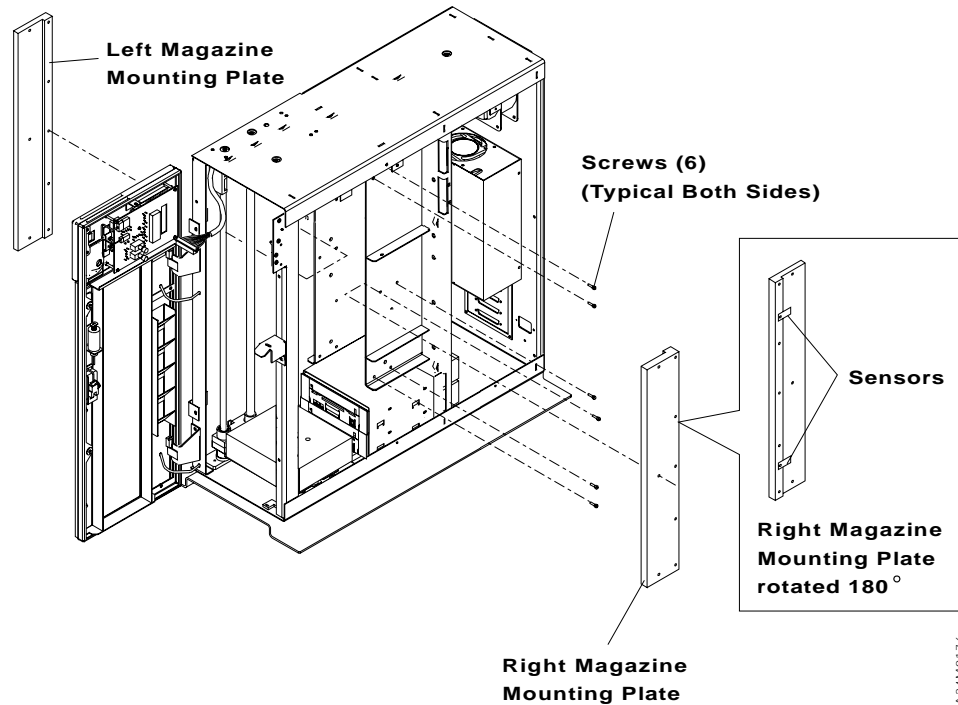


*Figure 70. Magazine Mounting Plates*



**Note:** The above symbol indicates appropriate cautions to address in this 10 on page 60 section of the manual.

## Removal

To remove the magazine mounting plates, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Open the library front door.

6. Remove all library covers. See "Library Cover Set Removal and Installation" on page 44.

7. Remove any installed tape magazines. See "Tape Cartridge Magazine Removal and Installation" on page 57.

8. Remove the 2-slot cartridge holder. See "2-Slot Cartridge Holder Removal and Installation" on page 62.

9. Disconnect the sensor signal cables at the sensors on the right mounting plate. There are two connectors on each sensor.

10. Remove 6 screws securing each mounting plate to the library frame and carefully remove the mounting plate from the library.

11. Repeat step 10 to remove the other mounting plate.

## Installation

To install magazine mounting plates, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the magazine mounting plates to be installed.

   **Note:** The mounting plates have pins that align with holes in the library frame when positioning the magazine mounting plates.

3. Position the mounting plate in the library and secure in position with 6 screws. Do not overtighten the screws.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Connect the sensor signal cables to the sensors on the right mounting plate. There are two connectors on each sensor.

5. Install the 2-slot cartridge holder. See "2-Slot Cartridge Holder Removal and Installation" on page 62.

6. Install the tape cartridge magazines. See "Tape Cartridge Magazine Removal and Installation" on page 57.

7. Calibrate the Tape Library. See "Library Calibration" on page 28.

8. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

9. Make sure the library front door is closed.

10. Return to the library service procedure that sent you here.

## 2-Slot Cartridge Holder Removal and Installation

The 2-slot cartridge holder (see Figure 71) is removed because of failure or when performing other maintenance procedures.



*Figure 71. 2-Slot Cartridge Holder*

**Note:** The above symbol indicates appropriate cautions to address in this "2-Slot Cartridge Holder Removal and Installation" section of the manual.

## Removal

To remove the 2-slot cartridge holder, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

4. Open the library front door and remove all tape cartridges from the 2-slot cartridge holder.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

5. Unplug the library power cable from the power outlet.

6. Remove all library covers. See "Library Cover Set Removal and Installation" on page 44.

7. Loosen the setscrew on each side of the library that secures the cartridge holder in place. Remove the cartridge holder.

## Installation

To install the 2-slot cartridge holder, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the 2-slot cartridge holder to be installed.

   **Attention:**  Do **Not** overtighten the setscrews in the following step. Overtightening the screws will cause the magazine supports to bow out.

3. Position the 2-slot cartridge holder in the library and tighten the setscrew on each side to secure in place. Do not overtighten setscrews.

4. Install the tape cartridges, that were removed above, in the 2-slot cartridge holder.

5. Calibrate the Tape Library. See "Library Calibration" on page 28.

6. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

7. Close the library front door.

8. Return to the library service procedure that sent you here.

# Fan Assembly Removal and Installation

The Tape Library has a cooling fan (see Figure 72) in addition to the power supply fan. The cooling fan is replaced due to failure. The fan does not normally need to be removed when performing other maintenance procedures.
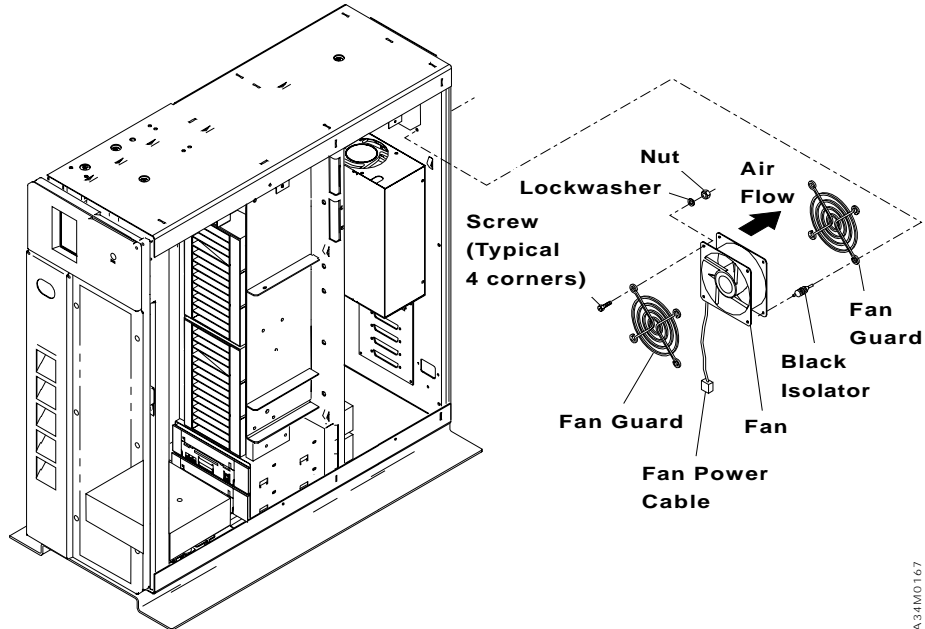


*Figure 72. Fan Assembly*

**Note:** The above symbol indicates appropriate cautions to address in this "Fan Assembly Removal and Installation" section of the manual.

## Removal

To remove the fan assembly, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove all library covers. See "Library Cover Set Removal and Installation" on page 44.

6. Disconnect the fan power cable from the controller card.

   **Note:** The fan is mounted to the library backpanel with black isolators. The isolator is pulled to stretch it so is passes through the mounting hole, then it's released to hold the component in place.

7. To remove the fan the black isolators need to be released one at a time.  Pull on the end of the isolator while pulling that corner of the fan away from the library backpanel. When all isolators are released remove the fan.

8. If replacement fan does not have black isolators in the corner mounting holes, remove them from this fan and install them in the replacement fan.

9. If replacement fan does not have a guard mounted on both sides, remove the guards from this fan and install them on the replacement fan.

## Installation

To install the fan assembly, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the fan assembly to be installed. If the fan does not have black isolators in the corner mounting holes, remove them from the fan previously removed and install them on the new fan.

   **Note:** In the following step the inside face of the fan is the side of the fan that the air in drawn into.

3. If the fan does not have a guard mounted on the inside face, remove the guard from the fan previously removed and secure it to the inside face of the new fan with 4 screws.

4. If the fan does not have a guard mounted on the outside face, remove the guard from the fan previously removed.

5. Position the fan guard on the outside face of the fan so black isolators go through the guard mounting holes and pull on each black isolator to secure the guard to the fan.

   **Note:** When installing the fan, make sure the fan is positioned on the backpanel so air flows out of the library.

6. Position the fan in the library on the backpanel so black isolators go through mounting holes in backpanel and pull on each black isolator to secure fan in place.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

7. Connect the fan cable to the controller card. See Figure 79 on page 76 for location of connector.

8. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

9. Close the library front door.

10. Return to the library service procedure that sent you here.

# Tape Drive Removal and Installation

The tape drives are replaced (see Figure 73) because of a tape drive failure or when performing other maintenance procedures.
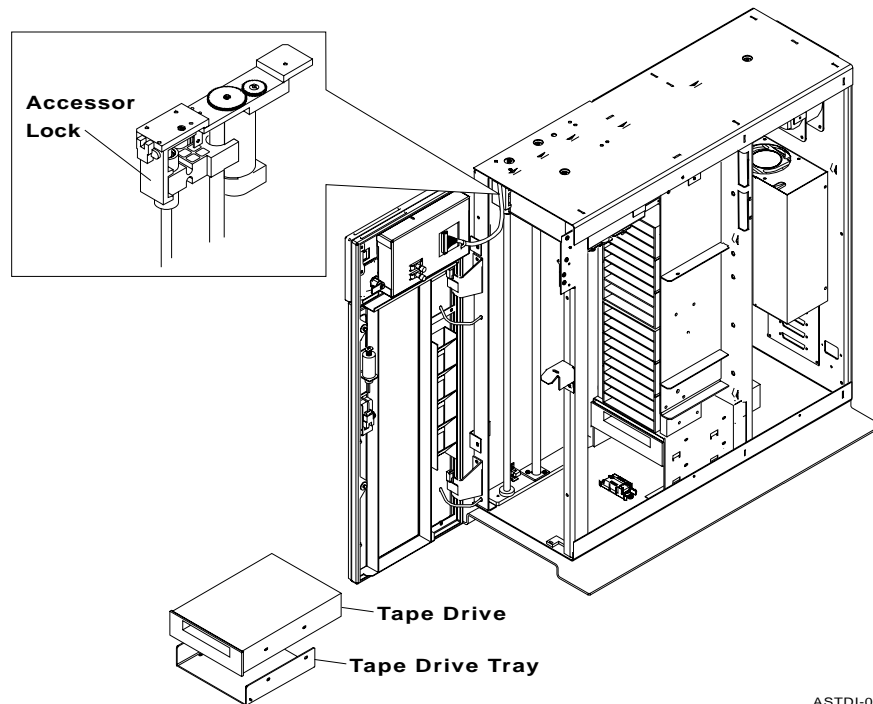


*Figure 73. Tape Drive and Tray*

**Note:** The above symbol indicates appropriate cautions to address in this "Tape Drive Removal and Installation" section of the manual.

## Removal

To remove a tape drive (see Figure 74 on page 68) use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

*Figure 74. 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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, right side, and left side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Using your hand, move the picker to the top of the Accessor Assembly and lock in place with the accessor lock (mechanical lock). See Figure 73 on page 67.

   **Attention:**  The tape drives are sensitive to static electricity discharge. During the following steps, make sure tape drives are handled as outlined in "Handling Static-Sensitive Devices" on page 43 and placed in an antistatic bag when removed from the 7331 Tape Library.

7. Disconnect the following cables from the tape drive being removed:

   4-pin power connector

   SCSI ID address cable

   SCSI signal cable

8. Remove 4 screws securing the tape drive in the tape drive mounting sleeve.

9. Lift front of tape drive and slide the tape drive and tray out of the tape drive mounting sleeve.

10. Remove 4 screws from the bottom of the tray that secure the tray to the tape drive and remove tray.

11. Place the tape drive in an antistatic bag.

## Installation

To install a tape drive, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

   **Attention:** The tape drives are sensitive to static electricity discharge. During the following steps, make sure tape drives are handled as outlined in "Handling Static-Sensitive Devices" on page 43 and not removed from the antistatic bag until ready for installation.

2. Obtain the tape drive to be installed. Make sure antistatic cautions are observed when installing the tape drive.

3. Remove the drive from the antistatic bag.

4. Place drive in tray and insert 4 screws through bottom of tray into drive. Align the drive as shown in Figure 76 on page 70.

5. Slide tape drive and drive tray into drive mounting sleeve. Tray self aligns with sleeve.

6. Secure tape drive in position with 2 screws through the right side and 2 screws through the left side of the tape drive mounting sleeve.

7. Support the picker with one hand while unlocking the accessor lock (mechanical lock) then lower picker to bottom of library.

8. Assure there is clearance between the front of the tape drive and the picker.

**DANGER**

**To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

9. Refer to Figure 75 and connect the following cables to the tape drive:

   Item  1  - SCSI signal cable

   Item  2  - SCSI ID address cable (longest cable goes to Tape Drive 1 and install cable with alignment tab in the up position)

   Item  3  - 4-pin power connector
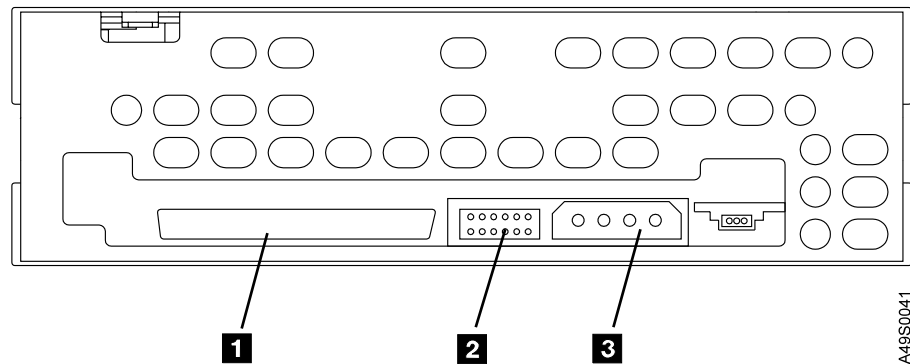


*Figure 75. Tape Drive Connections*

10. Calibrate the Tape Library. See "Library Calibration" on page 28.

11. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

12. Close the library front door.

13. Return to the library service procedure that sent you here.
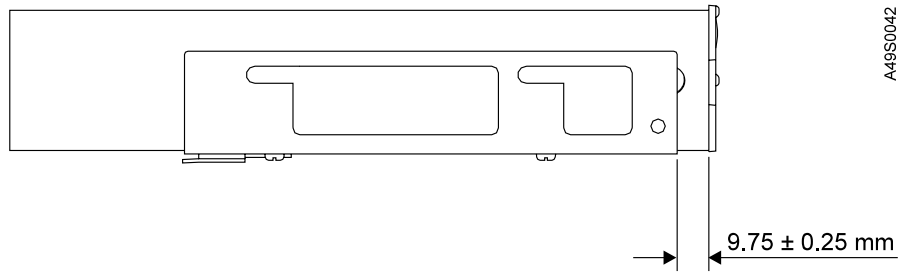
*Figure 76. Drive In Tray With Spacing*

# Power Supply Removal and Installation

The power supply is replaced (see Figure 77) because of failure or when performing other maintenance procedures.
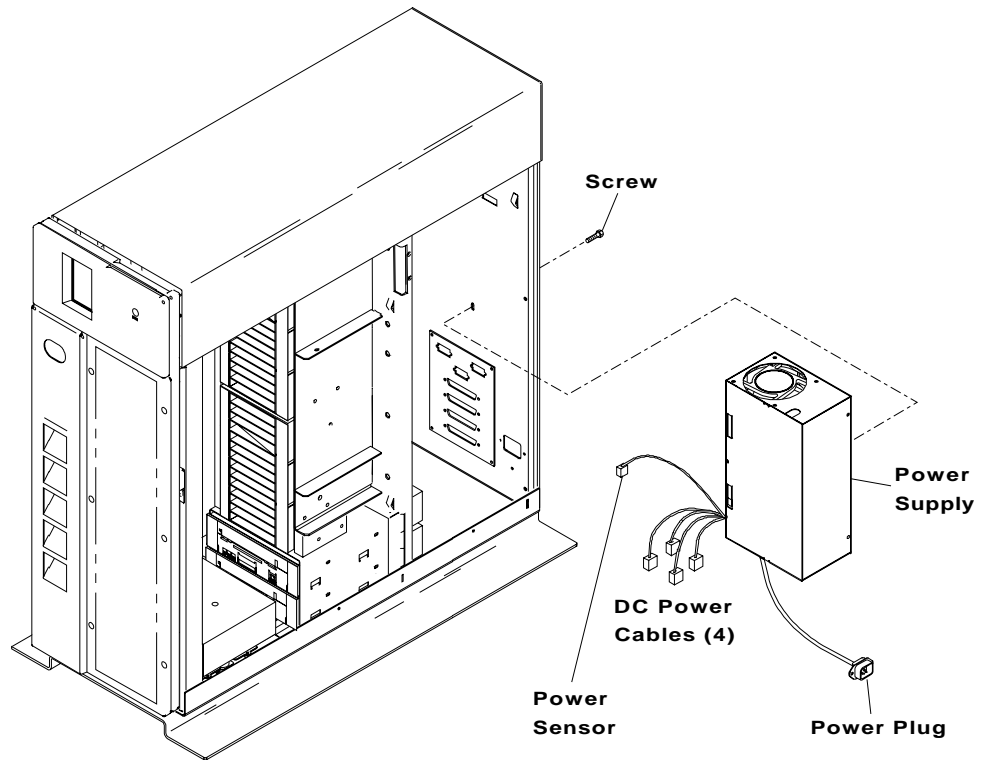


*Figure 77. Power Supply*

⚡

**Note:** The above symbol indicates appropriate cautions to address in this "Power Supply Removal and Installation" section of the manual.

## Removal

To remove the power supply, use the following procedure:

1. If the 8mm Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **Attention:** Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear and right side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Disconnect the following power supply cables:

   Tape drive power cables
   Power cable at P1 on the controller card
   Power sense cable at P2 on the controller card

7. Remove nut and lockwasher securing the power supply input ground wire below the power supply input connector and remove ground wire.

8. Remove 2 nuts and lockwashers securing the power supply input connector to the threaded studs on the backpanel and remove the connector.

9. Remove the screw securing the power supply to the backpanel.

10. Lift the power supply until tab on back of the power supply is out of slots in the backpanel, then remove the power supply from the library.

## Installation

To install the power supply, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the power supply to be installed.

   **Attention:**   Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

3. Position the power supply so tab on the back of power supply slips into slots in the library backpanel.

4. Install a screw through the backpanel to secure the power supply in place.

5. Position the power supply input connector over the threaded studs at the opening in the backpanel and secure with 2 lockwashers and nuts.

6. Place the power supply input ground wire over the threaded stud below the power supply input connector and secure with a lockwasher and nut.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

7. Connect the following power supply cables:

   Tape drive power cables
   Power cable to P1 on the controller card
   Power sense cable to P2 on the controller card

8. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

9. Close the library front door.

10. Return to the library service procedure that sent you here.

# Controller Card Removal and Installation

The controller card ( see Figure 78) is replaced because of failure or when performing other maintenance procedures.



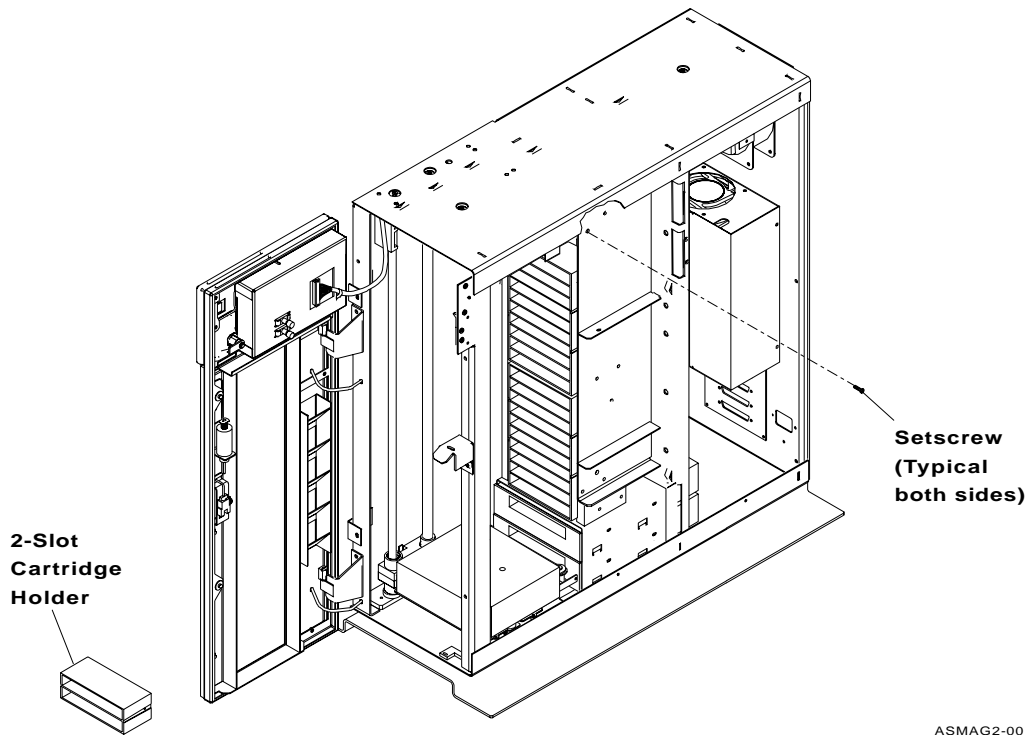RSCTRCRD-00
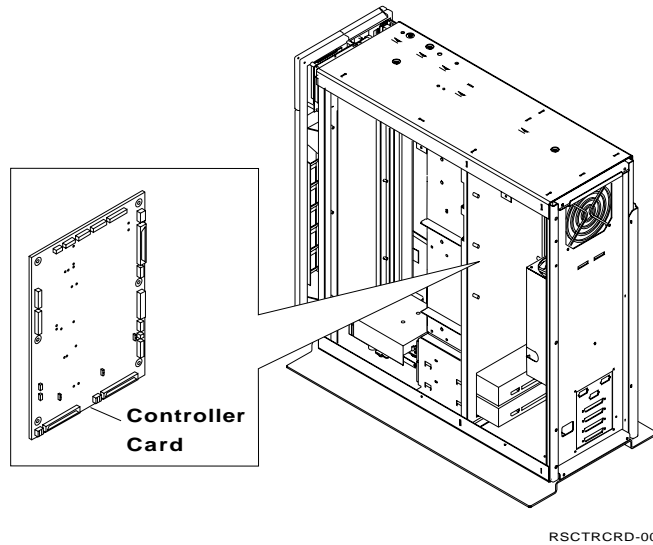
*Figure 78. Library Controller card*



**Note:** The above symbol indicates appropriate cautions to address in this "Controller Card Removal and Installation" section of the manual.

# Removal

To remove the controller card, use the following procedure:

**CAUTION:**
**The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries.** *(RSFTC228)*

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

    **Attention:** The controller card is ESD sensitive.

    **DANGER**

    > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, top, and right covers. See "Library Cover Set Removal and Installation" on page 44.

6. Disconnect the following cables from the controller card.

   DC power cable (P1)
   DC sense cable (P2)
   Fan cable (P3)
   Picker umbilical cable (P4)
   Accessor cable (P5)
   Control panel cable (P6)
   Accessor motor tach cable (P7)
   Top travel limit and picker locked cable (P8)
   Primary SCSI cable (P9)
   Bottom travel limit (P10)
   Magazine present switches cable (P11)
   Accessor obstructed receiver cable (P12)
   Accessor obstructed emitter cable (P13)
   Secondary SCSI cable (P14)
   Tape drive SCSI ID cable (P15)

**Top**



ASLUP-00
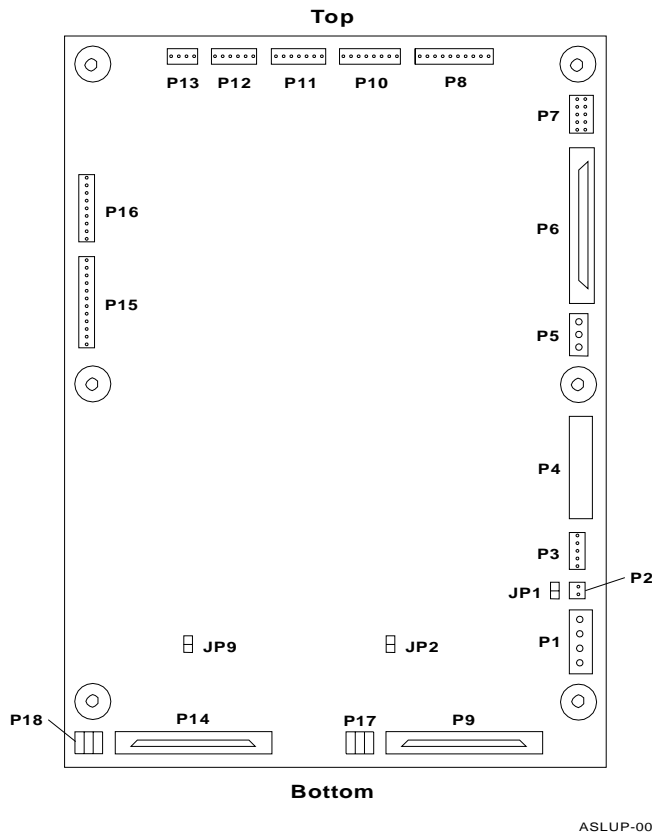
*Figure 79. Controller Card*

7. Remove 6 screws securing controller card to the standoffs on the library middle stiffener plate.

8. Remove the controller card from the library and place in an antistatic bag.

## Installation

To install the controller card, use the following procedure:

**CAUTION:**
**The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries.** *(RSFTC228)*

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

   **Attention:** The controller card is sensitive to static electricity discharge. During the following steps, make sure it is handled as outlined in "Handling Static-Sensitive Devices" on page 43 and not removed from the antistatic bag until ready to be installed in the Tape Library.

2. Obtain the controller card to be installed. Make sure antistatic precautions are observed when installing the card.

3. Remove the controller card from the antistatic bag and position on the standoffs inside library. Secure the card in position with 6 (M4X8 PH) screws.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Connect the following connectors to the controller card. See Figure 79 on page 76 for location of connectors.

   DC power cable (P1)
   DC sense cable (P2)
   Fan cable (P3)
   Picker umbilical cable (P4)
   Accessor cable (P5)
   Control panel display cable (P6)
   Accessor motor tach cable (P7)
   Top travel limit and picker locked cable (P8)
   Primary SCSI cable (P9)
   Bottom travel limit (P10)
   Magazine present switches cable (P11)
   Accessor obstructed receiver cable (P12)
   Accessor obstructed emitter cable (P13)
   Secondary SCSI cable (P14)
   Tape drive SCSI ID cable (P15)

5. Calibrate the Tape Library. See "Library Calibration" on page 28.

6. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

7. Close the library front door.

8. Locate and record the library serial number and product type. This information is on a label fastened to the right front corner of the library floor inside the library.

9. Close the library front door.

10. Go to "Set the Library Product Type and Serial Number" on page 33

11. Return to the library service procedure that sent you here.

## Internal SCSI Cable Group Removal and Installation

The internal SCSI signal cable group (see Figure 80) is replaced because of failure or when performing other maintenance procedures.



RSCSI05-00
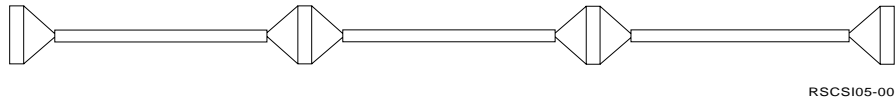
*Figure 80. Internal SCSI Signal Cable*



**Note:** The above symbol indicates appropriate cautions to address in this "Internal SCSI Cable Group Removal and Installation" section of the manual.

## Removal

To remove the internal SCSI signal cable group, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

    **Attention:** Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

    **DANGER**

    > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

    **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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear and right side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Disconnect the internal SCSI cables from P9 and P14 on the controller card.

7. Disconnect the internal SCSI signal cables from both tape drives.

8. Remove 2 screws securing each SCSI cable end connector to backpanel and remove SCSI cables from the library.

# Installation

To install the internal SCSI cables, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the SCSI cables to be installed.

   **Attention:** Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

   **Note:** Refer to Figure 81 on page 80 when positioning and connecting the internal SCSI cables in the following steps. To prevent possible incorrect cable connections, it is recommended that you do steps 3 - 6 to install one internal SCSI cable, then repeat steps 3 - 6 to install the other internal SCSI cable.

   Figure 81 on page 80 shows the internal SCSI cable connections for a Tape Library.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

3. Position the SCSI cable inside the library.

**Controller Card**

**P-14 Secondary
SCSI Cable**

**P-9 Primary
SCSI Cable**

A  B

C

1

2

3

**Tape Drive 2**

4

**Tape Drive 1**

**Tape Library
Backpanel**

====== **Internal SCSI Cables**

===●=== **Cable Connectors**

**Note:  If Tape Drive 2 is not present, the cabling will still be present,
         but not connected at Tape Drive 2.**

RSSCSIIA-00

*Figure 81. Internal SCSI Cable Configuration*

4. Referring to Figure 81 for the internal SCSI connections, position the SCSI
   cable end connectors on inside of the backpanel and secure each connector in
   place with 2 screws.

5. Referring to Figure 81 connect the appropriate internal SCSI cable connector
   to the tape drive.

6. Connect the primary internal SCSI cable to P9 on the controller card and the
   secondary SCSI cable to P14 on the controller card.

7. Install the library covers. See "Library Cover Set Removal and Installation" on
   page 44.

8. Close the library front door.

9. Return to the library service procedure that sent you here.

# Tape SCSI ID Cable Removal and Installation

The tape SCSI ID cable (see Figure 82) is replaced because of failure or when performing other maintenance procedures.
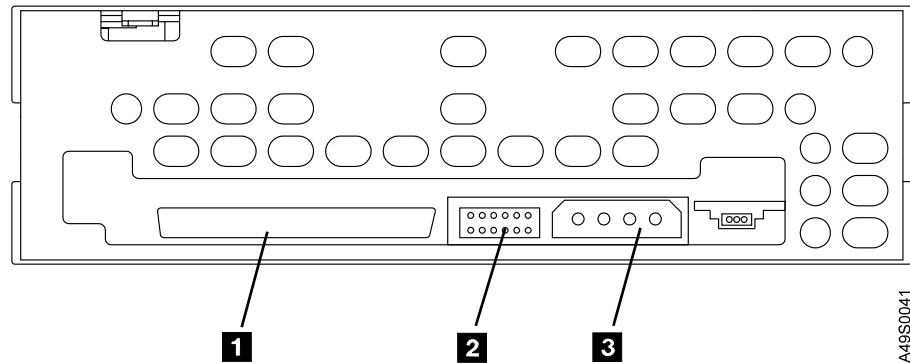


*Figure 82. Tape SCSI ID Cable*



**Note:** The above symbol indicates appropriate cautions to address in this "Tape SCSI ID Cable Removal and Installation" section of the manual.

The items in Figure 82 are:

Item 1 - SCSI signal cable.

Item 2 - SCSI ID address cable.

Item 3 - 4-pin power connector.

## Removal

To remove the tape SCSI ID cable, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **Attention:** Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear and right side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Disconnect the tape SCSI ID cable from both tape drives.

7. Disconnect the SCSI ID address cable from the controller card connector P15.

## Installation

To install the tape SCSI ID cable, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the tape SCSI ID cable to be installed.

   **Attention:**   Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

3. Position the tape SCSI ID cable inside the library and connect the end of the SCSI ID address cable with a single connector to the controller card connector P15.

4. Referring to Figure 82 on page 81 connect the tape SCSI ID cable to each the tape drive. The longest SCSI ID address cable connects to Tape Drive 1. The cable is connected to the tape drive with the alignment tab in the up position.

5. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

6. Close the library front door.

7. Return to the library service procedure that sent you here.

# Picker (Assembly & Umbilical Cable) Removal and Installation

The picker assembly and the picker umbilical cable (see Figure 83) are replaced because of failure or when performing other maintenance procedures.
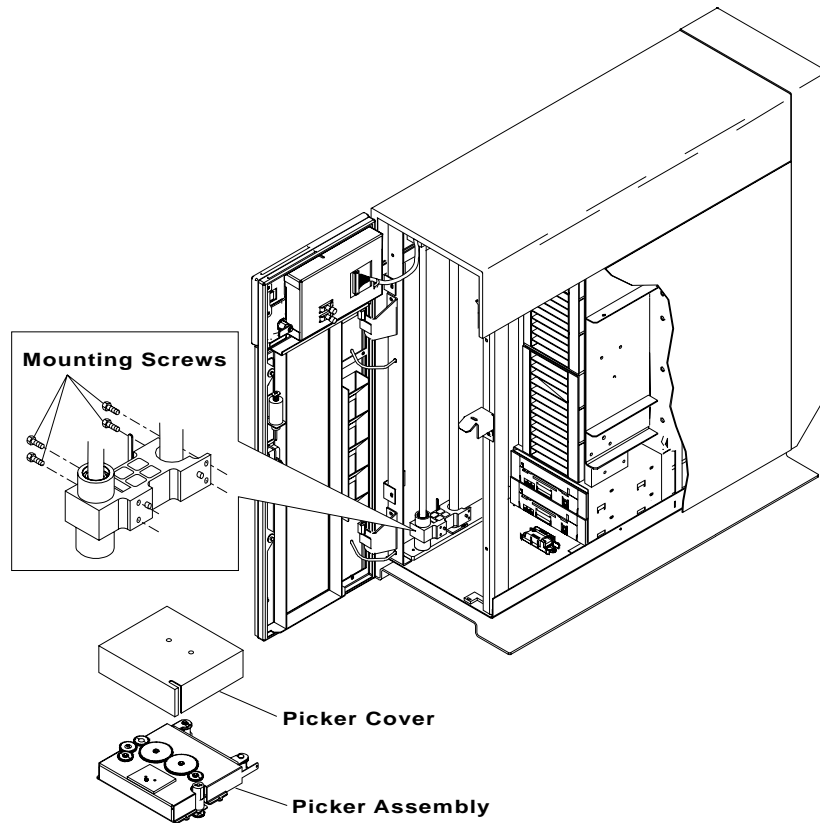


*Figure 83. Picker Assembly*

**Note:** The above symbols indicate appropriate cautions to address in this "Picker (Assembly & Umbilical Cable) Removal and Installation" section of the manual.

## Removal

To remove the picker assembly and picker umbilical cable, use the following procedure:

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **Attention:** Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

   **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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, top, and left side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Remove the picker assembly cover. The cover snaps off the picker assembly. If the new picker cover does not have a **laser caution label** on it, retain the removed cover for installation on the new picker.

7. Remove 4 screws securing the picker assembly to the accessor assembly.

8. Move the picker away from the accessor, tilt right side of picker up and disconnect the picker umbilical cable from the picker.

9. Remove the picker assembly from the library.

10. If this library is configured with a bar code reader, remove the bar code reader from the picker assembly for installation on the new picker assembly. See "Bar Code Reader Removal and Installation" on page 88.

11. Place the picker assembly in an antistatic bag.

12. If a bar code reader was removed and will not be installed on the new picker assembly at this time, place it in an antistatic bag.

13. Disconnect the picker umbilical cable from P4 on the controller card.

14. Note the routing and the position of the colored stripe of the picker umbilical cable.

15. Remove 4 screws securing picker umbilical cable tray in place.

    **Note:** In the following step, use care so the picker umbilical cable is not damaged when removing the cable from under picker and when pulling the cable through the slot in the middle stiffener plate.

16. Carefully remove the cable tray and cable from library.

17. Using a pliers, bend umbilical cable tray tabs out and remove umbilical cable from the tray.

18. Retain the cable and do not remove the ferrite shield from the umbilical cable until ready to transfer it to the new cable during installation.

# Installation

To install the picker assembly and the picker umbilical cable, use the following procedure:

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

   **Attention:**  Many assemblies in the library are sensitive to static electricity discharge. During the following steps, make sure all antistatic precautions are observed as outlined in "Handling Static-Sensitive Devices" on page 43.

2. Obtain the picker umbilical cable to be installed.

3. If not already installed, use 4 screws to install cable tray in library.  Make sure top end of tray is positioned inside the middle stiffener slot.

   **Note:**  In the following step the colored stripe on the new umbilical cable must be orientated the same as the removed cable to ensure proper cable connection and picker operation.
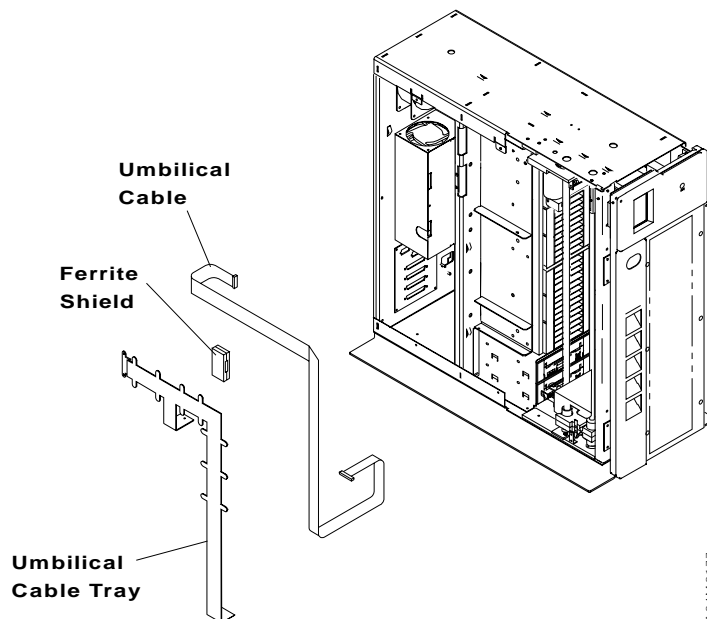


*Figure 84. Umbilical Cable Installation*

4. Position the new umbilical cable next to the removed cable and make 90° bend in new cable at same location as in removed cable. Make sure the colored stripe on the cables are placed in the same orientation. See Figure 84.

5. Remove the ferrite shield from the removed cable and install it on the new cable in the same location and orientation as it was installed on the removed cable. See Figure 84.

6. Position the picker umbilical cable in cable tray.

   **Note:** Use care when bending tabs in following step so cable is not damaged.

7. Make sure the cable is positioned in the cable tray with the bend at the correct location and with the colored stripe correctly orientated, then carefully bend tabs on cable tray in to secure cable in position. See Figure 84 on page 85.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

8. Connect the picker umbilical cable to P4 on the controller card. See Figure 79 on page 76 for location of connector.

9. Obtain the picker assembly to be installed. Make sure antistatic precautions are observed when handling the picker assembly.

10. Remove the picker assembly from the antistatic bag.

11. If this library is configured with a bar code reader and the picker does not have a bar code reader installed, install the bar code reader removed from the defective picker. See "Bar Code Reader Removal and Installation" on page 88.

    **Note:** The umbilical cable is routed under the picker in the following step.

12. Position picker inside the library and connect the picker umbilical cable to the picker.

    **Note:** In the following step, **do not** tighten screws when they are first installed.

13. Align the picker mounting block with alignment pins on the accessor mounting block and loosely install 4 screws. See Figure 83 on page 83.

14. When viewing from the left side of the library, tighten the screws in the following sequence:

    a. Top rear screw

    b. Top front screw

    c. Bottom rear screw

    d. Bottom front screw

15. Install the picker assembly cover. The cover snaps on the picker assembly. If the new picker cover does not have a **laser caution label** on it, install the cover removed from the failed picker.

16. Align drives to picker assembly. See "Aligning the Picker Assembly with the Drive" on page 94.

17. Calibrate the Tape Library. See "Library Calibration" on page 28.

18. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

19. Close the library front door.

20. Return to the library service procedure that sent you here.

# Bar Code Reader Removal and Installation

The bar code reader (see Figure 85) is an optional item for the Tape Library. It is replaced because of failure or when performing other maintenance procedures.
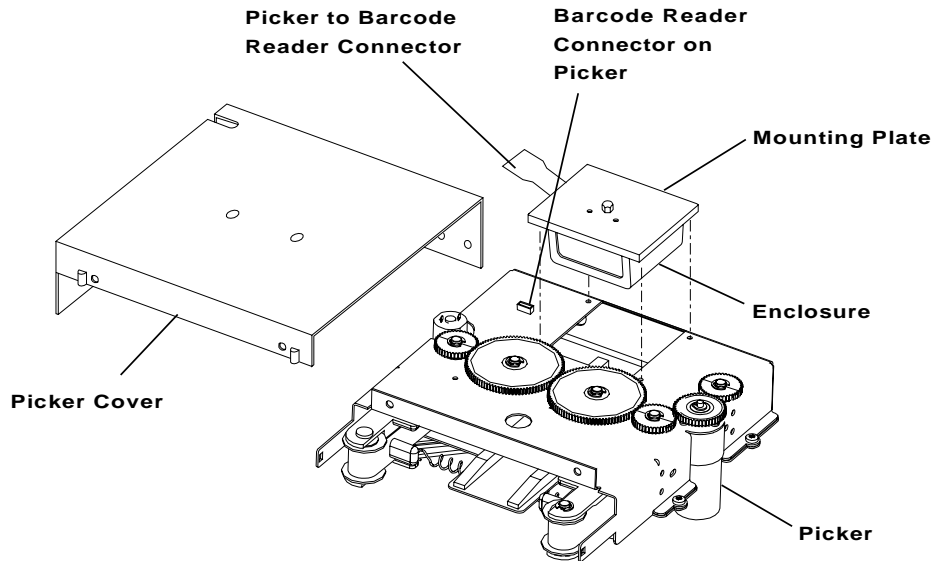


*Figure 85. Bar Code Reader*

**Note:** The above symbols indicate appropriate cautions to address in this "Bar Code Reader Removal and Installation" section of the manual.

# Removal

To remove the bar code reader, use the following procedure:

**CAUTION:**
**The bar-code reader contains a Class II laser component. Only trained service personnel may repair the bar-code reader.** *(RSFTC237)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.
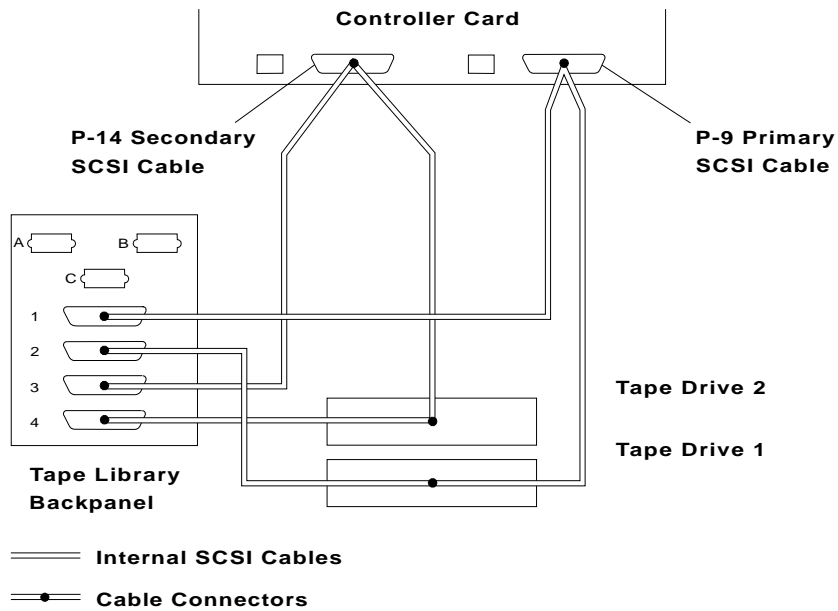
   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Open the library front door.

   **Attention:** The picker assembly and the bar code reader are sensitive to static electricity discharge. During the following steps, make sure they are handled as outlined in "Handling Static-Sensitive Devices" on page 43 and placed in an antistatic bag when removed from the Tape Library.

6. Remove the picker assembly cover. The cover snaps off the picker assembly.

7. Remove the bar code reader assembly by doing the following:

   a. Using a flat-head screwdriver, gently pry the pigtail connector off the picker flex cable. This action disconnects the Bar Code Reader from the picker assembly.

   b. Gently pry the par code reader assembly from the picker.

8. Place the bar code reader assembly in an antistatic bag.

## Installation

To install the bar code reader, use the following procedure:

**CAUTION:**
**The bar-code reader contains a Class II laser component. Only trained service personnel may repair the bar-code reader.** *(RSFTC237)*

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

1. Make sure the library power switch is Off and the library power cable is unplugged from the power source.

**Attention:** The picker assembly and the bar code reader are sensitive to static electricity discharge. During the following steps, make sure they are handled as outlined in "Handling Static-Sensitive Devices" on page 43 and not be removed from the antistatic bag until ready to be installed in the Tape Library.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

2. Obtain the bar code reader assembly to be installed. Make sure antistatic precautions are observed when handling the bar code reader.

3. Remove the bar code reader assembly from the antistatic bag.

4. Place the bar code reader assembly into the opening of the picker. Assure that:

   a. The enclosure is oriented with the window to the front of the picker.

   b. The stakes on the bar code reader assembly fit into the holes on the picker. The picker should be supported with your hand while pressing the bar code reader assembly in place.

   The assembly should fit level to the top of the picker shell.

   **Note:** When upgrading the Tape Library to contain a bar code reader, the bar code mounting plate must be removed from the picker opening. To remove the mounting plate, use a flat-blade screwdriver and gently pry it from the picker.

5. Press the pigtail connector onto the picker flex cable.

6. Install the picker assembly cover. The cover snaps on the picker assembly.

7. Close the library front door.

8. To ensure the assembly was installed correctly, power the unit on and perform an inventory.

   **Note:** If the inventory fails, recheck the bar code reader installation.

9. Return to the library service procedure that sent you here.

# Accessor Assembly Removal and Installation

The accessor assembly (see Figure 86) is replaced because of failure or when performing other maintenance procedures.
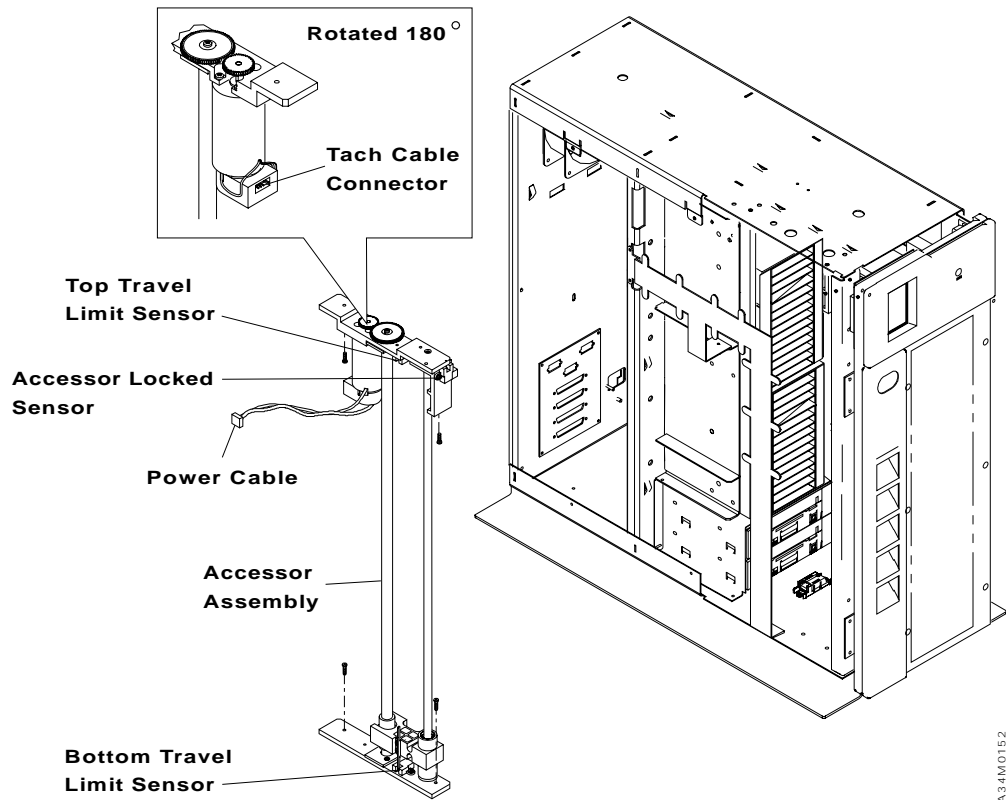


*Figure 86. Accessor Assembly*



**Note:** The above symbol indicates appropriate cautions to address in this "Accessor Assembly Removal and Installation" section of the manual.

## Removal

To remove the accessor assembly, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, top, left side, and right side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Remove the picker assembly. Do not leave picker assembly inside the library. See "Picker (Assembly & Umbilical Cable) Removal and Installation" on page 83.

7. Disconnect the accessor motor tach cable from accessor motor. Cable connector is not keyed, note orientation of cable connector for installation.

8. Disconnect the accessor power cable from P5 on the controller card.

9. Disconnect the top travel limit and accessor locked sensor connector, and the bottom travel limit sensor connector from the accessor.

10. Remove screw securing umbilical tray to bottom of accessor assembly. **Do not** remove other umbilical cable tray screws.

11. Remove 4 screws that secure accessor assembly to the library frame and remove accessor assembly from library frame.

## Installation

To install the accessor assembly, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the accessor assembly to be installed.

3. Position the accessor in the library. Make sure accessor top and bottom mounting plates are firmly seated against alignment pins on library frame.

4. Install 2 screws through the accessor bottom mounting plate into the frame and tighten screws, then install 2 screws through the accessor top mounting plate into the frame and tighten screws.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

5. Connect the top travel limit and accessor locked sensor connector, and the bottom travel limit sensor connector to the accessor.

6. Connect the accessor motor tach cable to accessor motor. Cable connector is not keyed, make sure connector orientation is same as noted during accessor removal.

7. Connect the accessor power cable to P5 on the controller card. See Figure 79 on page 76 for location of connector.

8. Install the picker assembly. See "Picker (Assembly & Umbilical Cable) Removal and Installation" on page 83.

9. Align drives to picker assembly. See "Aligning the Picker Assembly with the Drive" on page 94.

10. Calibrate the Tape Library. See "Library Calibration" on page 28.

11. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

12. Close the library front door.

13. Return to the library service procedure that sent you here.

# Aligning the Picker Assembly with the Drive

Align the picker assembly (see Figure 87) with the drive whenever picker or accessor assemblies are replaced.
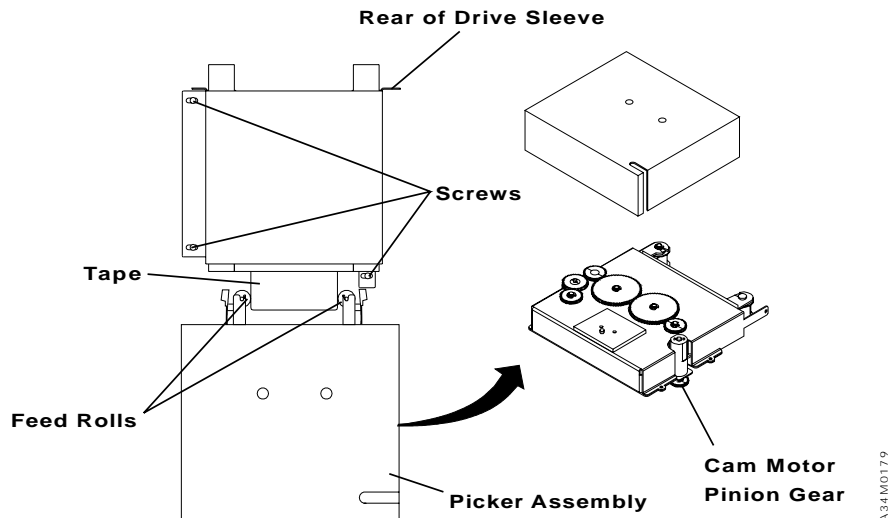


*Figure 87. Aligning the Picker Assembly with the Drive*

⚠️

**Note:** The above symbol indicates appropriate cautions to address in this "Aligning the Picker Assembly with the Drive" section of the manual.

**Attention:** Before aligning the picker with the drive:

Remove the 2 tape cartridge magazines.

Remove any tapes from the 2-slot cartridge holder.

To align the picker with the drive, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access and press the library power switch to turn the library power off.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, right side, and left side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Using your hand, move the picker assembly to the top of the accessor assembly and lock it in place with the accessor (mechanical) lock. Refer to Figure 73 on page 67.

7. Place a tape in the ejected position in the drive.

8. Remove the bezel from drive 1 (the lower drive).

9. Loosen the 3 screws holding the drive sleeve so the sleeve can be gently moved from side to side (reference Figure 87 on page 94). Assure the rear of the drive sleeve is positioned against the mid-point of the library frame.

10. Release the picker assembly and lower it to align with the tape in the drive.

11. Rotate the picker assembly's cam motor pinion gear so the feed rolls open to the width of the tape cartridge.

12. Move the drive from right to left until the drive is centered with the picker assembly.

13. Manually raise and lower the picker assembly to assure it freely passes the tape cartridge.

14. Manually raise the picker assembly, then tighten the 3 screws holding the drive sleeve.

15. Install the bezel onto drive 1.

16. Manually raise and lower the picker assembly to verify the tape cartridge is still centered between the feed rolls.

17. Calibrate the tape library. See "Library Calibration" on page 28.

18. Install the library covers. See "Library Cover Set Removal and Installation" on page 44.

19. Close the library front door.

20. Return to the library service procedure that sent you here.

# Sensor Group Removal and Installation

Removal and Installation

The sensor group includes the following:

Accessor obstructed sensors (emitter and receiver)

Accessor bottom travel limit cable

Accessor top travel limit and lock cable

Accessor motor tach cable

Upper/lower magazine sensor cable

**Note:** This procedure is written for removing and installing the accessor obstructed sensors (emitter and receiver) and all sensor group cables listed above (see Figure 88). If only some of the sensor group are being replaced make sure all preparatory steps and all closing steps are performed.
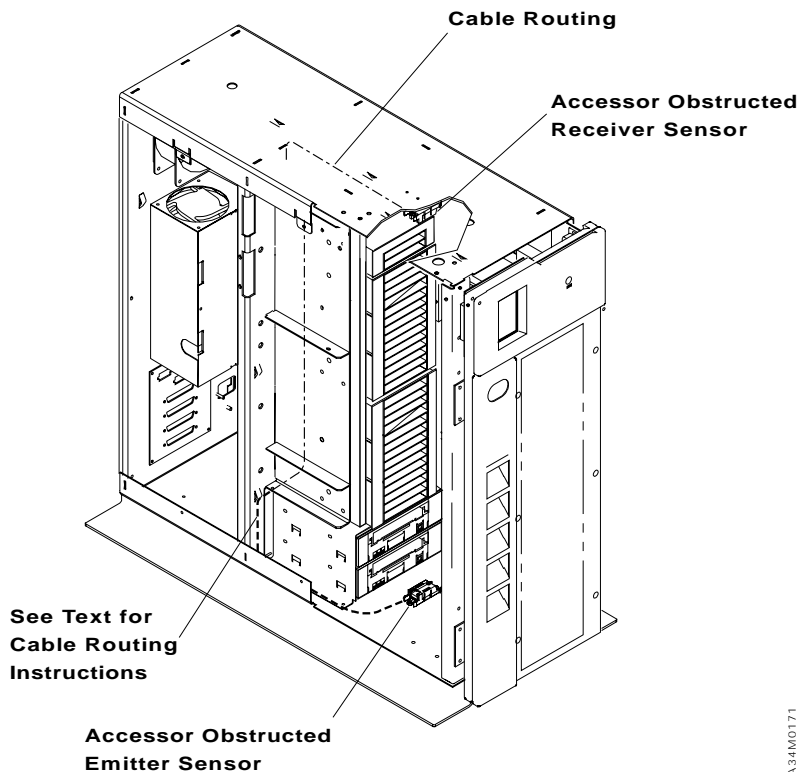


*Figure 88. Sensor Group*

## Removal

To remove the sensor group, use the following procedure:

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

4. Unplug the library power cable from the power outlet.

5. Remove the library rear, top, and left side covers. See "Library Cover Set Removal and Installation" on page 44.

6. Remove the tape cartridge magazines. Go to "Tape Cartridge Magazine Removal and Installation" on page 57.

### Removing the Accessor Obstructed Sensors and Cables

7. Disconnect the accessor obstructed receiver sensor cable from the accessor obstructed receiver sensor located inside of the library at the top.

8. Remove 2 screws from the sensor and remove the sensor.

9. Using your hand, move the picker to the top of the accessor and lock in position with the accessor lock (mechanical lock).

10. Disconnect the obstructed emitter sensor cable from the accessor obstructed emitter sensor located inside the library at the bottom.

11. Remove 2 screws from the sensor and remove the sensor.

12. Note the routing of the sensor cables, then remove cable ties from the sensor cables.

13. Disconnect the accessor obstructed emitter sensor cable from P13 on the controller card and the accessor obstructed receiver sensor cable from P12 on the controller card.

14. Carefully remove the sensor cables from the library.

### Removing the Accessor Motor Tach Cable

15. Disconnect the accessor motor tach cable from accessor. Connector is not keyed, note orientation of connector for installation.

16. Note the routing of the tach cable, then remove cable ties from the tach cable.

17. Disconnect the tach cable from P7 on the controller card.

18. Carefully remove the tach cable from the library.

### Removing the Magazine Sensors Cable

19. Disconnect the magazine present sensor cables from the magazine sensors.

20. Note the routing of the sensor cable, then remove cable ties from the sensor cable.

21. Disconnect the sensor cable from P11 on the controller card.

22. Carefully remove the sensor cables from the library.

### Removing the Bottom Travel Limit Sensor Cable

23. Disconnect the bottom travel limit sensor cable from the accessor assembly.

24. Note the routing of the sensor cable, then remove cable ties from the sensor cable.

25. Disconnect the sensor cable from P10 on the controller card.

26. Carefully remove the sensor cable from the library.

### Removing the Top Travel Limit and Accessor Locked sensor cable

27. Disconnect the top travel limit and accessor locked sensor cable from the accessor assembly.

28. Note the routing of the sensor cable, then remove cable ties from the sensor cable.

29. Disconnect the sensor cable from P8 on the controller card.

30. Carefully remove the sensor cable from the library.

## Installation

To install the sensor group, use the following procedure:

1. Make sure the library power is Off and the library power cable is unplugged from the power source.

2. Obtain the sensors and sensor cables to be installed.

3. Make sure the tape cartridge magazines are removed.

### Installing the Accessor Obstructed Sensors and Cables

4. If not already done, move the picker to the top of the accessor and lock in position with the accessor lock (mechanical).

5. Position the accessor obstructed emitter sensor in the bottom of the library and secure in position with 2 screws.

   **Note:** In the following steps, use care so sensor cables are not damaged when they are routed through the slots in the middle stiffener plate.

6. Connect the accessor obstructed emitter sensor cable to the sensor.

7. Route the sensor cable as shown in Figure 88 on page 96 to the controller card and connect sensor cable to P13 on the controller card. See Figure 79 on page 76 for location of connector.

8. Support the picker with one hand while unlocking the accessor lock (mechanical lock) then lower picker to bottom of library.

9. Position the accessor obstructed receiver sensor inside the library at the top and secure in position with 2 screws.

10. Connect the accessor obstructed receiver sensor cable to the sensor.

11. Route cable as shown in Figure 88 on page 96 to the controller card and connect sensor cable to P12 on the controller card. See Figure 79 on page 76 for location of connector.

### Installing the Accessor Motor Tach Cable

12. Connect the accessor motor tach cable to the accessor motor. See Figure 86 on page 91. Cable connector is not keyed, make sure connector orientation is same as noted during accessor removal.

13. Route the tach cable, route from the accessor motor through upper slot in middle frame panel to controller card.

14. Attach required cable ties to secure sensor cable to library frame.

15. Connect the tach cable to P7 on the controller card.

**Installing the Magazine Sensors Cable**

16. Position the magazine present sensor cable in the

17. Position the magazine present sensor cable in the library and connect the sensor cables to the magazine sensors. The longer sensor cable connects to the bottom sensor.

18. Route the sensor cable, up the center of the middle frame panel. The sensor cable controller card connector (single connector) is routed through the slot at the top of the middle frame panel.

19. Attach required cable ties to secure sensor cable to library frame.

20. Connect the sensor cable to P11 on the controller card.

**Installing the Bottom Travel Limit Sensor Cable**

21. Position the bottom travel limit sensor cable in the library and connect to the accessor assembly connector at the bottom of the accessor assembly.

22. Route the sensor cable as follows:

    Along the bottom left side of the frame to the middle frame panel and up as far as the top of the tape drive sleeve,

    Pass the cable through the opening between the sleeve and the magazine mounting plate side panels to the center of the middle frame panel,

    Up the middle frame panel and through the opening at the top of the frame panel.

23. Attach required cable ties to secure sensor cable to library frame.

24. Connect the sensor cable to P10 on the controller card.

**Installing the Top Travel Limit and Accessor Locked Sensor cable**

25. Position the top travel limit and accessor locked sensor cable in the library and connect the sensor cable to the accessor assembly.

26. Route the sensor cable along the inside top of the library and through the opening at the top of the middle frame panel.

27. Attach required cable ties to secure sensor cable to library frame.

28. Connect the sensor cable to P8 on the controller card.

29. If required, install the library covers. See "Library Cover Set Removal and Installation" on page 44.

30. Close the library front door.

31. Return to the library service procedure and continue.

# Manually Removing a Tape Cartridge

If a power failure or a drive failure prevents the tape cartridge from ejecting, the cartridge can be removed manually.

Before manually removing a tape cartridge:

Remove power from the 8mm Tape Drive,

Apply power, again, to clear potential error conditions, then

Press the unload.

If the tape does not eject, proceed with a manual removal.

**Attention:** The procedure that follows may result in damage to a tape cartridge.

# Remove The Tape Cartridge:

1. Perform the cover removal procedure. Refer to "Library Cover Set Removal and Installation" on page 44.

2. Perform the drive removal procedure. Refer to "Tape Drive Removal and Installation" on page 67.

3. Remove the three (3) T-6 screws that secure the top cover of the drive (see Figure 89); one (1) each on the rear and two (2) sides of the drive. See Figure 89.
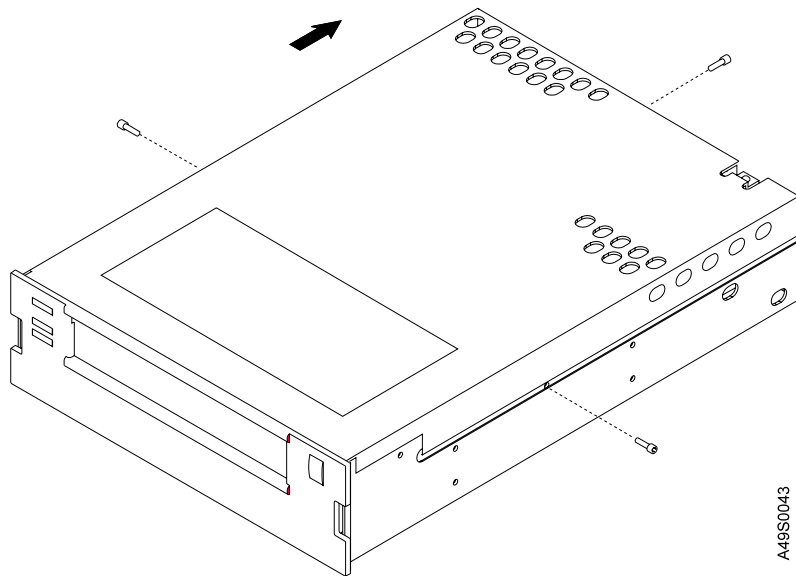


*Figure 89. Drive Top Cover Removal*

4. Slide cover to the rear of the drive and remove it.

5. If it is obvious the tape must be destroyed before it can be removed, perform the following procedure. Otherwise, continue with step 6 on page 101.

   **Attention:** This procedure will destroy the tape cartridge and its data.

   Use the following procedure only if the loaded tape is known to be damaged or cannot be unloaded by another method.

   a. Cut the tape at a convenient location.

  b. Manually unload the tape cartridge (see "Unload the tape cartridge:" on page 102).

6. Position the drive with the front facing the technician.

7. Take up slack in the tape by using the following instructions to move the drive's trolleys and the supply reel motor.

  **Attention:** To avoid damaging the tape, do not touch it.

## Move the Trolleys:

1. On the left side panel of the drive (toward the rear), locate the hole marked UNLOAD  1  ( Figure 90).

2. Insert a 2.5-mm allen wrench approximately 43 mm (2 in.) into the UNLOAD hole and position it so it seats securely into the inner socket.

3. Turn the wrench in the direction marked on the drive (clockwise).

4. Rotate the wrench until the trolleys  2  stop moving.
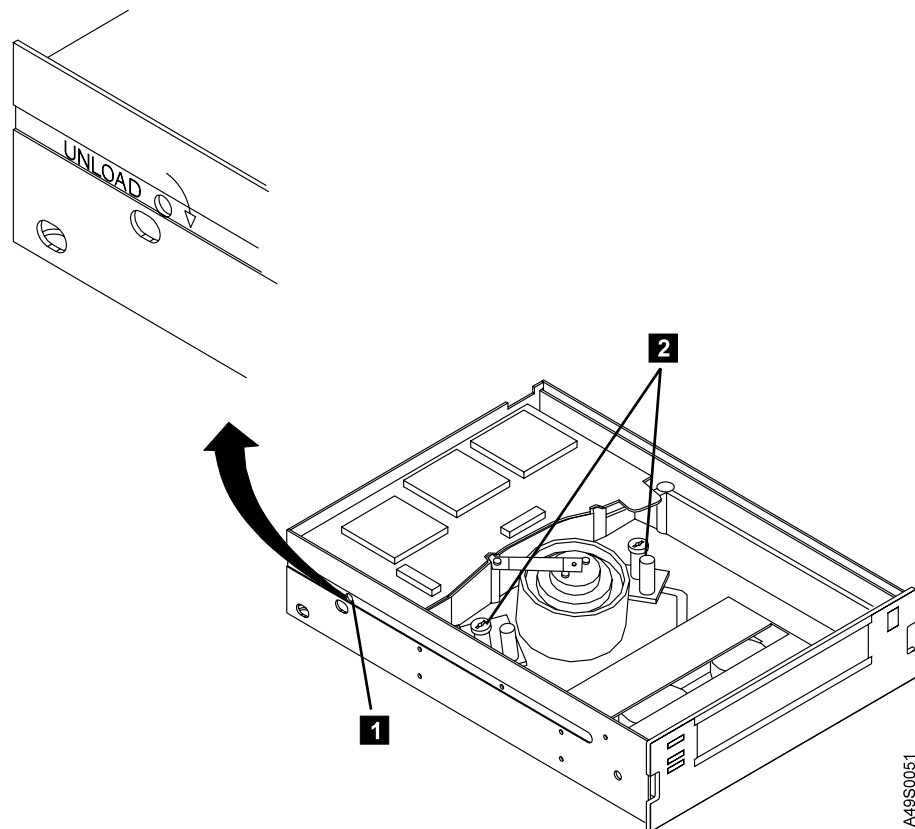


*Figure 90. Moving Trolleys*

## Move the Supply Reel Motor:

1. Locate the hole marked UNLOAD  1  on the bottom of the drive ( Figure 91 on page 102).

2. Insert a non-metallic probe (such as the wooden end of a swab) approximately 0.64 cm (0.25 in.) into the UNLOAD hole and position it so it rests on the inner flange  2 .

3. Gently push the flange with the probe in the direction marked on the drive (clockwise).

4. Repeat the preceding step until there is no slack in the tape.

5. Ensure the tape is fully retracted into the cartridge
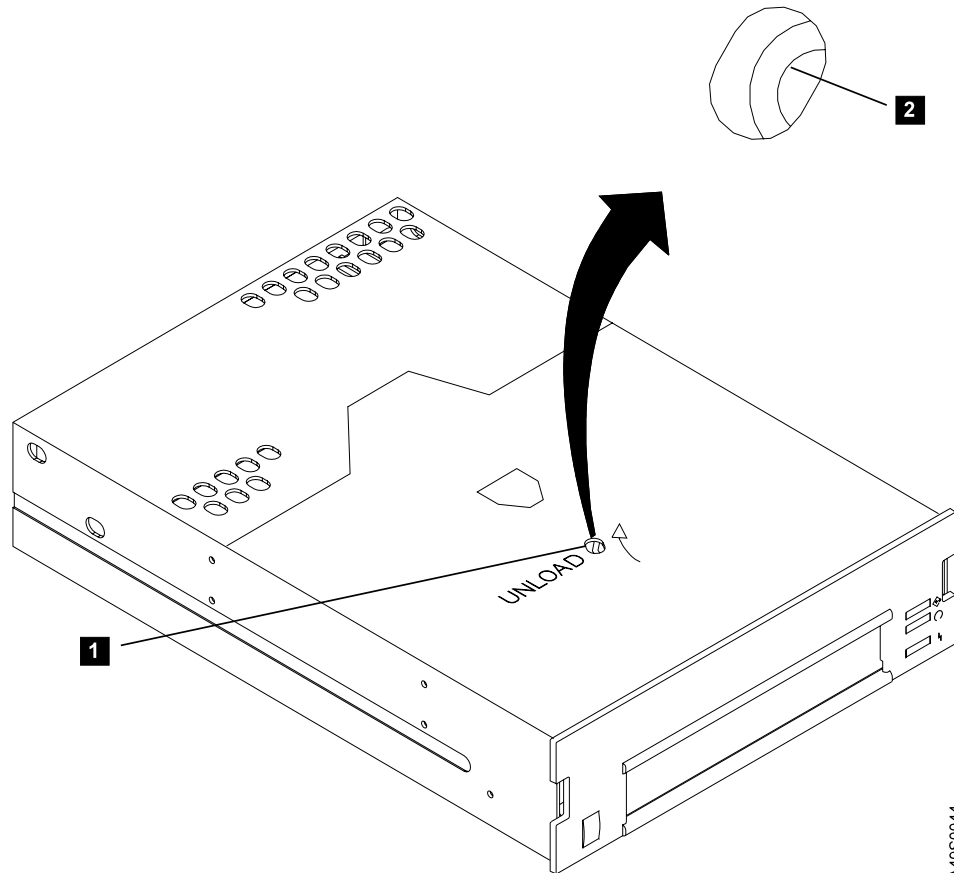


*Figure 91. Moving the Supply Reel Motor. The drive is turned topside down.*

## Unload the tape cartridge:

1. Insert a 2.5-mm allen wrench into the hole marked UNLOAD  1  at the left front of the drive (see Figure 92 on page 103).

2. Turn the wrench in the direction marked on the drive (counterclockwise) until the tape ejects.
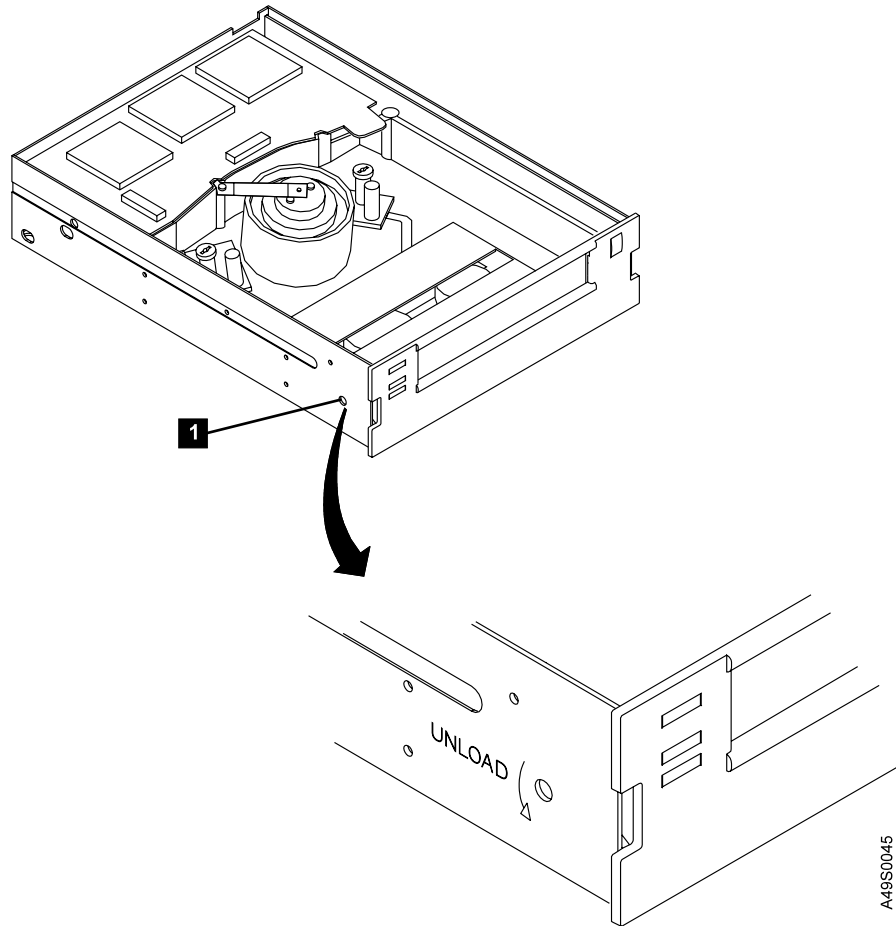
*Figure 92. Unloading a Tape Cartridge*

## Install a New Drive:

1. Reverse the removal procedure.

2. Replace the drive cover on the old drive and return the drive according to instructions that came with the new drive.

# Removing a Tape Cartridge Stuck in the Picker

**Note:** The above symbols indicate appropriate cautions to address in this "Removing a Tape Cartridge Stuck in the Picker" section of the manual.

## Removal

**Note:** This procedure assumes the tape cartridge is stuck in the picker and the tape is not extended into the tape drive.

To remove a tape cartridge that is stuck in a picker, use the following procedure:

**CAUTION:**
**Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

**CAUTION:**
**If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

1. If the Tape Library is currently performing an operation, wait until the operation is complete before continuing.

2. If not already done, do a controlled system shutdown.

3. Open the control panel access cover and press the library power switch to turn the library power Off.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

4. Unplug the library power cable from the power outlet.

5. Open the library front door.

6. Remove the picker assembly cover. The cover snaps off the picker assembly.

7. Using your hand, lift the picker to allow access to the gears on the bottom of the picker.
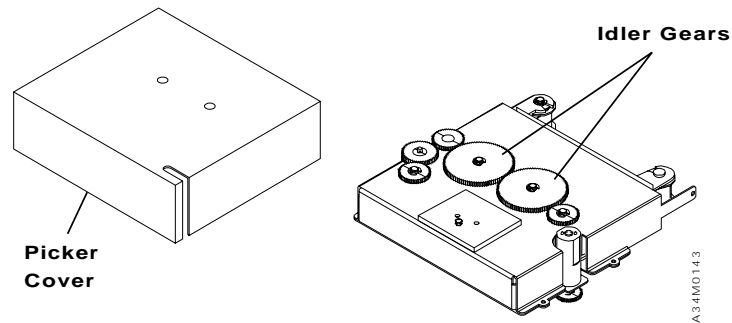
*Figure 93. Picker Assembly and Cover*

8. Using your other hand turn the large idler gear on the bottom of the picker to fully open the picker arms.

9. Align the tape cartridge in the picker with an empty magazine slot.

10. Rotate the idler gears to move the cartridge out of the picker assembly and into the empty magazine slot.

11. Lower the picker to the bottom of the library.

12. Examine the picker and the tape cartridge for damage or the presence of a foreign substance. If required, clean or replace picker. See "Picker (Assembly & Umbilical Cable) Removal and Installation" on page 83.

13. Install the picker assembly cover. The cover snaps on the picker assembly.

14. Close the library front door.

15. Return to the library service procedure that sent you here.

# Chapter 4.  Problem Analysis Procedures (PAPs)

Problem Analysis Procedures (PAPs) are used to isolate 8mm Tape Library failures and to provide repair actions for those failures. Listed in the following table are problem conditions with corresponding processes to identify PAPs. PAPs protocols follow the table.

## Analysis Starting Point

Begin all problem analysis for the 8mm Tape Library with Figure 94. Locate the first condition in the left column of the table that most closely describes the library problem and perform the corresponding action in the right column.

| *Figure 94 (Page 1 of 4). Start Here for Library Problem Analysis* | |
|---|---|
| **If You Observe this Condition** | **Take this Action** |
| The library power switch does not power-on the library. See "Definition of Power-Off and Power-On" on page 9. | Do the following: <br><br> 1. Go to "PAP 1, Inoperative Control Panel LCD or Power-On Indicator" on page 111. <br><br> 2. Make sure all the library covers are installed. <br><br> 3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* GA32-0376. <br><br> 4. Return the library to the operational mode it was in before the error condition. |
| The library power-on indicator does not light when library power is On. See "Definition of Power-Off and Power-On" on page 9. | Do the following: <br><br> 1. Go to "PAP 1, Inoperative Control Panel LCD or Power-On Indicator" on page 111. <br><br> 2. Make sure all the library covers are installed. <br><br> 3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*, GA32-0376. <br><br> 4. Return the library to the operational mode it was in before the error condition. |
| The library continuously beeps and the power-on indicator continuously blinks one of four sequences indicating an error occurred during the Power-On Self Test (POST). | Do the following: <br><br> 1. If a UEC **is** displayed, continue problem analysis with "PAP 3, Processing a Unit Error Code (UEC)" on page 120. <br><br> 2. If calibration failed and a UEC **is not** displayed, continue problem analysis using the condition listed in this table that best describes the failure condition. <br><br> 3. Make sure all the library covers are installed. <br><br> 4. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*, GA32-0376. <br><br> 5. Return the library to the operational mode it was in before the error condition. |

| Figure 94 (Page 2 of 4). Start Here for Library Problem Analysis | |
|---|---|
| **If You Observe this Condition** | **Take this Action** |
| The control panel display is blank. | Do the following:<br><br>1. Go to "PAP 1, Inoperative Control Panel LCD or Power-On Indicator" on page 111.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*, GA32-0376.<br><br>4. Return the library to the operational mode it was in before the error condition. |
| Control panel display does not show the correct library configuration. For example, only one drive is displayed and the library has two drives installed. | Do the following:<br><br>1. If a library power reset has not been attempted, perform step 2. Otherwise go to step 5.<br><br>2. Press the control panel power switch ( ⍟ ) to turn the library power Off. Wait 10 seconds for the power supply to reset, then press the power switch ( ⍟ ) to turn the library power On.<br><br>3. If the control panel display still does not show the correct library configuration, go to step 5.<br><br>4. If the control panel display is correct, this was an intermittent problem. Resume library operations.<br><br>5. Perform calibration. Go to "Library Calibration" on page 28.<br><br>   a. If calibration passed and the display is correct, resume library operations.<br><br>   b. If calibration failed and a UEC **is** displayed, continue problem analysis with "PAP 3, Processing a Unit Error Code (UEC)" on page 120.<br><br>   c. If calibration failed and a UEC **is not** displayed, continue problem analysis using the condition listed in this table that best describes the failure condition.<br><br>6. Make sure all the library covers are installed.<br><br>7. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>8. Return the library to the operational mode it was in before the error condition. |
| The library power switch does not power-off the library. See "Definition of Power-Off and Power-On" on page 9. | Do the following:<br><br>1. Go to "PAP 2, Power Switch does not Power-Off the Library" on page 116.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |

*Figure 94 (Page 3 of 4). Start Here for Library Problem Analysis*

| If You Observe this Condition | Take this Action |
|---|---|
| The control panel display shows a Unit Error Code or the unit fails during system diagnostics. See "UEC and FRU Code Displays" on page 10. | Do the following:<br><br>1. Go to "PAP 3, Processing a Unit Error Code (UEC)" on page 120.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |
| System unit cannot read bar code label. Unknown tape error. | Do the following:<br><br>1. Perform "Step 10, SAC 08" on page 129. If problem analysis is required beyond this SAC, use a FRU group of 0A.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |
| The library control panel is nonfunctional. | Do the following:<br><br>1. Perform "PAP 5, Control Panel Nonfunctional" on page 144.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |
| A Door Open message is displayed continuously. | Do the following:<br><br>1. Perform "Step 11, SAC 09" on page 129. If problem analysis is required beyond this SAC, use a FRU group of 08.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |
| Control panel display does not show an installed magazine. | Do the following:<br><br>1. Perform "Step 12, SAC 10" on page 130. If problem analysis is required beyond this SAC, use a FRU group of 0C.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |

| Figure 94 (Page 4 of 4). Start Here for Library Problem Analysis ||
| --- | --- |
| **If You Observe this Condition** | **Take this Action** |
| A tape cartridge is stuck in a tape drive. | Do the following:<br><br>1. Perform "Manually Removing a Tape Cartridge" on page 100.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |
| A tape cartridge is stuck in the picker. | Do the following:<br><br>1. Perform "Removing a Tape Cartridge Stuck in the Picker" on page 104.<br><br>2. Make sure all the library covers are installed.<br><br>3. If not already done, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*<br><br>4. Return the library to the operational mode it was in before the error condition. |

# PAP 1, Inoperative Control Panel LCD or Power-On Indicator

**Note:** The above symbol indicates appropriate caution to address in this "PAP 1, Inoperative Control Panel LCD or Power-On Indicator" section of the manual.

This procedure is performed if **either** of the following conditions exist:

Blank control panel display (LCD)
Power-On indicator (POI) continuously off

**Note:** At power-on the library software sets valid display brightness and contrast values and writes status messages to the display (see Figure 95). The software also turns the power-on indicator On.
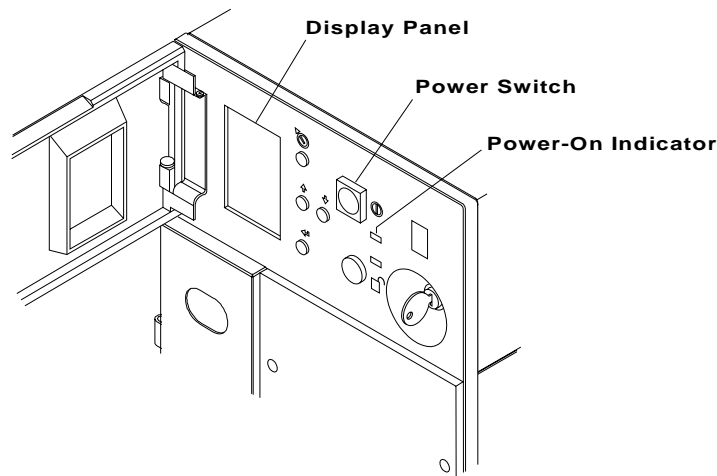
ASOP03-00

*Figure 95. Control Panel*

## Step 1

1. Do a controlled system shutdown.
2. Unplug the library power cord from the power outlet and wait at least 10 seconds before continuing (this allows the power supply to reset).
3. Plug the library power cord into the power outlet.

**Are BOTH the power-on indicator and the control panel display On?**

**YES**        Go to "Step 9" on page 115.

**NO**         Do the following:

       1. Press the control panel power switch **once**.

       2. If both the power-on indicator and the control panel display are On, go to "Step 9" on page 115.

       3. If either the power-on indicator or the control panel display are Off, go to "Step 2" on page 112.

# Step 2

1. Unplug the library power cord from the power outlet.
2. Remove all library covers. Go to "Library Cover Set Removal and Installation" on page 44.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

3. Disconnect, inspect, repair or replace, and reconnect the following cables and connectors:

   **Note:** Inspect the connectors for bent, broken, or missing pins; corrosion or other damage that could prevent a good connection.

   Connectors at both ends of control panel cable

   Power-sense cable connector at P2 on the controller card

   Power supply cable connector at P1 on the controller card

4. Make sure all of the cables disconnected in the previous step are reconnected, then plug the library power cord into the power outlet.

**Are BOTH the power-on indicator and the control panel display On?** (Refer to Figure 96 on page 113.)

**YES**        Go to "Step 9" on page 115.

**NO**        Do the following:

1. Press the control panel power switch **once**.

2. If both the power-on indicator and the control panel display are On, go to "Step 9" on page 115.

3. If either the power-on indicator or the control panel display are Off, go to "Step 3" on page 113.

## Step 3
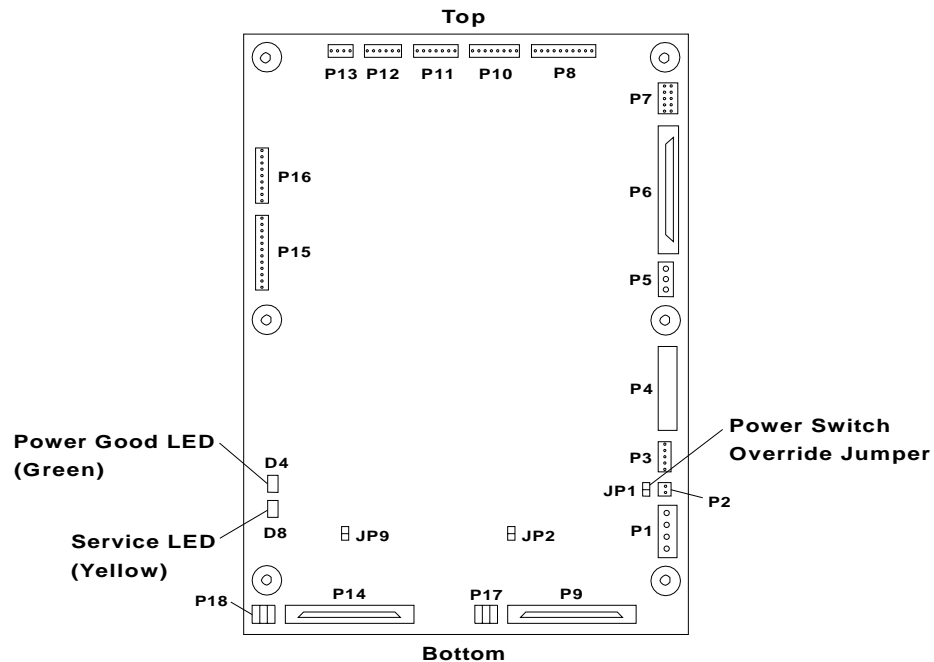


*Figure 96. Controller Card LEDs and Power-Switch Override Jumper*

**Is the Controller Card Power Good LED (green) Off?**

**Note:** The control card power good LED (green) On condition indicates that an undervoltage condition does not exist on the control card.

**YES**        Do the following:

> 1. Install a jumper at JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.
>
> 2. Go to "Step 4."

**NO**         Go to "Step 5" on page 114.

## Step 4

**Is the Controller Card Power Good LED (green) Off?**

**YES**        Do the following:

> 1. Go to "PAP 4, Power System Check" on page 137.
>
> 2. If power system check passed or corrected the problem, return to the library service procedure that sent you here.
>
> 3. If power system check did not isolate a problem, go to "Step 8" on page 114.

**NO**         Go to "Step 5" on page 114.

# Step 5

**Is the Controller Card Service LED (yellow) Off?**

**Note:** The control card service LED (yellow) indicator is a redundant indicator for the library front panel power indicator.

**YES**          Go to "Step 6."

**NO**          Go to "Step 7."

# Step 6

1. Replace the controller card. Go to "Controller Card Removal and Installation" on page 74.
2. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

**Are BOTH the power-on indicator and the control panel display On?**

**YES**          This procedure is complete. Return to the library service procedure that sent you here.

**NO**          Go to "Step 6."

# Step 7

1. Replace the control panel assembly and control Panel cable. Go to "Control Panel Assembly Removal and Installation" on page 51 and "Control Panel Cable Removal and Installation" on page 54.
2. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

**Are BOTH the power-on indicator and the control panel display On?**

**YES**          Do the following:

    1. Make sure all cables are connected and library covers are installed.

    2. Return to the library service procedure that sent you here.

**NO**          Go to "Step 8."

# Step 8

1. Call the 8mm Tape Library service representative or the next level of support.
2. The problem was resolved with technical support assistance.
3. Make sure all cables are connected and all the library covers are installed.
4. Return to the library service procedure that sent you here or prepare library for operational use.

# Step 9

Both the power-on indicator and the control panel display are now functioning, an intermittent problem is no longer present, and the cause of the problem cannot be determined at this time.

1. If the library covers are off, install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

2. This procedure is complete, return to the library service procedure that sent you here.

# PAP 2, Power Switch does not Power-Off the Library

This Problem Analysis Procedure (PAP) is performed if the 8mm Tape Library does not power-off when the control panel power switch is pressed. For information on power distribution within the library, refer to "Power Distribution" on page 9.

**Note:** If the library power is On, proceed with this PAP. For a definition of power-on, refer to "Definition of Power-Off and Power-On" on page 9.



**Note:** The above symbol indicates appropriate caution to address in this "PAP 2, Power Switch does not Power-Off the Library" section of the manual.

## Step 1

1. If you have not already done so, do a controlled system shutdown.

2. Remove all library covers. Go to "Library Cover Set Removal and Installation" on page 44.

**Is a jumper installed at JP1 (power-switch override) on the controller card?**
(Refer to Figure 97.)
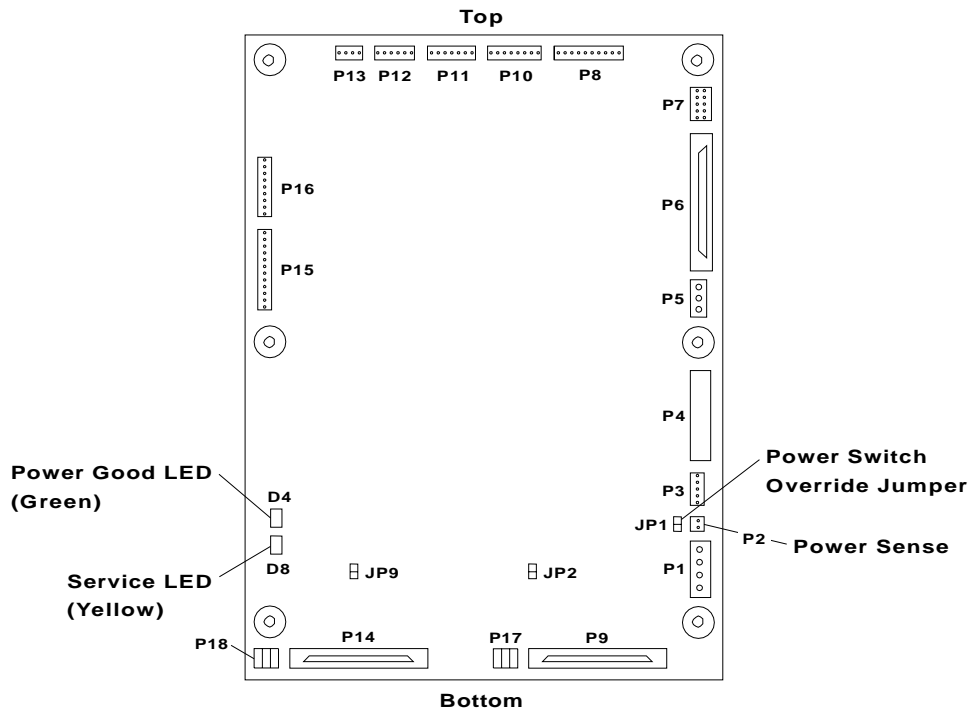


*Figure 97. Controller Card LEDs and Power-Sense Connector*

**YES**      Do the following:

1. Remove the jumper from JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.

2. Go to "Step 2" on page 117.

**NO**  Go to "Step 3."

## Step 2
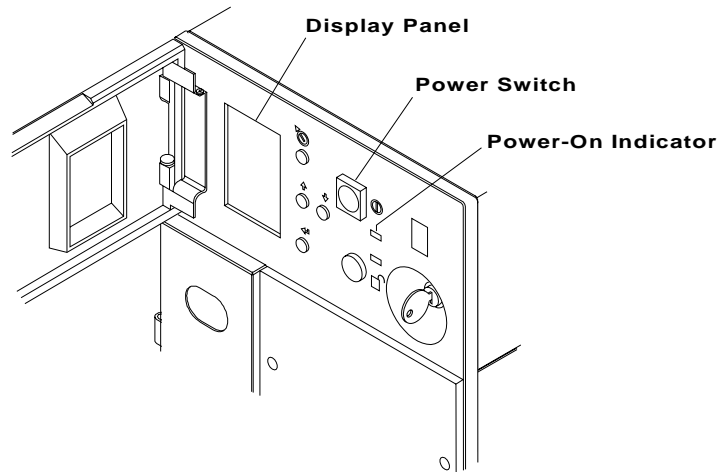


Figure 98. Control Panel

**Is the library power still On?** (Refer to Figure 98.)

**YES**  Do the following:

1. Press the control panel power switch **one** time.

2. If the library power is still On, go to "Step 3."

3. If the library power is Off, install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

4. This procedure is complete, return to the library service procedure that sent you here.

**NO**  Go to "Step 3."

## Step 3

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

Disconnect the control panel cable from the control panel card.

**Is the library power Off?**

**YES**        Do the following:

1. Replace the control panel. Go to "Control Panel Assembly Removal and Installation" on page 51.

2. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

3. Press the control panel power switch **one** time.

4. If the library power is still On, go to "Step 4."

5. If the library power is Off, install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

6. This procedure is complete, return to the library service procedure that sent you here.

**NO**        Go to "Step 4."

## Step 4

Disconnect the control panel cable from P6 on the controller card. See Figure 97 on page 116.

**Is the library power Off?**

**YES**        Do the following:

1. Replace the control panel cable. Go to "Control Panel Cable Removal and Installation" on page 54.

2. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

3. Press the control panel power switch **one** time.

4. If the library power is still On, go to "Step 5."

5. If the library power is Off, install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

6. This procedure is complete, return to the library service procedure that sent you here.

**NO**        Go to "Step 5."

## Step 5

1. Connect the control panel cable to the control panel.

2. Disconnect the power-sense cable from P2 on the controller card.

**Is the library power Off?**

**YES**        Do the following:

1. Replace the controller card. Go to "Controller Card Removal and Installation" on page 74.

2. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

3. Perform calibration. Go to "Library Calibration" on page 28.

4. If calibration failed, go to "Step 6" on page 119.

5. If calibration passed, install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

6. This procedure is complete. Return to the library service procedure that sent you here.

**NO**          Go to "Step 6."

# Step 6

1. Connect the control panel cable to P6 on the controller card. See Figure 97 on page 116.

2. If not already connected, connect the power-sense cable to P2 on the controller card.

3. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.

4. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

**Are BOTH the control panel display and the power-on indicator On?**

**YES**          Do the following:

1. Install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

2. Return to the library service procedure that sent you here.

**NO**          Do the following:

1. Call the 8mm Tape Library service representative or the next level of support.

2. The problem was resolved with technical support assistance.

3. Make sure all cables are connected and all the library covers are installed.

4. Return to the library service procedure that sent you here or prepare library for operational use.

## PAP 3, Processing a Unit Error Code (UEC)

This procedure is performed if a Unit Error Code (UEC) is available through the front panel display or through the system unit Sense data.

**Note:** The above symbol indicates appropriate caution to address in this "PAP 3, Processing a Unit Error Code (UEC)" section of the manual.

## Step 1

1. Find the UEC code in Figure 109 on page 155.

2. Record the Service Action Code (SAC) and the FRU group for the UEC.

3. Locate the SAC in Figure 99 and perform the service actions indicated for the SAC value.

| Figure 99. Service Action Codes and Service Actions | |
|---|---|
| **SAC** | **Service Action** |
| 00 | Go to "Step 2, SAC 00." |
| 01 | Go to "Step 3, SAC 01" on page 121. |
| 02 | Go to "Step 4, SAC 02" on page 121. |
| 03 | Go to "Step 5, SAC 03" on page 124. |
| 04 | Go to "Step 6, SAC 04" on page 124. |
| 05 | Go to "Step 7, SAC 05" on page 125. |
| 06 | Go to "Step 8, SAC 06" on page 127. |
| 07 | Go to "Step 9, SAC 07" on page 128. |
| 08 | Go to "Step 10, SAC 08" on page 129. |
| 09 | Go to "Step 11, SAC 09" on page 129. |
| 10 | Go to "Step 12, SAC 10" on page 130. |
| 11 | Go to "Step 13, SAC 11" on page 131 |
| 12 | Go to "Step 14, SAC 12" on page 132. |
| 13 | Go to "Step 15, SAC 13" on page 133. |
| 14 | Go to "Step 16, SAC 14" on page 133. |
| 15 | Go to "Step 17, SAC 15" on page 134. |

## Step 2, SAC 00

FRU Group 00 is for information only.

1. No service action required, return to the library service procedure that sent you here.

## Step 3, SAC 01

1. Find the FRU Group number in Figure 110 on page 161.

2. For each FRU of the FRU Group inFigure 110 on page 161, do the following:

   a. Locate the service action for the FRU in Figure 111 on page 163.

   b. Perform the FRU service action.

   c. If the service action repaired the problem, this procedure is complete. Return to the library service procedure that sent you here.

   d. If the service action did not correct the problem, repeat step 2a - 2d for the next FRU listed in the FRU Group until the problem is corrected or all service actions are complete.

3. If you have completed the service actions for all the FRUs in the FRU Group and the problem still exists, call the 7331 Tape Library service representative or the next level of support.

4. The problem was resolved with technical support assistance.

5. Make sure all cables are connected and all the library covers are installed.

6. Return to the library service procedure that sent you here or prepare library for operational use.

## Step 4, SAC 02

Possible mechanical interference problems preventing smooth picking and placing of cartridges.

1. **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

2. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

**Are all tape cartridges fully seated in magazine slots and the tape cartridge magazines properly seated in the magazine mounting plates?**

**YES**          Go to "Step 4a" on page 122.

**NO**           Go to "Step 4b" on page 122.

# Step 4a

**Is a tape cartridge stuck in the picker assembly?**

**YES**　　　　Do the following:

1. Go to "Removing a Tape Cartridge Stuck in the Picker" on page 104.

2. Make sure all cartridges are fully seated and the library is operational.

3. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

4. If the error cleared, return to the library service procedure that sent you here.

5. If the error did not clear, go to "Step 4c."

**NO**　　　　Go to "Step 4c."

# Step 4b

1. Make sure all tape cartridges are fully seated.

2. Make sure the tape cartridge magazines are fully seated.

3. Close the library door.

**Does the error clear?**

**YES**　　　　If the error cleared, return to the library service procedure that sent you here.

**NO**　　　　Go to "Step 4a."

# Step 4c

Go to "History Log Display" on page 19 and verify the source and destination of the move.

**Is the destination a tape drive?**

**YES**　　　　Do the following:

1. Use the move command to move a tape cartridge to the destination tape drive. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for instructions on moving a tape cartridge.

2. If the error reoccurs, go to "Step 4d" on page 123.

3. If the error cleared and does not reoccur, return to the library service procedure that sent you here.

**NO**　　　　Go to "Step 3, SAC 01" on page 121.

# Step 4d

**Is a second drive installed in the library?**

**YES**        Go to "Step 4e."

**NO**        Do the following:

1. Replace the tape drive. Go to "Tape Drive Removal and Installation" on page 67.

2. Make sure all cables are connected to the tape drive.

3. Plug the library power cable into a grounded outlet.

4. Press the control panel power switch ( ⏻ ) to turn the library power On.

5. Use the move command to move a tape cartridge to the tape drive. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for instructions on moving a tape cartridge.

6. If the error reoccurs, go to "Step 3, SAC 01" on page 121.

7. If the error cleared and does not reoccur, return to the library service procedure that sent you here.

# Step 4e

Use the move command to move a tape cartridge to the other tape drive. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for instructions on moving a tape cartridge.

**Does the tape cartridge load into the other tape drive without producing an error?**

**YES**        Do the following:

1. Replace the first tape drive. Go to "Tape Drive Removal and Installation" on page 67.

2. Make sure all cables are connected to the tape drive.

3. Plug the library power cable into a grounded outlet.

4. Press the control panel power switch ( ⏻ ) to turn the library power On.

5. Use the move command to move a tape cartridge to the tape drive that was just installed. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for instructions on moving a tape cartridge.

6. If the error reoccurs, go to "Step 3, SAC 01" on page 121.

7. If the error cleared and does not reoccur, return to the library service procedure that sent you here.

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 5, SAC 03

Possible mechanical interference problems preventing smooth operation of the accessor mechanism.

1. If not already done, do a controlled system shutdown.

2. Open the control panel access cover and press the library power switch to turn the library power Off.

3. Unplug the library power cable from the power outlet.

4. Using your hand, move the picker assembly from the lower to the upper limit and back to check for any obvious binding.

5. Make sure the accessor lock (blue plastic at top of accessor) is fully retracted and not preventing the accessor from reaching the upper limit.

**Were any mechanical interference problems found?**

**YES**          Do the following:

            1. Perform the necessary service actions to correct the problem.

            2. Go to "Step 5a."

**NO**           Go to "Step 3, SAC 01" on page 121.

## Step 5a

**Did the service actions correct the problems?**

**YES**          Return to the library service procedure that sent you here.

**NO**           Go to "Step 3, SAC 01" on page 121.

## Step 6, SAC 04

1. Power-down the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

2. Remove the library right side cover. Go to "Library Cover Set Removal and Installation" on page 44.

> **DANGER**
>
> > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.**  *(RSFTD204)*

> **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.** *(RSFTD004)*

3. Make sure the 2 cables connecting the accessor motor and tachometer to the controller card are connected at both ends.

4. Connect any connectors that are not connected.

**Were there any loose connectors that were connected?**

**YES**          Do the following:

       1. Install the library right side cover. Go to "Library Cover Set Removal and Installation" on page 44.

       2. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

       3. Go to "Step 6a."

**NO**           Go to "Step 3, SAC 01" on page 121.

## Step 6a

**Did the service actions correct the problems?**

**YES**          Return to the library service procedure that sent you here.

**NO**           Go to "Step 3, SAC 01" on page 121.

## Step 7, SAC 05

SCSI communication problems.

1. Make sure the 7331 Tape Library and library tape drives are set to the correct SCSI IDs. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

2. Power-down the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

3. Remove the library right side cover. Go to "Library Cover Set Removal and Installation" on page 44.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

4. Make sure the library internal SCSI bus cables are connected and properly terminated. See "Internal SCSI Cable Group Removal and Installation" on page 78 for internal SCSI cable configuration and *7331 and 3449 8mm Model 3xx Installation Guide* for the proper termination for your library configuration.

Top

P13 P12 P11 P10 P8

P7

P16

P15

P6

P5

P4

P3

JP1  P2

P1

Power Good LED
(Green)

D4

Service LED
(Yellow)

D8   JP9       JP2

Secondary SCSI
Port Term Power

Primary SCSI
Port Term Power

P18   P14       P17   P9

Bottom

ASLUP4-00

*Figure 100. Controller Card LEDs and SCSI Port Term Power Jumpers*

5. If the library is not connected to a host computer system and the SCSI
   terminators are installed, make sure the jumpers are installed at JP2 and JP9
   (Primary and Secondary SCSI Port Term Power) on the controller card. See
   Figure 100.

6. Make sure the SCSI ID Address cable is connected to each tape drive and the
   controller card P15. The longest SCSI ID address cable connects to Tape Drive
   1. The cable is connected to the tape drive with the alignment tap in the up
   position.



1        2        3
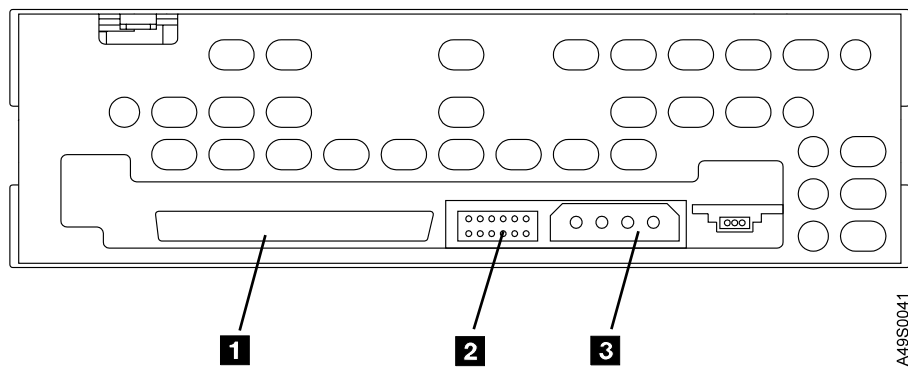
A49S0041

*Figure 101. SCSI ID Address Cable Connections*

The items in Figure 101 are:

Item  1  - SCSI Signal Cable.

Item  2  - SCSI ID Address Cable.

Item  3  - 4-pin Power Connector.

7. Connect any connectors that are not connected.

**Were there any loose connectors that were connected?**

**YES**        Do the following:

1. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

2. Go to "Step 7a."

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 7a

**Did the service actions correct the problems?**

**YES**        Return to the library service procedure that sent you here.

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 8, SAC 06

The SCSI bus reset (RST) line is stuck active.

1. Power-down the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

2. Remove the library right side cover. Go to "Library Cover Set Removal and Installation" on page 44.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

3. If the library is not connected to a host computer system and the SCSI terminators are installed, make sure the jumpers are installed at JP2 and JP9 (SCSI Port Term Power) on the controller card. See Figure 100 on page 126.

**Were any cables, terminators, or jumpers connected or installed in the previous step?**

**YES**        Do the following:

1. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

2. Go to "Step 8a" on page 128.

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 8a

**Did the service actions correct the problems?**

**YES**          Return to the library service procedure that sent you here.

**NO**          Go to "Step 3, SAC 01" on page 121.

## Step 9, SAC 07

Calibration problem. The location of the tape cartridges during calibration is not within the acceptable range.

1. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

   **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

2. Make sure the tape cartridges, tape cartridge magazines, and tape drives are properly installed.

**Were the tape cartridges, tape cartridge magazines, and tape drives all properly installed?**

**YES**          Go to "Step 3, SAC 01" on page 121.

**NO**          Do the following:

      1. Perform the necessary service actions to correct the problem.

      2. Perform calibration. Go to "Library Calibration" on page 28.

      3. Go to "Step 9a."

## Step 9a

**Did calibration pass?**

**YES**          Return to the library service procedure that sent you here.

**NO**          Go to "Step 3, SAC 01" on page 121.

## Step 10, SAC 08

Bar code reader error.

1. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

   **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

2. Make sure the bar code labels are of the correct type, properly applied, and have no visible print quality problems that prevent the label from being scanned correctly. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for bar code specifications.

**Were the bar code labels of the correct type, properly applied, and in good condition?**

**YES**          Go to "Step 3, SAC 01" on page 121 and use FRU Group 0A if a FRU Group was not previously assigned.

**NO**          Do the following:

          1. Perform the necessary actions to correct the problem.

          2. Perform calibration. Go to "Library Calibration" on page 28.

          3. Go to "Step 10a."

## Step 10a

**Did calibration pass?**

**YES**          Return to the library service procedure that sent you here.

**NO**          Go to "Step 3, SAC 01" on page 121 and use FRU Group 0A if a FRU Group was not previously assigned.

## Step 11, SAC 09

A door open condition is detected. The library front door open sensor is indicating that the door is open.

1. Make sure the library front door is closed. If the door appears to be closed, open and close the door.

**Did closing the door properly correct the problem?**

**YES**          Return to the library service procedure that sent you here.

NO            Go to "Step 3, SAC 01" on page 121.

## Step 12, SAC 10

The library detects a tape cartridge magazine is missing.  The presence of the tape cartridge magazine is sensed by a microswitch located behind the magazine.

1. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

   **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*


   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*


2. Make sure the tape cartridge magazines are present and properly seated in the magazine mounting plates.

**Did installing missing magazines or properly seating magazines correct the problem?**

YES            Return to the library service procedure that sent you here.

NO            Go to "Step 12a."

## Step 12a

1. Power-down the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

2. Remove the library right side cover. Go to "Library Cover Set Removal and Installation" on page 44.

3. Remove the tape cartridge magazines. Go to "Tape Cartridge Magazine Removal and Installation" on page 57.

   **DANGER**

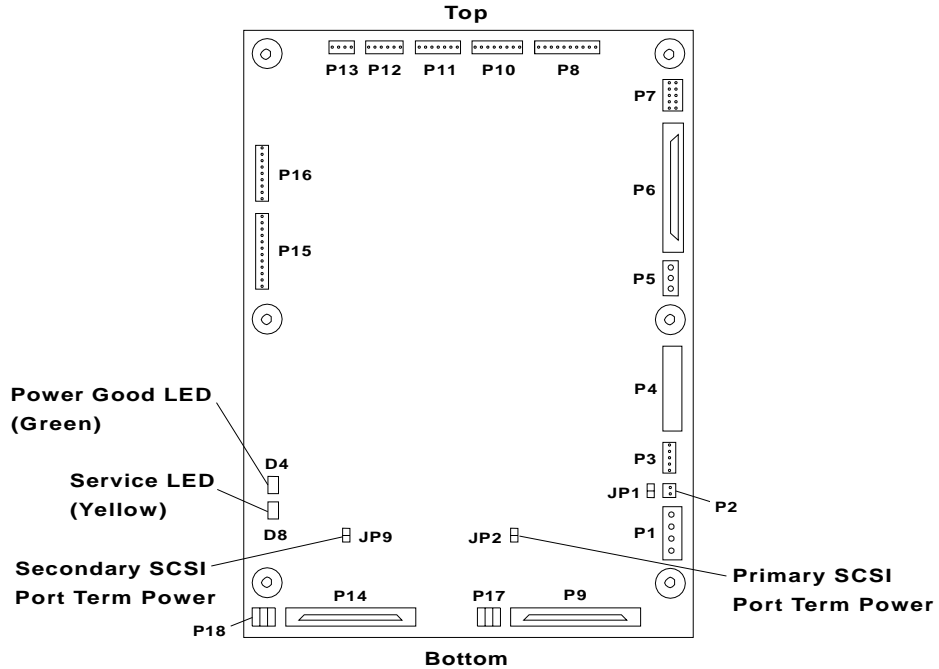   | **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.**  *(RSFTD204)* |
   | --- |


   **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.** *(RSFTD004)* |
   | --- |

4. Inspect the magazine sensor switches and the sensor cables connecting the sensors to the controller card (P11) for damage and loose connections.

5. Connect any connectors that are not connected or replace any damaged components.

**Were there any loose connectors that were connected or any components replaced?**

**YES**        Do the following:

        1. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

        2. Go to "Step 12b."

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 12b

**Did the service actions correct the problem?**

**YES**        Install the library covers and return to the library service procedure that sent you here.

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 13, SAC 11

An over temperature condition has been detected.

**Is the library cooling fan operating?**

**YES**        Go to "Step 13b."

**NO**        Go to "Step 3, SAC 01" on page 121.

## Step 13b

**Is the library cooling fan air flow blocked?**

**YES**        Do the following:

        1. Power-down the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

        2. Remove the obstruction.

        3. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

        4. If the error is cleared, this procedure is complete. Return to the library service procedure that sent you here.

        5. If the error has not cleared, go to "Step 13c" on page 132.

**NO**        Go to "Step 13c" on page 132.

# Step 13c

**Is the ambient temperature too high (5 to 40°C or 41 to 104°F)?**

**YES**         Do the following:

1. Lower the ambient temperature.

2. When the ambient temperature is at the correct level, power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*.

3. If the error is cleared, this procedure is complete. Return to the library service procedure that sent you here.

4. If the error has not cleared, go to "Step 3, SAC 01" on page 121.

**NO**         Go to "Step 3, SAC 01" on page 121.

# Step 14, SAC 12

An accessor locked condition has been detected.

1. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

2. Verify the accessor lock (blue plastic at top of accessor) is fully retracted.

**Is accessor lock fully retracted?**

**YES**         Go to "Step 3, SAC 01" on page 121.

**NO**         Do the following:

1. Retract and secure the accessor lock.

2. Make sure the accessor lock sensor cable is fully connected.

3. Close the library door.

4. If the service actions corrected the problem, return to the library service procedure that sent you here.

5. If the service actions did not correct the problem, go to "Step 3, SAC 01" on page 121.

## Step 15, SAC 13

Go to "History Log Display" on page 19 and verify the source and destination of the move.

**Is the destination full?**

**YES**        Do the following:

      1. Return to the operation.

      2. Choose an empty destination and continue the operation.

      3. If the error reoccurs, go to "Step 15a."

**NO**        Go to "Step 15a."

## Step 15a

Perform calibration. Go to "Library Calibration" on page 28.

**Does the problem still exist?**

**YES**        Go to "Step 3, SAC 01" on page 121 and use a FRU Group of 03.

**NO**        Return to the library service procedure that sent you here.

## Step 16, SAC 14

1. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

   **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*


   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*


2. Check for tape cartridge magazines that are not fully seated and tape cartridges that are not fully seated in magazine slots.

**Are all tape cartridge magazines and all tape cartridges fully seated?**

**YES**        Go to "Step 16a" on page 134.

**NO**        Go to "Step 16b" on page 134.

# Step 16a

**Is there a tape cartridge stuck in the picker assembly?**

**YES**          Do the following:

1. Go to "Removing a Tape Cartridge Stuck in the Picker" on page 104.

2. Make sure all cartridges are fully seated and the library is operational.

3. Power-on the library. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

4. If the error cleared, return to the library service procedure that sent you here.

5. If the error did not clear, go to "Step 3, SAC 01" on page 121.

**NO**          Go to "Step 5, SAC 03" on page 124.

# Step 16b

1. Make sure all tape cartridge magazines and all tape cartridges are fully seated.

2. Close the library door.

**Does the error clear?**

**YES**          If the error cleared, return to the library service procedure that sent you here.

**NO**          Go to "Step 16a."

# Step 17, SAC 15

1. Open the library front door. See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide*

   **Note:** As long as power is applied to the library, the move buttons located inside the library front door on the back of the control panel card can be used to move the picker assembly up and down.

   **CAUTION:**
   **Do not place a highly reflective surface between either the picker assembly and the tape cartridge magazines or between the picker assembly and the tape drives. This may cause damage to your eyes.** *(RSFTC238)*

   **CAUTION:**
   **If the automatic lock on the front door is not functioning and the door is open, do not look directly at the laser beam. Staring at the beam may cause damage to your eyes.** *(RSFTC239)*

2. If the picker is positioned in front of the tape drive, use the move buttons to reposition the picker away from the tape drives.

3. Press the tape drive unload button.
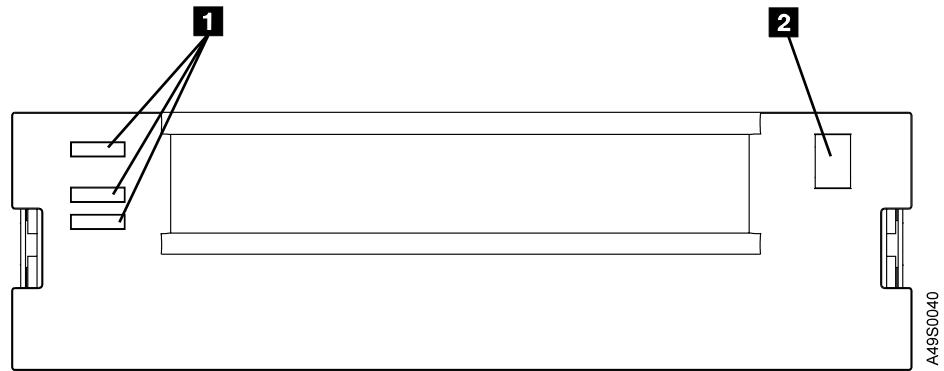
*Figure 102. Tape Drive Status Lights and Unload Button*

In Figure 102, Item  1  is the column of status lights made up of (top to bottom) DISTURBANCE, READY, and READ-WRITE indicators, and

Item  2  is the UNLOAD BUTTON.

**Did the tape drive eject a tape cartridge?**

**YES**      Do the following:

1. Close the library door.

2. Use the move command to move a tape cartridge to the problem tape drive.  See the *7331 and 3449 8mm Tape Library Model 3xx Operator Guide* for instructions on moving a tape cartridge.

3. Use the move command to move the tape cartridge from the problem tape drive to an empty slot.

4. If the error reoccurs, go to "Step 3, SAC 01" on page 121.

5. If the error cleared and does not reoccur, return to the library service procedure that sent you here.

**NO**      Go to "Step 17a."

## Step 17a

Open the tape drive door and check for a tape cartridge stuck in the drive.

**Is a tape cartridge stuck in the tape drive?**

**YES**      Perform the following:

1. Go to "Manually Removing a Tape Cartridge" on page 100.

2. Perform calibration. Go to "Library Calibration" on page 28.

3. If calibration failed, go to "Step 3, SAC 01" on page 121, except do not replace the tape drive if a new one was just installed.

4. If calibration passed, use the move command to move a tape cartridge to the tape drive then to an empty slot.

5. If the error reoccurs, go to "Step 3, SAC 01" on page 121, except do not replace the tape drive if a new one was just installed.

6. If the error cleared and does not reoccur, return to the library service procedure that sent you here.

**NO** Go to "Step 3, SAC 01" on page 121.

## PAP 4, Power System Check

This Problem Analysis Procedure verifies the integrity of the 7331 Tape Library power system. For information on power distribution within the library, refer to "Power Distribution" on page 9.



**Note:** The above symbol indicates appropriate caution to address in this "PAP 4, Power System Check" section of the manual.

## Step 1

1. If not already done, perform the following operations:

   a. Do a controlled system shutdown.
   b. Remove all library covers. Go to "Library Cover Set Removal and Installation" on page 44.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

   c. Install a jumper at JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.
   d. Unplug the library power cable from the power outlet.

2. If not already done, disconnect the following power cables:

   Power cable to the controller card
   Tape drive power cable to Tape Drive 1
   Tape drive power cable to Tape Drive 2

3. Make sure the power supply power-sense cable is connected to P2 on the controller card.

4. Plug the library power cable into a grounded outlet.

**Is the power supply fan is Off?** (Refer to Figure 103 on page 139.)

**YES**          Go to "Step 2" on page 138.

**NO**           Go to "Step 5" on page 138.

# Step 2

**Is this the first time to this step in this procedure?**

**YES**        Do the following:

       1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.

       2. Go to "Step 1" on page 137.

**NO**        Go to "Step 3."

# Step 3

**Is this the first time to this step in this procedure?**

**YES**        Do the following:

       1. Replace the controller card. Go to "Controller Card Removal and Installation" on page 74.

       2. Go to "Step 1" on page 137.

**NO**        Go to "Step 4."

# Step 4

1. Call the 8mm Tape Library service representative or the next level of support.

2. The problem was resolved with technical support assistance.

3. Make sure all cables are connected and all the library covers are installed.

4. Return to the library service procedure that sent you here or prepare library for operational use.

# Step 5

1. Unplug the library power cable from the power outlet.

2. Connect the power cable from the power supply to the controller card.

3. Make sure the power supply power-sense cable is connected to P2 on the controller card.

4. If the tape drive power cables to Tape Drive 1 and Tape Drive 2 are connected, disconnect them.

5. Plug the library power cable into a grounded outlet.

**Is the controller card Power Good LED (green) On?** (Refer to Figure 103 on page 139.)
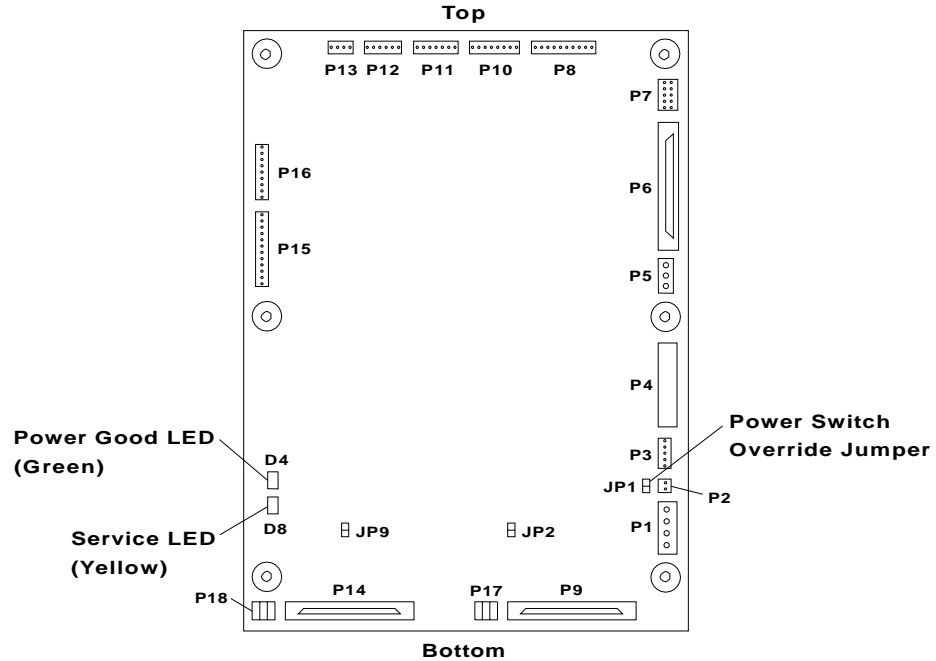
*Figure 103. Controller Card LEDs*

**YES**          Go to "Step 12" on page 140.

**NO**          Go to "Step 6."

## Step 6

**Do you have a voltmeter?**

**YES**          Go to "Step 7."

**NO**          Go to "Step 9" on page 140.

## Step 7

Measure the voltages on the controller card. Go to "Controller Card Voltage Measurement" on page 153.

**Are the voltages within tolerance?**

**YES**          Do the following:

          1. Replace the controller card. Go to "Controller Card Removal and Installation" on page 74.

          2. Go to "Step 5" on page 138

**NO**          Go to "Step 8."

## Step 8

1. Unplug the library power cable from the power outlet.

2. Disconnect the power cable to the controller card.

3. Measure the voltage on all of the power cables coming from the power supply. Go to "Power Supply Voltage Measurement" on page 152.

**Are the voltages within tolerance?**

**YES**           Go to "Step 12."

**NO**            Do the following:

      1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.
      2. Go to "Step 5" on page 138.

# Step 9

**Is this the first time to this step in this procedure?**

**YES**           Do the following:

      1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.

      2. Go to "Step 5" on page 138.

**NO**            Go to "Step 10."

# Step 10

**Is this the first time to this step in this procedure?**

**YES**           Do the following:

      1. Replace the controller card. Go to "Controller Card Removal and Installation" on page 74.

      2. Go to "Step 5" on page 138.

**NO**            Go to "Step 11."

# Step 11

1. Call the 8mm Tape Library service representative or the next level of support.

2. The problem was resolved with technical support assistance.

3. Make sure all cables are connected and all the library covers are installed.

4. Return to the library service procedure that sent you here or prepare library for operational use.

# Step 12

1. Unplug the library power cable from the power outlet.

2. Connect the tape drive power cable 1 to Tape Drive 1.

3. Plug the library power cable into a grounded outlet.

**Is the Controller Card Power Good LED (green) On?**

**YES**           Go to "Step 16" on page 142.

**NO**            Go to "Step 13" on page 141.

## Step 13

1. Unplug the library power cable from the power outlet.

2. Disconnect the tape drive power cable 1 from Tape Drive 1.

3. Connect the tape drive power cable 2 to Tape Drive 2.

4. Plug the library power cable into a grounded outlet.

**Is the Controller Card Power Good LED (green) On?**

**YES**        Go to "Step 14."

**NO**        Do the following:

      1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.

      2. Disconnect the tape drive power cables from Tape Drive 1 and Tape Drive 2.

      3. Go to "Step 12" on page 140.

## Step 14

1. Unplug the library power cable from the power outlet.

2. Disconnect the tape drive power cable 2 from Tape Drive 2.

3. Connect the tape drive power cable 2 to Tape Drive 1.

4. Plug the library power cable into a grounded outlet.

**Is the Controller Card Power Good LED (green) On?**

**YES**        Do the following:

      1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.

      2. Disconnect the tape drive power cables from Tape Drive 1 and Tape drive 2.

      3. Go to "Step 12" on page 140.

**NO**        Go to "Step 15."

## Step 15

**Is this the first time to this step in this procedure?**

**YES**        Do the following:

      1. Replace Tape Drive 1. Go to "Tape Drive Removal and Installation" on page 67.

      2. Go to "Step 12" on page 140.

**NO**        Do the following:

      1. Call the 8mm Tape Library service representative or the next level of support.

      2. The problem was resolved with technical support assistance.

      3. Make sure all cables are connected and all the library covers are installed.

> 4. Return to the library service procedure that sent you here or prepare library for operational use.

## Step 16

1. Unplug the library power cable from the power outlet.
2. If not already done, connect the tape drive power cable 1 to Tape Drive 1.
3. Connect the tape drive power cable 2 to Tape Drive 2.
4. Plug the library power cable into a grounded outlet.

**Is the Controller Card Power Good LED (green) On?**

**YES**   Go to "Step 20" on page 143.

**NO**   Go to "Step 17."

## Step 17

1. Unplug the library power cable from the power outlet.
2. Disconnect the tape drive power cable 1 from Tape Drive 1.
3. Plug the library power cable into a grounded outlet.

**Is the Controller Card Power Good LED (green) On?**

**YES**   Do the following:

>    1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.
>    2. Disconnect the tape drive power cables from Tape Drive 1 and Tape Drive 2.
>    3. Go to "Step 16."

**NO**   Go to "Step 18."

## Step 18

1. Unplug the library power cable from the power outlet.
2. Disconnect the tape drive power cable 2 from Tape Drive 2.
3. Connect the tape drive power cable 1 to Tape Drive 2.
4. Plug the library power cable into a grounded outlet.

**Is the Controller Card Power Good LED (green) On?**

**YES**   Do the following:

>    1. Replace the power supply. Go to "Power Supply Removal and Installation" on page 71.
>    2. Disconnect the tape drive power cables from Tape Drive 1 and Tape Drive 2.
>    3. Go to "Step 16."

**NO**   Go to "Step 19" on page 143.

# Step 19

**Is this the first time to this step in this procedure?**

**YES**        Do the following:

1. Replace Tape Drive 2. Go to "Tape Drive Removal and Installation" on page 67.

2. Go to "Step 12" on page 140.

**NO**        Do the following:

1. Call the 8mm Tape Library service representative or the next level of support.

2. The problem was resolved with technical support assistance.

3. Make sure all cables are connected and all the library covers are installed.

4. Return to the library service procedure that sent you here or prepare library for operational use.

# Step 20

1. Remove the jumper from JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.

2. Unplug the library power cable from the power outlet.

3. Replace any library covers removed during the power problem analysis procedure. Go to "Library Cover Set Removal and Installation" on page 44.

4. Plug the library power cable into a grounded outlet.

5. This procedure is complete, return to the library service procedure that sent you here.

## PAP 5, Control Panel Nonfunctional

This procedure is used to analyze a library that is not responding to any control panel input.

⚠

**Note:** The above symbol indicates appropriate caution to address in this "PAP 5, Control Panel Nonfunctional" section of the manual.

## Step 1

1. If you have not already done so, do a controlled system shutdown.

2. Open the control panel access cover and press the control panel power switch ( ⏻ ) to turn the library power Off.

3. Unplug the library power cord from the power outlet and wait 10 seconds. (Ensures a power supply reset.)

4. Plug the library power cord into a grounded power outlet.

5. Press the control panel power switch ( ⏻ ) to turn the library power On.

6. Press the control panel Up ( ⇧ ) or Down ( ⇩ ) button.

**Did the control panel respond when the buttons were pressed?**

**YES** Do the following:

1. The non-response condition is no longer present, and the cause of the problem cannot be determined at this time.

2. If the library covers are off, install the covers. Go to "Library Cover Set Removal and Installation" on page 44.

3. This procedure is complete, return to the library service procedure that sent you here.

**NO** Go to "Step 2."

## Step 2

1. Open the control panel access cover and press the control panel power switch ( ⏻ ) to turn the library power Off.

2. Remove all library covers. Go to "Library Cover Set Removal and Installation" on page 44.

3. If the library is not connected to a host computer system and the SCSI terminators are installed, make sure the jumpers are installed at JP2 and JP9 (Primary and Secondary SCSI Port Term Power) on the controller card.

**DANGER**

> **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

4. Make sure the library internal SCSI bus cables are connected and properly terminated. See "Internal SCSI Cable Group Removal and Installation" on page 78 for internal SCSI cable configuration and the *7331 and 3449 8mm Model 3xx Installation Guide* for the proper termination for your library configuration.

5. Make sure the SCSI ID Address cable is connected to each tape drive and the controller card P15. The longest SCSI ID address cable connects to Tape Drive 1. The cable is connected to the tape drive with the alignment dot in the up position.
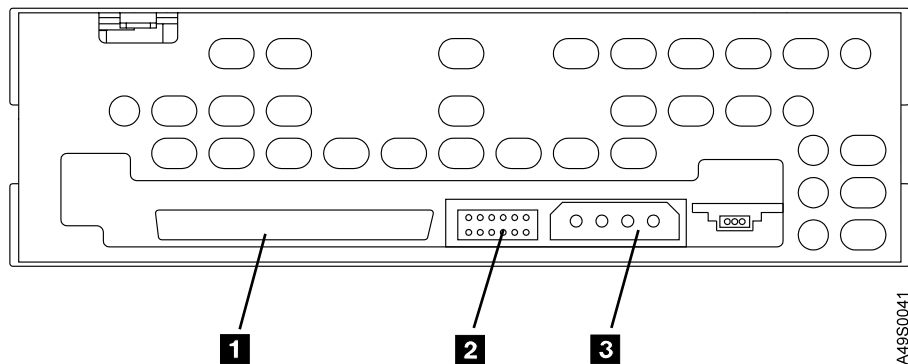


*Figure 104. SCSI ID Address Cable Connections*

The items identified in Figure 104 are as follows:

Item ⎯1⎯ - SCSI Signal Cable.

Item ⎯2⎯ - SCSI ID Address Cable.

Item ⎯3⎯ - 4-pin Power Connector.

**Were any cables connected in this step?**

**YES**          Do the following:

1. Open the control panel access cover and press the control panel power switch ( ⎔ ) to turn the library power On.

2. Press the control panel Up ( ⇧ ) or Down ( ⇩ ) button.

3. If control panel responds, go to "Step 3" on page 146.

4. If control panel does not respond, go to "Step 4" on page 146.

**NO**          Go to "Step 4" on page 146.

## Step 3

1. Press the control panel power switch ( ⬒ ) to turn the library power Off.
2. Install the library covers. Go to "Library Cover Set Removal and Installation" on page 44.
3. Press the control panel power switch ( ⬒ ) to turn the library power On.
4. This procedure is complete, return to the library service procedure that sent you here.

## Step 4

1. If the library power is not Off, press the control panel power switch ( ⬒ ) to turn the library power Off.
2. Disconnect the SCSI signal cable from Tape Drive 1.
3. Press the control panel power switch ( ⬒ ) to turn the library power On.
4. Press the control panel Up ( ⬑ ) or Down ( ⬐ ) button.

**Did the control panel respond when the buttons were pressed?**

**YES**      Do the following:

1. Replace Tape Drive 1. Go to "Tape Drive Removal and Installation" on page 67.
2. Make sure all cables are connected to Tape Drive 1.
3. Press the control panel power switch ( ⬒ ) to turn the library power On.
4. Press the control panel Up ( ⬑ ) or Down ( ⬐ ) button.
5. If control panel responds, go to "Step 3."
6. If control panel does not respond, go to "Step 5."

**NO**      Do the following:

1. Press the control panel power switch ( ⬒ ) to turn the library power Off.
2. Reconnect the SCSI signal cable to Tape Drive 1.
3. Go to "Step 5."

## Step 5

1. If the library power is not Off, press the control panel power switch ( ⬒ ) to turn the library power Off.
2. Disconnect the SCSI signal cable from Tape Drive 2.
3. Press the control panel power switch ( ⬒ ) to turn the library power On.
4. Press the control panel Up ( ⬑ ) or Down ( ⬐ ) button.

**Did the control panel respond when the buttons were pressed?**

**YES**      Do the following:

1. Replace Tape Drive 2. Go to "Tape Drive Removal and Installation" on page 67.
2. Make sure all cables are connected to Tape Drive 2.

3. Press the control panel power switch ( ⃝ ) to turn the library power On.

4. Press the control panel Up ( ⌃ ) or Down ( ⌄ ) button.

5. If control panel responds, go to "Step 3" on page 146.

6. If control panel does not respond, go to "Step 6."

**NO**        Do the following:

1. Press the control panel power switch ( ⃝ ) to turn the library power Off.

2. Reconnect the SCSI signal cable to Tape Drive 2.

3. Go to "Step 6."

# Step 6

1. If the library power is not Off, press the control panel power switch ( ⃝ ) to turn the library power Off.

2. Disconnect the internal SCSI cables from P9 and P14 on the controller card.

3. Press the control panel power switch ( ⃝ ) to turn the library power On.

4. Press the control panel Up ( ⌃ ) or Down ( ⌄ ) button.

**Did the control panel respond when the buttons were pressed?**

**YES**        Do the following:

1. Replace the controller card. Go to "Controller Card Removal and Installation" on page 74.

2. Make sure all cables are connected to controller card.

3. Press the control panel power switch ( ⃝ ) to turn the library power On.

4. Press the control panel Up ( ⌃ ) or Down ( ⌄ ) button.

5. If control panel responds:

     a. Perform library calibration, go to "Library Calibration" on page 28.

     b. Go to "Step 3" on page 146.

6. If control panel does not respond, go to "Step 7" on page 148.

**NO**        Do the following:

1. Press the control panel power switch ( ⃝ ) to turn the library power Off.

2. Connect the primary internal SCSI cable to P9 on the controller card and the secondary SCSI cable to P14 on the controller card. See "Internal SCSI Cable Group Removal and Installation" on page 78 for internal SCSI cable configuration.

3. Go to "Step 7" on page 148.

## Step 7

1. If the library power is not Off, press the control panel power switch ( ⊚ ) to turn the library power Off.

2. Disconnect the external SCSI cables at the back of the library.

3. Install jumpers at JP2 and JP9 (SCSI port term power) on the controller card. See Figure 105.
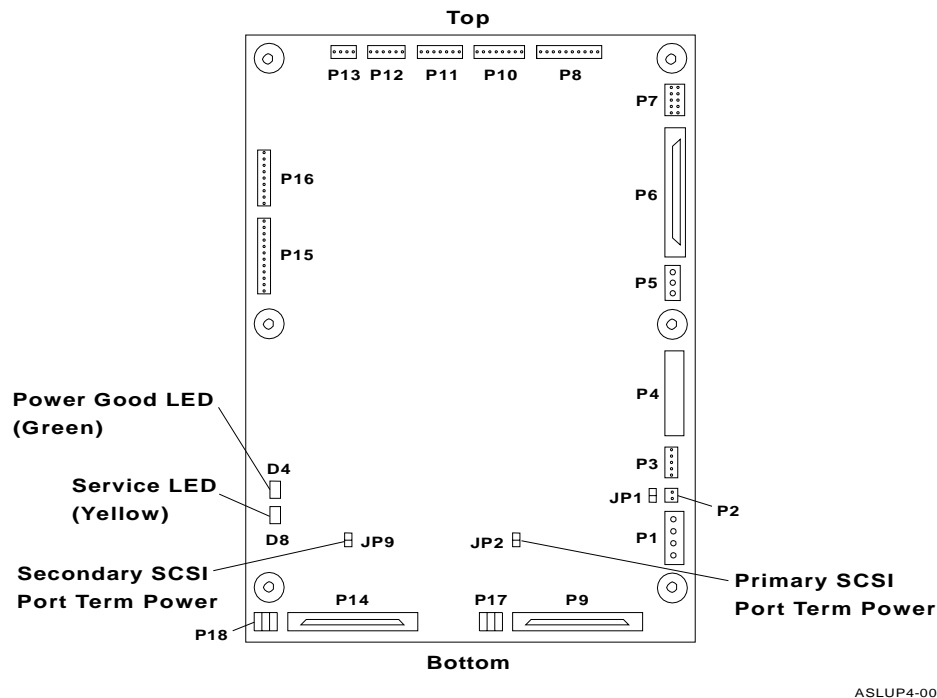


*Figure 105. Controller Card LEDs and SCSI Port Term Power Jumpers*

4. Press the control panel power switch ( ⊚ ) to turn the library power On.

5. Press the control panel Up ( ⬆ ) or Down ( ⬇ ) button.

**Did the control panel respond when the buttons were pressed?**

**YES**    Do the following:

1. Replace the internal SCSI cables. Go to "Internal SCSI Cable Group Removal and Installation" on page 78.

2. Make sure all internal and external SCSI cables are connected.

3. Remove the jumpers from JP2 and JP9 (SCSI port term power) on the controller card. See Figure 105.

4. Press the control panel power switch ( ⊚ ) to turn the library power On.

5. Press the control panel Up ( ⬆ ) or Down ( ⬇ ) button.

6. If control panel responds, go to "Step 3" on page 146.

7. If control panel does not respond, go to "Step 8" on page 149.

**NO**        Do the following:

1. Press the control panel power switch ( ⓞ ) to turn the library power Off.

2. Connect the external SCSI cables at the back of the library.

3. Remove the jumpers from JP2 and JP9 (SCSI port term power) on the controller card. See Figure 105 on page 148

4. Go to "Step 8."

# Step 8

1. If you have completed the service actions for all the FRUs in the FRU Group and the problem still exists, call the 8mm Tape Library service representative or the next level of support.

2. The problem was resolved with technical support assistance.

3. Make sure all cables are connected and all the library covers are installed.

4. Return to the library service procedure that sent you here or return the library to the operational mode it was in before the error condition.

# Power-Switch Override Jumper Installation and Removal

**Attention:** Do not enter the manual here unless you have been directed to do so by another procedure in this book.

**Note:** The above symbol indicates appropriate caution to address in this "Power-Switch Override Jumper Installation and Removal" section of the manual.

An installed controller card power-switch override jumper overrides the library power switch and turns on the library power supply when the library power cord is plugged into an outlet. The jumper should not be installed during normal operation.
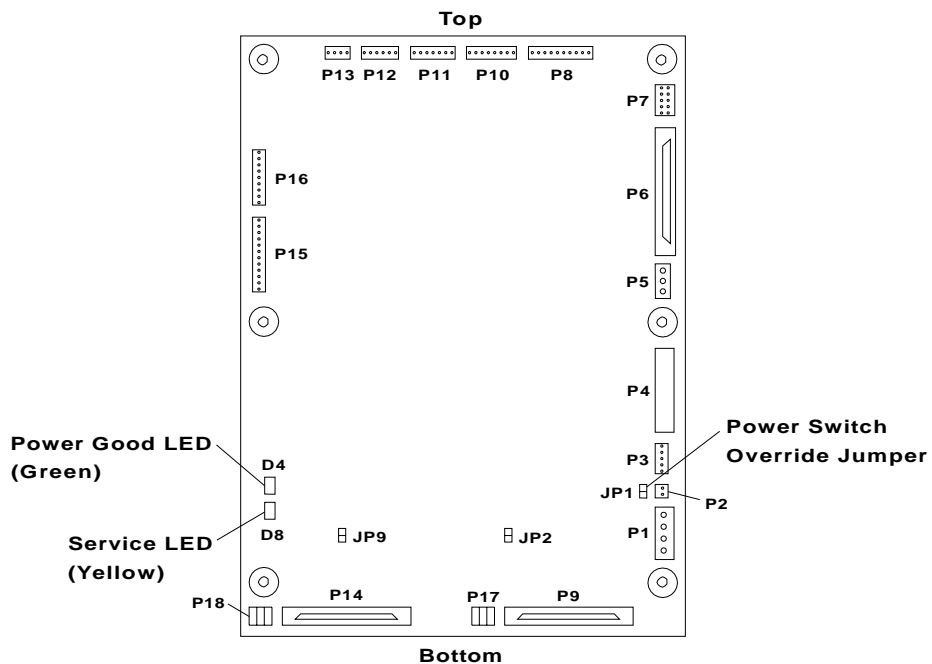


*Figure 106. Controller Card Power-Switch Override Jumper*

To install or remove the controller card power-switch override jumper (see Figure 106 on page 150), do the following:

1. Unplug the library power cord.

   **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

2. Carefully, remove or install the jumper at JP1 (power-switch override) on the controller card.

3. Plug the library power cord into a grounded outlet.

# Power Supply Voltage Measurement

⚠️

**Note:** The above symbol indicates appropriate caution to address in this "Power Supply Voltage Measurement" section of the manual.

**DANGER**

**To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

**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.** *(RSFTD004)*

**Attention:** Do not enter the manual here unless you have been directed to do so by another procedure in this book.

1. Make sure the following cables are disconnected:

    Power cable to the controller card

    Tape drive power cable to Tape Drive 1

    Tape drive power cable to Tape Drive 2

2. Make sure the power supply power-sense cable is connected to P2 on the controller card.

3. Install the jumper at JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.

4. Plug the library power cable into a grounded electrical outlet.

5. Using a voltmeter, carefully measure and record the following voltages on the power supply connectors. (See illustration below.)

    Measure the +12 volt position for +11.4 to +12.6 volts.

    Measure the +5 volt position for +4.75 to +5.25 volts.

**Power Supply Connector**

| ○ | ○ | ○ | ○ |
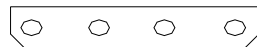
**+5v   Gnd   Gnd   +12v**

SC2F1-00

6. Remove the jumper from JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.

7. Return to the library service procedure that sent you here.

# Controller Card Voltage Measurement

**Attention:** Do not enter the manual here unless you have been directed to do so by another procedure in this book.



**Note:** The above symbol indicates appropriate caution to address in this "Controller Card Voltage Measurement" section of the manual.
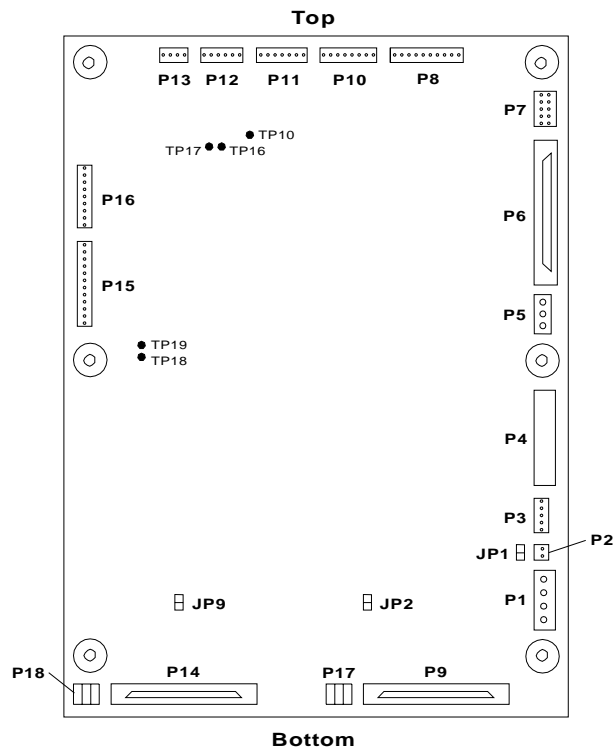


*Figure 107. Controller Card Voltage Test Points*

1. **DANGER**

   > **To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables.** *(RSFTD204)*

   **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.** *(RSFTD004)*

2. Make sure the power supply power-sense cable (see Figure 107 on page 153) is connected to P2 on the controller card.

3. Install a jumper at JP1 (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.

4. Plug the library power cable into a grounded electrical outlet.

5. Using a voltmeter, carefully measure and record the voltages as indicated in "Controller Card Voltage Measurement" on page 153.

| Figure 108. Controller Card Voltages | | | |
|---|---|---|---|
| **Test Point** | **Signal Name** | **Voltage Range** | **Description** |
| TP 10 | +12V | +11.4 to +12.6V | Power supply voltage monitor |
| TP 16 | -15V | -13.5 to -16.5V | Local inverter output monitor |
| TP 17 | -12V | -11.75 to -12.25V | Local regulator output monitor |
| TP 18 | +5V | +4.75 to +5.25V | Power supply voltage monitor |
| TP 19 | GND | | Signal ground |

6. Remove the jumper from JP1 on (power-switch override) on the controller card. Go to "Power-Switch Override Jumper Installation and Removal" on page 150.

7. Return to the procedure that sent you here.

# Appendix A.  Error Codes and Related Service Actions

## Unit Error Codes (UECs)

Figure 109 lists UEC codes generated by the 8mm Tape Library. Most of these UEC codes are returned in the SCSI Request Sense data and also displayed on the front panel. The table includes the FRU Group for each UEC.

**Attention: Do not** start 8mm Tape Library problem analysis with Figure 109. This table is used in support of other service tables and procedures, and is only used when it is referenced by those service procedures and tables.

## Error codes sorted by UEC

| Figure 109 (Page 1 of 7). Error codes sorted by UEC | | | | | | |
|---|---|---|---|---|---|---|
| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
| 0102 | 00 | Operation cancelled at control panel | 6 | 2A/01 | 02/01 | 00 |
| 0103 | 01 | Logical unit is in process of becoming ready | 2 | 04/01 | 06/01 | 05 |
| 0104 | 11 | Over temperature sensed on controller card | 2 | 04/92 | 15/01 | 0D |
| 0105 | 05 | Synchronous data transfer error | B | 1B/00 | 02/01 | 04 |
| 0106 | 01 | Cartridge present in magazine sensor error | 4 | 40/89 | 01/01 | 02 |
| 0114 | 01 | Degraded mode / RAM microcode not loaded | 4 | 4C/00 | 01/01 | 05 |
| 0115 | 01 | Degraded mode / RAM microcode incomplete | 4 | 40/85 | 01/01 | 05 |
| 011D | 00 | SCSI message error | B | 43/00 | 02/01 | 00 |
| 011E | 00 | SCSI message error | B | 43/00 | 02/01 | 00 |
| 0122 | 01 | Degraded mode / bringup successful | 4 | 40/80 | 01/01 | 05 |
| 012C | 01 | SBIC internal parity error | 4 | 44/00 | 01/01 | 05 |
| 012D | 01 | Cannot resume function | B | 44/00 | 02/01 | 05 |
| 0130 | 00 | Invalid command operation code | 5 | 20/00 | 09/01 | 00 |
| 0132 | 00 | Invalid field in CDB | 5 | 24/00 | 09/01 | 00 |
| 0133 | 00 | Logical unit not supported | 5 | 25/00 | 09/01 | 00 |
| 0134 | 00 | Invalid field in parameter list | 5 | 26/00 | 09/01 | 00 |
| 0135 | 00 | Parameter list length error | 5 | 1A/00 | 09/01 | 00 |
| 0136 | 00 | Load ID mismatch | 5 | 26/00 | 09/01 | 00 |
| 0137 | 00 | Invalid field in CDB | 5 | 24/00 | 09/01 | 00 |
| 0138 | 00 | Invalid field in parameter list | 5 | 26/00 | 09/01 | 00 |
| 013A | 00 | Invalid field in CDB | 5 | 24/00 | 09/01 | 00 |

| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
|------|-----|-----------------|------|-------|-------|-----|
| 013B | 00 | Downloaded microcode checksum failed | 5 | 26/02 | 09/01 | 00 |
| 0141 | 00 | Power On, Reset, or Bus device reset occurred | 6 | 29/00 | 05/01 | 00 |
| 0142 | 00 | Unit attention - Mode parameters changed | 6 | 2A/01 | 02/01 | 00 |
| 0144 | 00 | Commands cleared by another initiator | 6 | 2F/00 | 02/01 | 00 |
| 0145 | 00 | Power on, Reset, or Bus device reset occurred | 6 | 29/00 | 05/01 | 00 |
| 0146 | 00 | Inquiry data has changed | 6 | 3F/03 | 02/01 | 00 |
| 0148 | 00 | Inventory changed by operator or another initiator | 6 | 28/80 | 02/01 | 00 |
| 0149 | 00 | Unit attention - Log changed | 6 | 2A/02 | 02/01 | 00 |
| 014A | 00 | Unit Attention - Mode changed | 6 | 2A/01 | 02/01 | 00 |
| 014B | 01 | Generic microprocessor error | 4 | 40/81 | 01/01 | 05 |
| 014C | 01 | Microprocessor PCM register error | 4 | 40/81 | 01/01 | 05 |
| 014D | 01 | Microprocessor timer error | 4 | 40/81 | 01/01 | 05 |
| 014E | 01 | Microprocessor stack error | 4 | 40/81 | 01/01 | 05 |
| 014F | 01 | ROS microcode checksum error | 4 | 40/81 | 01/01 | 05 |
| 0150 | 01 | Control store RAM error | 4 | 40/80 | 01/01 | 05 |
| 0151 | 01 | NVRAM clock error | 4 | 40/82 | 01/01 | 05 |
| 0152 | 01 | NVRAM error | 4 | 40/88 | 17/01 | 05 |
| 0153 | 01 | SCSI port #1 BIST never finished | 4 | 40/83 | 01/01 | 05 |
| 0154 | 01 | SCSE port #2 BIST never finished | 4 | 40/84 | 01/01 | 05 |
| 0155 | 01 | SCSI port #1 BIST error | 4 | 40/83 | 01/01 | 05 |
| 0156 | 01 | SCSI port #2 BIST error | 4 | 40/84 | 01/01 | 05 |
| 0157 | 01 | SCSI port #1 BIST flag error | 4 | 40/83 | 01/01 | 05 |
| 0158 | 01 | SCSI port #2 BIST flag error | 4 | 40/84 | 01/01 | 05 |
| 0159 | 01 | SCSI port #1 dual port RAM error | 4 | 40/83 | 01/01 | 05 |
| 015A | 01 | SCSI port #2 dual port RAM error | 4 | 40/84 | 01/01 | 05 |
| 015B | 01 | FPGA DONE Not Active Error | 4 | 40/8C | 01/01 | 05 |
| 015C | 01 | Accessor motor controller R/W register test error | 4 | 40/86 | 01/01 | 05 |
| 015D | 01 | UART error | 4 | 40/8D | 01/01 | 05 |
| 015E | 06 | Barcode scanner error | 4 | 40/87 | 01/01 | 0A |
| 015F | 00 | SCSE RESET deassertion timeout | 4 | 00/00 | 01/01 | 00 |
| 0160 | 00 | Initiator detected error message received | B | 48/00 | 09/01 | 00 |
| 0161 | 00 | SCSI parity error (cmd or data) | B | 47/00 | 02/01 | 00 |
| 0162 | 00 | Overlapped commands attempted | B | 4E/00 | 09/01 | 00 |
| 0163 | 01 | LCD error | 4 | 40/88 | 01/01 | 09 |

Figure 109 (Page 2 of 7). Error codes sorted by UEC

| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
|-----|-----|-----------------|------|------|------|------|
| | | *Figure 109 (Page 3 of 7). Error codes sorted by UEC* | | | | |
| 0164 | 01 | Upper-Lower limit sensor conflict | 4 | 40/89 | 01/01 | 0B |
| 0165 | 01 | Generic sensor error | 4 | 40/89 | 01/01 | 0B |
| 0166 | 03 | Acsr motor overcurrents detected | 4 | 40/8B | 01/01 | 01 |
| 0167 | 04 | Uncontrollable accessor | 4 | 40/8B | 01/01 | 01 |
| 0168 | 01 | Incompatible hardware | 4 | 40/8C | 01/01 | 05 |
| 0169 | 02 | Feed motor overcurrents detected | 4 | 40/8A | 01/01 | 02 |
| 016A | 02 | Pick motor overcurrents detected | 4 | 40/8A | 01/01 | 02 |
| 016B | 04 | Acsr motor out of control detect | 4 | 40/8B | 01/01 | 01 |
| 016C | 01 | Feed motor out of control detect | 4 | 40/8A | 01/01 | 02 |
| 016D | 01 | Internal target failure - Unexpected bus free | 4 | 44/00 | 01/01 | 05 |
| 016E | 01 | Pick motor out of control detect | 4 | 40/8A | 01/01 | 02 |
| 016F | 01 | Bar scanner not present error | 4 | 40/87 | 01/01 | 0A |
| 0170 | 00 | Abnormal termination, Abort message received | n/a | 00/00 | 00/00 | 00 |
| 0171 | 00 | Different LUN addressed (ID Message) from first selected | B | 25/00 | 09/01 | 00 |
| 0172 | 00 | SCSI Message error | B | 43/00 | 02/01 | 00 |
| 0173 | 00 | Select or Reselect failure | B | 45/00 | 01/01 | 00 |
| 0174 | 00 | SCSI parity error (msg out) | B | 47/00 | 02/01 | 00 |
| 0175 | 00 | Initiator detected error | B | 48/00 | 09/01 | 00 |
| 0176 | 00 | Invalid message error | B | 49/00 | 09/01 | 00 |
| 0177 | 00 | SCSI message error | B | 43/00 | 02/01 | 00 |
| 0178 | 00 | SCSI message error | B | 43/00 | 02/01 | 00 |
| 0179 | 00 | Reserved bits in identify message not 0 | 5 | 3D/00 | 09/01 | 00 |
| 017A | 00 | SCSI parity error detected by initiator | B | 47/00 | 02/01 | 00 |
| 017B | 05 | Internal target failure - SCSI interrupt invalid | 4 | 44/00 | 01/01 | 05 |
| 017C | 00 | Abort tag message received | n/a | 00/00 | 05/01 | 00 |
| 017D | 00 | Clear queue tag message received | n/a | 00/00 | 05/01 | 00 |
| 017E | 01 | NVRAM watch dog timer error | 4 | 40/82 | 01/01 | 05 |
| 017F | 01 | NVRAM battery error | 4 | 40/82 | 01/01 | 05 |
| 0180 | 01 | GA ram error | 4 | 40/8C | 01/01 | 05 |
| 0181 | 04 | Acsr motor error | 4 | 40/8B | 01/01 | 01 |
| 0182 | 01 | Feed motor error | 4 | 40/8A | 01/01 | 02 |
| 0183 | 01 | Pick motor error | 4 | 40/8A | 01/01 | 02 |
| 0184 | 01 | Cool fan error | 4 | 40/8E | 01/01 | 0D |
| 0185 | 01 | Upper travel limit error | 4 | 40/89 | 01/01 | 0B |
| 0186 | 01 | Lower travel limit error | 4 | 40/89 | 01/01 | 0B |
| 0187 | 01 | Accessor overcurrent sensor error | 4 | 40/8B | 01/01 | 01 |

| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
|---|---|---|---|---|---|---|
| | | Figure 109 (Page 4 of 7). Error codes sorted by UEC | | | | |
| 0188 | 01 | Accessor motor move error | 4 | 40/8B | 01/01 | 01 |
| 0189 | 01 | Feed belt warning sensor | 4 | 40/8A | 01/01 | 02 |
| 018A | 02 | Feed belt overcurrent sensor | 4 | 40/8A | 01/01 | 02 |
| 018B | 02 | Feed belt move error | 4 | 40/8A | 01/01 | 02 |
| 018C | 01 | Pinch cam position sensor error | 4 | 40/8A | 01/01 | 02 |
| 018D | 01 | OP Panel presence error | 4 | 40/88 | 01/01 | 09 |
| 018E | 00 | No empty slots in the library (manual move) | 5 | 3B/0D | 0D/01 | 00 |
| 018F | 00 | No tapes in the library | 5 | 3B/0E | 0D/01 | 00 |
| 0190 | 01 | Invalid SCSI opcode (internal) | 4 | 40/B0 | 01/01 | 05 |
| 0191 | 01 | Accessor obstructed sensor error | 4 | 40/93 | 01/01 | 0B |
| 0192 | 01 | Feed belt tach error | 4 | 40/94 | 01/01 | 02 |
| 0197 | 01 | No task available | 4 | 40/B0 | 01/01 | 05 |
| 0199 | 01 | Diagnostic failure SCSI port reset unsuccessful | 4 | 40/B0 | 01/01 | 05 |
| 019A | 01 | Diagnostic failure stack has overflowed | 4 | 40/B0 | 01/01 | 05 |
| 019B | 01 | Diagnostic failure divide by zero Interrupt | 4 | 40/B0 | 01/01 | 05 |
| 019C | 01 | Diagnostic failure invalid program counter | 4 | 40/B0 | 01/01 | 05 |
| 019D | 01 | Illegal CPU instruction error | 4 | 40/B0 | 01/01 | 05 |
| 019F | 01 | SCSI invalid queue operation | 4 | 40/B0 | 01/01 | 05 |
| 01A0 | 14 | Accessor path not clear | 2 | 04/8F | 0F/01 | 00 |
| 01A1 | 00 | Changed operating definition | 6 | 3F/02 | 02/01 | 00 |
| 01A2 | 00 | Command phase error | B | 4A/00 | 02/01 | 00 |
| 01A3 | 00 | Command sequence error | 5 | 2C/00 | 09/01 | 00 |
| 01A4 | 00 | Data phase error | B | 4B/00 | 02/01 | 00 |
| 01A6 | 00 | Invalid bits in identify message | B | 3D/00 | 09/01 | 00 |
| 01A7 | 00 | Invalid element address | 5 | 21/01 | 09/01 | 00 |
| 01A8 | 00 | I/O process terminated | B | 00/06 | 09/01 | 00 |
| 01A9 | 00 | Log counter at maximum | 6 | 5B/02 | 08/05 | 00 |
| 01AA | 00 | Log list codes exhausted | 5 | 5B/03 | 09/01 | 00 |
| 01AB | 01 | Logical unit failed self-configuration | 4 | 4C/00 | 01/01 | 05 |
| 01AC | 00 | Logical unit not ready, cause not reportable | 2 | 04/00 | 06/01 | 00 |
| 01AD | 00 | Logical unit not ready, manual intervention required | 2 | 04/03 | 06/01 | 00 |
| 01AE | 01 | Mechanical positioning error | 4 | 15/01 | 01/01 | 01 |
| 01AF | 15 | media load or eject failed | 4 | 53/00 | 06/01 | 0E |
| 01B0 | 15 | Media load or eject failed | 2 | 53/00 | 06/01 | 0E |
| 01B1 | 13 | Medium destination element full | 5 | 3B/0D | 0A/01 | 00 |

| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
|------|-----|---|---|---|---|---|
| 01B1 | 00 | Medium not present | | | | 00 |
| 01B3 | 00 | Medium removal prevented | 5 | 53/02 | 09/01 | 00 |
| 01B4 | 04 | Medium source element empty | 5 | 3B/0E | 0A/01 | 00 |
| 01B7 | 00 | Not ready to ready transition, medium may have changed | 6 | 28/00 | 02/01 | 00 |
| 01B9 | 00 | parameter not supported | 5 | 26/01 | 09/01 | 00 |
| 01BA | 00 | Parameter value invalid | 5 | 26/02 | 09/01 | 00 |
| 01BB | 00 | Rounded parameter | 1 | 37/00 | 05/01 | 00 |
| 01BC | 00 | Saving parameters not supported | 5 | 39/00 | 09/01 | 00 |
| 01BD | 00 | Threshold condition met | 6 | 5B/01 | 08/05 | 00 |
| 01BE | 00 | Threshold parameters not supported | 5 | 26/03 | 09/01 | 00 |
| 01BF | 09 | Open door | 2 | 04/85 | 10/01 | 08 |
| 01C0 | 10 | Cartridge holder is missing | 2 | 04/86 | 11/01 | 0C |
| 01C1 | 00 | In manual mode | 2 | 04/8D | 06/01 | 00 |
| 01C2 | 00 | In sequential mode | 2 | 04/8E | 06/01 | 00 |
| 01C3 | 02 | Pick error | 4 | 81/12 | 01/01 | 02 |
| 01C4 | 02 | Place error | 4 | 82/22 | 01/01 | 02 |
| 01C5 | 05 | SCSI error communicating to tape drive | 4 | 90/00 | 01/01 | 0E |
| 01C6 | 00 | Error log overflow | 6 | 0A/00 | 08/05 | 00 |
| 01C7 | 00 | Medium in picker (unable to scan barcodes) | 2 | 04/90 | 0A/01 | 00 |
| 01C8 | 03 | Move error | 4 | 85/50 | 01/01 | 02 |
| 01C9 | 00 | Medium in drive | 5 | 3B/0D | 0E/01 | 00 |
| 01CA | 00 | Element reserved by another initiator | n/a | 80/00 | 00/00 | 00 |
| 01CB | 00 | Element status unknown - Initialize element status required | n/a | 81/00 | 0B/01 | 00 |
| 01CC | 00 | Drive not present | n/a | 82/00 | 00/00 | 00 |
| 01CD | 00 | Medium loaded in drive (unable to access) | 2 | 83/00 | 0E/01 | 00 |
| 01CE | 00 | Need to calibrate tape locations | 2 | 06/00 | 13/01 | 00 |
| 01CF | 08 | Barcode read error | n/a | 11/00 | 16/01 | 0A |
| 01D0 | 12 | Accessor is locked | 2 | 04/91 | 14/01 | 0B |
| 01D1 | 02 | Medium in picker | 5 | 3B/80 | 01/01 | 00 |
| 01D2 | 00 | No usable cleaning tape in library | n/a | 00/00 | 12/01 | 00 |
| 01D3 | 00 | Calibrate failed (missing cartridges) | n/a | 00/00 | 0D/01 | 00 |
| 01D4 | 00 | Calibrate failed (miscounted) | n/a | 00/00 | 0D/01 | 00 |
| 01D5 | 07 | Calibrate failed (did not match table) | n/a | 00/00 | 01/01 | 0C |
| 01D6 | 01 | Generic drive communication problem | 4 | 90/00 | 01/01 | 0E |
| 01D7 | 01 | Drive comm. Invalid SCSI opcode | 4 | 90/00 | 01/01 | 05 |

*Figure 109 (Page 5 of 7). Error codes sorted by UEC*

| Figure 109 (Page 6 of 7). Error codes sorted by UEC | | | | | | |
|------|-----|-------------------------------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|
| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
| 01D8 | 01 | Drive comm. Unexpected SCSI port number | 4 | 90/00 | 01/01 | 05 |
| 01D9 | 05 | Drive comm. Unexpected SCSI bus phase | 4 | 90/00 | 01/01 | 0E |
| 01DA | 01 | Drive comm. SBIC rejected start | 4 | 90/00 | 01/01 | 05 |
| 01DB | 01 | Drive comm. Sequence address other than expected | 4 | 90/00 | 01/01 | 05 |
| 01DC | 05 | Drive comm. Selection timeout | 4 | 90/00 | 01/01 | 0E |
| 01DD | 05 | Drive comm. Unexpected bit in stopu register | 4 | 90/00 | 01/01 | 0E |
| 01DE | 05 | Drive comm. Unexpected bit in uei register | 4 | 90/00 | 01/01 | 05 |
| 01DF | 00 | Drive comm. Target mode interrupt pending | 4 | 90/00 | 01/01 | 00 |
| 01E0 | 01 | Cartridge travel warning sensor | 4 | 04/8A | 01/01 | 02 |
| 01E1 | 05 | Drive 1 error | 4 | 90/00 | 18/01 | 0E |
| 01E2 | 05 | Drive 1 present error | 4 | 90/00 | 18/01 | 0E |
| 01E3 | 05 | Drive 1 third error | 4 | 90/00 | 18/01 | 0E |
| 01E4 | 05 | Drive 2 error | 4 | 90/00 | 18/01 | 0E |
| 01E5 | 05 | Drive 2 present error | 4 | 90/00 | 18/01 | 0E |
| 01E6 | 05 | Drive 2 third error | 4 | 90/00 | 18/01 | 0E |
| 01E7 | 00 | High SRAM error | 4 | 40/81 | 01/01 | 05 |
| 01E8 | 00 | Invalid packet from scanner | 4 | 40/87 | 01/01 | 0A |
| 01E9 | 00 | No transmit ready from UART | 4 | 40/87 | 01/01 | 05 |
| 01EA | 00 | Scanner - no CMDACK for CAPREQUEST | 4 | 40/87 | 01/01 | 0A |
| 01EB | 00 | Scanner - Timeout waiting for RTS | 4 | 40/87 | 01/01 | 0A |
| 01EC | 00 | Scanner - Timeout waiting for packet | 4 | 40/87 | 01/01 | 0A |
| 01ED | 00 | Scanner - Packet receive error (bad UART status) | 4 | 40/87 | 01/01 | 0A |
| 01EE | 00 | Scanner - Error sending IDREPLY | 4 | 40/87 | 01/01 | 0A |
| 01EF | 00 | Scanner - Error sending CMDACK | 4 | 40/87 | 01/01 | 0A |
| 01F0 | 00 | Scanner - Error sending ATN | 4 | 40/87 | 01/01 | 0A |
| 01F1 | 01 | Scanner - Error sending STORECAP | 4 | 40/87 | 01/01 | 0A |
| 01F2 | 01 | Scanner - Error sending CAPREQUEST | 4 | 40/87 | 01/01 | 0A |
| 01F3 | 01 | Scanner - no CMDACK received for ATN packet | 4 | 40/87 | 01/01 | 0A |
| 01F4 | 01 | Scanner - Expected IDREQUEST not received | 4 | 40/87 | 01/01 | 0A |
| 01F5 | 01 | Scanner - No CMDACK for IDREPLY packet | 4 | 40/87 | 01/01 | 0A |
| 01F6 | 01 | Scanner - No CMDACK for STORECAP packet | 4 | 40/87 | 01/01 | 0A |

Figure 109 (Page 7 of 7). Error codes sorted by UEC

| UEC | SAC | UEC Description | Sense Key Byte 2, Bits 3-0 | ASC/ ASCQ Bytes 12/13 | RAC/ BRAC Bytes 21/22 | FRU Group Byte 14 |
|------|-----|-----------------|------|------|------|------|
| 01F7 | 01 | Scanner - No CAPREPLY packet received | 4 | 40/87 | 01/01 | 0A |
| 01F8 | 01 | Scanner - Expected CAPREQUEST not received | 4 | 40/87 | 01/01 | 0A |
| 01F9 | 01 | RTS active at entry to xmit | 4 | 40/87 | 01/01 | 0A |
| 01FA | 00 | Codeload - No valid code load tape | | | | 0A |
| 0200 | 00 | Invalid Split source element | 5 | 24/82 | 09/01 | 00 |
| 0201 | 00 | Invalid Split destination element | 5 | 24/83 | 09/01 | 00 |
| 0202 | 00 | Inaccessable Split element | n/a | 80/02 | 00/00 | 00 |
| 0203 | 00 | Manual mode in Split configuration | 5 | 24/85 | 09/01 | 00 |
| 0210 | 00 | SCSI ID overlay error | n/a | 90/00 | 20/01 | 00 |

**Note:**

1. The unit error code (UEC) is described in this table.

2. The service action code (SAC) cross references to Figure 99 on page 120 for a specific service actions required for the reported UEC.

3. The field replacement unit (FRU) group code cross references to Figure 110 on page 161 for failing FRUs associated with the reported UEC.

## FRU Group Codes

Figure 110 lists the library field replaceable unit (FRU) Group codes that are reported to the system unit in SCSI Request Sense data when a library assembly fails. The possible failing FRUs for the FRU Group are listed with their probability of correcting the problem.

**Attention: Do not** start 8mm Tape Library problem analysis with Figure 110. This table is used in support of other service tables and procedures, and is only used when it is referenced by those service procedures and tables.

Figure 110 (Page 1 of 2). 8mm Tape Library FRU Group Codes with Failing FRU Probabilities

| FRU Group | Failing FRU | IBM P/N | Probability (%) |
|-----------|-------------|---------|-----------------|
| 00 | Reserved | | |
| 01 | Accessor Assembly | 86G9258 | 75 |
| | Sensor Group | 86G9260 | 10 |
| | Controller Card | 59H3410 | 10 |
| | Other | - | 5 |
| 02 | Picker Assembly w/ umbilical cable | 59H3409 | 75 |
| | Accessor Assembly | 86G9258 | 20 |
| | Controller Card | 59H3410 | 5 |

| FRU Group | Failing FRU | IBM P/N | Probability (%) |
|---|---|---|---|
| 03 | Picker Assembly w/ umbilical cable | 59H3409 | 75 |
|  | Accessor Assembly | 86G9258 | 20 |
|  | Controller Card | 59H3410 | 5 |
| 04 | Controller Card | 59H3410 | 95 |
|  | Internal SCSI Cable Group | 86G9255 | 5 |
| 05 | Controller Card | 59H3410 | 100 |
| 06 | Picker Assembly w/ umbilical cable | 59H3409 | 55 |
|  | Accessor Assembly | 86G9258 | 35 |
|  | Sensor Group | 86G9260 | 10 |
|  | Other | - | 5 |
| 07 | Reserved |  |  |
| 08 | Control Panel Assembly | 87G1531 | 40 |
|  | Control Panel Cable | 87G1554 | 40 |
|  | Front Door Assembly | 59H3408 | 20 |
| 09 | Control Panel Assembly | 87G1531 | 55 |
|  | Control Panel Cable | 87G1554 | 40 |
|  | Controller Card | 59H3410 | 5 |
| 0A | Bar Code Reader | 44H3620 | 70 |
|  | Picker Assembly w/ umbilical cable | 59H3409 | 20 |
|  | Controller Card | 59H3410 | 10 |
| 0B | Sensor Group | 86G9260 | 95 |
|  | Controller Card | 59H3410 | 5 |
| 0C | Magazine Mounting Plate | 86G9299 | 70 |
|  | Magazine | 86G9310 | 25 |
|  | Controller Card | 59H3410 | 5 |
| 0D | Fan Assembly | 86G9326 | 95 |
|  | Controller Card | 59H3410 | 5 |
| 0E | Tape Drive | 59H2842 | 60 |
|  | Internal SCSI Cable Group | 87G1885 | 35 |
|  | Controller Card | 59H3410 | 5 |
| 10-FF | Reserved |  |  |

*Figure 110 (Page 2 of 2). 8mm Tape Library FRU Group Codes with Failing FRU Probabilities*

**Note:**

1. IBM part number cross references to Figure 111 on page 163 for a description of the Failing Item and any required service actions.

# Failing Items and Related Service Actions

**Attention: Do not** start 8mm Tape Library problem analysis with Figure 111. This table is used in support of other service tables and procedures, and is only used when it is referenced by those service procedures and tables.

*Figure 111 (Page 1 of 4). Failing Items and Related Service Actions*

| Failing Item IBM P/N | Description | Service Action |
|---|---|---|
| A0B00E0 | Licensed Internal Code for the programmable tape drive | Service Functions; APAR or LICTR |
| AJSLC01 | I/O processor Licensed Internal Code | Service Functions; APAR or LICTR |
| FI01140 | External SCSI Cable | Do the following: 1. Replace the cable. 2. Return to the service procedure that sent you here. |
| LIBDEV | Library Device | Do the following: 1. Go to "Analysis Starting Point" on page 107. 2. Return to the service procedure that sent you here. |
| 59H2678 | Defective tape | Do the following: 1. Replace the tape. 2. Return to the service procedure that sent you here. |
| ULYWAIT | Wait to next IPL or perform TU-PIP4 | Problem Analysis |
| 17G9134 | Terminating plug | Do the following: 1. Replace the SCSI bus terminator. 2. Return to the service procedure that sent you here. |
| 86G1554 | Control Panel Cable | Do the following: 1. Go to "Control Panel Cable Removal and Installation" on page 54. 2. Return to the service procedure that sent you here. |
| 59H2842 | Tape Drive Assembly | Do the following: 1. Go to "Tape Drive Removal and Installation" on page 67. 2. Return to the service procedure that sent you here. |

| Figure 111 (Page 2 of 4). Failing Items and Related Service Actions | | |
|---|---|---|
| **Failing Item** | | |
| **IBM P/N** | **Description** | **Service Action** |
| 59H3409 | Picker Assembly w/ umbilical cable | Do the following: <br><br> 1. Go to "Picker (Assembly & Umbilical Cable) Removal and Installation" on page 83. <br><br> 2. Return to the service procedure that sent you here. |
| 59H3410 | Controller Card | Do the following: <br><br> 1. Go to "Controller Card Removal and Installation" on page 74. <br><br> 2. Return to the service procedure that sent you here. |
| 86G9255 | Internal SCSI Cable Group | Do the following: <br><br> 1. Go to "Internal SCSI Cable Group Removal and Installation" on page 78. <br><br> 2. Return to the service procedure that sent you here. |
| 86G9258 | Accessor Assembly | Do the following: <br><br> 1. Go to "Accessor Assembly Removal and Installation" on page 91. <br><br> 2. Return to the service procedure that sent you here. |
| | Power Cord | Do the following: <br><br> 1. Refer to Figure 127 on page 205. |
| 86G9260 | Sensor Group (Accessor Obstructed, Accessor Travel Limit, Accessor Lock with Cables) | Do the following: <br><br> 1. Go to "Sensor Group Removal and Installation" on page 96. <br><br> 2. Return to the service procedure that sent you here. |
| 86G9274 | Power supply | Do the following: <br><br> 1. Go to "Power Supply Removal and Installation" on page 71. <br><br> 2. Return to the service procedure that sent you here. |
| 86G9299 | Magazine Mount Plate Assembly (includes Sensors and Cables) | Do the following: <br><br> 1. Go to 10 on page 60. <br><br> 2. Return to the service procedure that sent you here. |

| Figure 111 (Page 3 of 4). Failing Items and Related Service Actions | | |
|---|---|---|
| **Failing Item** | | |
| **IBM P/N** | **Description** | **Service Action** |
| 86G9310 | Magazine | Do the following:<br><br>1. Go to "Tape Cartridge Magazine Removal and Installation" on page 57.<br><br>2. Return to the service procedure that sent you here. |
| 86G9312 | 2 Slot Cartridge Holder | Do the following:<br><br>1. Go to "2-Slot Cartridge Holder Removal and Installation" on page 62.<br><br>2. Return to the service procedure that sent you here. |
| 86G9326 | Fan Assembly | Do the following:<br><br>1. Go to "Fan Assembly Removal and Installation" on page 64.<br><br>2. Return to the service procedure that sent you here. |
| 44H3620 | Bar Code Reader Assembly | Do the following:<br><br>1. Go to "Bar Code Reader Removal and Installation" on page 88.<br><br>2. Return to the service procedure that sent you here. |
| 87G1531 | Control Panel Assembly | Do the following:<br><br>1. Go to "Control Panel Assembly Removal and Installation" on page 51.<br><br>2. Return to the service procedure that sent you here. |
| 87G1601 | SCSI Jumper | Do the following:<br><br>1. Replace the SCSI jumper.<br><br>2. Return to the service procedure that sent you here. |
| 59H3408 | Front Door Assembly, White<br><br>(Includes Lock Solenoid and Sensor) | Do the following:<br><br>1. Go to "Front Door Assembly Removal and Installation" on page 48.<br><br>2. Return to the service procedure that sent you here. |

| Figure 111 (Page 4 of 4). Failing Items and Related Service Actions | | |
|---|---|---|
| **Failing Item** **IBM P/N** | **Description** | **Service Action** |
| 87G5109 | Cover Set, White (Sides, Top and Back) | Do the following: 1. Go to "Library Cover Set Removal and Installation" on page 44. 2. Return to the service procedure that sent you here. |

# Appendix B.  Accessing the System Error Log for RS/6000 (7331 Model 305 only)

## Error Log Analysis

The AIX Tape and Medium Changer Device Driver for the 7331 Tape Library provides logging to the system error log for a variety of errors. You can view the error log in various formats by using one of the following AIX commands:

> **smit** command, see page "SMIT."
> **TCTL** command, see page "TCTL Analysis."
> **errpt** command, see page "ERRPT" on page 168.
> **tapeutil** command, see page "Running Tapeutil" on page 171.

Use the Hex to ASCII conversion in Figure 119 on page 171. Examples of the different error log formats are shown following this text.

## SMIT

The **smit** command has various ways to format the error log. To use the **smit** command:

1. Type **smit** at the AIX command line.
2. Select **Problem Determination** from the System Management menu.
3. Select **Error Log** from the Problem Determination menu.
4. Select **Generate Error Report** from the Error Log menu.
5. Select **filename**, then select **no** from the Single Select list.
6. From the Generate Error Report menu you can select the type of reports you want to view, then press the **Do** icon.
7. You can scroll through the log by using the up or down icons on the menu.

## TCTL Analysis

TCTL is used to perform operations on a device. This is especially useful for those types of devices that are NOT accessible from Tapeutil (ex: 7331, 7336, etc.).

An example follows:

**tctl -f/dev/rmt3 rewoff1**          Rewind/Unload of a tape drive.

An alternate form of using TCTL is with line commands as shown below.

1. **Usage:** TCTL (-Bnv) (-b num) (-p device) (subcommand (count))

2. Valid Subcommands are:

| weof | fsf | fsr | rewind | repffl |
|------|-----|-----|--------|--------|
| eof | bsf | bsr | offline | |

# ERRPT

To use the **errpt** command:

1. Select **errpt |pg** at the AIX command line. The summary report will be displayed.
2. Scroll through the log by pressing the Enter key for the next page.
3. Type **q** to quit the error log at any time.

Figure 112 is information for the 'errpt |pg' command.

```
IDENTIFIER TIMESTAMP  T C RESOURCE_NAME  DESCRIPTION
2E2EFDDE   2 5 83897 U H rmt            UNDETERMINED ERROR
4865FA9B   2 5 83897 P H rmt            TAPE OPERATION ERROR
476B351D   2 5 83497 P H rmt            TAPE DRIVE FAILURE
2E2EFDDE   2 5 83497 U H rmt            UNDETERMINED ERROR
4865FA9B   2 5 82997 P H rmt2           TAPE OPERATION ERROR
5537AC5F   2 5 82697 P H rmt            TAPE DRIVE FAILURE
5537AC5F   2 5 82697 P H rmt            TAPE DRIVE FAILURE
5537AC5F   2 5 82697 P H rmt            TAPE DRIVE FAILURE
4865FA9B   2 5 82497 P H rmt            TAPE OPERATION ERROR
4865FA9B   2 5 81897 P H rmt            TAPE OPERATION ERROR
4865FA9B   2 5 81197 P H rmt1           TAPE OPERATION ERROR
4865FA9B   2 5 8 897 P H rmt1           TAPE OPERATION ERROR
4865FA9B   2 5 8 697 P H rmt1           TAPE OPERATION ERROR
4865FA9B   2 5 8 597 P H rmt1           TAPE OPERATION ERROR
```

*Figure 112. ERRPT |pg Command Error Example*

**Attention:** For errors indicating system problems, enter the appropriate maintenance package.

The following table is for quick reference.

| Figure 113. Hex to ASCII Conversion | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Hex** | **ASCII** | **Hex** | **ASCII** | **Hex** | **ASCII** | **Hex** | **ASCII** | **Hex** | **ASCII** |
| 00 | Null | 30 | 0 | 41 | A | 4A | J | 54 | T |
| 20 | Space | 31 | 1 | 42 | B | 4B | K | 55 | U |
| | | 32 | 2 | 43 | C | 4C | L | 56 | V |
| | | 33 | 3 | 44 | D | 4D | M | 57 | W |
| | | 34 | 4 | 45 | E | 4E | N | 58 | X |
| | | 35 | 5 | 46 | F | 4F | O | 59 | Y |
| | | 36 | 6 | 47 | G | 50 | P | 5A | Z |
| | | 37 | 7 | 48 | H | 51 | Q | 5F | _ |
| | | 38 | 8 | 49 | I | 52 | R | | |
| | | 39 | 9 | | | 53 | S | | |
| **Note:** All codes are not shown. | | | | | | | | | |

1. Type **errpt -a |pg** at the AIX command line; the detailed report will be displayed.
2. Press the Enter key to scroll through the log.
3. Type **Q** to quit the error log at any time.

```
ERROR LABEL:    TAPE_ERR2
ERROR ID:       476B351D

Date/Time:            Tue Dec 17 07:58:40
Sequence Number:   55588
Machine Id:            000029843500
Node Id:               raptor
Error Class:           H
Error Type:            PERM
Resource Name:     smc0
Resource Class:     tape
Resource Type:      7331
Location:              00-02-01-50
VPD:


Error Description
TAPE DRIVE FAILURE

Probable Causes
TAPE DRIVE

Failure Causes
TAPE
TAPE DRIVE

      Recommended Actions
      PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0C05 0000 A500 0000 000A 0017 0000 0000 0102 0000 7000 0400 0000 0018 0000 0000
4089 0B00 0000 0050 0B01 0100 0186 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
```

*Figure 114. AIX SMIT and ERRPT Command Tape Error Log Example*

```
HEX               Description
  4               Sense key
4 89              ASC/ASCQ (additional sense code/additional sense code qualifier)
 186              UEC (Unit Error Code)
```

*Figure 115. Sense Data for Tape Error Log Example*

```
ERROR LABEL:    TAPE_ERR4
ERROR ID:       5537AC5F

Date/Time:          FRI Dec 13 12:53:02
Sequence Number:    55545
Machine Id:         000029843500
Node Id:            raptor
Error Class:        H
Error Type:         PERM
Resource Name:      rmt3
Resource Class:     tape
Resource Type:      ost
Location:           00-02-01-10
VPD:

Error Description
TAPE DRIVE FAILURE

Probable Causes
ADAPTER
TAPE DRIVE

Failure Causes
ADAPTER
TAPE DRIVE

        Recommended Actions
        PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0601  0000 0000 0000   0000 0000 0000 0000   0200 0800 0000 xx00   0000 0000 0000 0000
yyyy  0000 0000 0000   0000 0000 0000 0000   zz00 0000 0000 0000   0000 0000 0000 0000
0000  0000 0000 0000   0000 0000 0000 0000   0000 0000 0000 0000   0000 0000 0000 0000
0000  0000 0000 0000   0000 0000 0000 0000   0000 0000 0000 0000   0000 0000 0000 0000
0000  0000 0000 0000   0000 0000 0000 0000   0000 0000 0000 0000   0000 0000
```

*Figure 116. AIX SMIT and ERRPT Command SCSI Error Log Example*

```
        HEX             Description
         xx             Sense key
        yyyy            ASC/ASCQ (additional sense code/additional sense code qualifier)
         zz             FSC (Fault Symptom Code)
```

*Figure 117. Sense Data for SCSI Error Log Example*

# Running Tapeutil

If **tapeutil** is running and an error condition is detected, an error message is displayed. The error sense data has the format seen in Figure 118. The **errno**, or error number, is explained in Figure 120 on page 172.

```
Read/Write test terminated, total bytes written
Operation failed with errno 5: I/O error
Residual count: 2 48

Error Sense Data,  Length 8

 1  2 3  4 5  6 7  8 9  1    12   14   A B  C D  E F

7    4            18           4 89  B            5   B 1

 1    186





             HEX    DESCRIPTION

               4    Sense Key

             4 89   ASC/ASCQ (additional  sense code/additional sense code
                                          qualifier)
              186   UEC (Unit Error Code)
```

*Figure 118. Tape Util Error Sample*

The following table is for quick reference.

| Figure 119. Hex to ASCII Conversion | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Hex** | **ASCII** | **Hex** | **ASCII** | **Hex** | **ASCII** | **Hex** | **ASCII** | **Hex** | **ASCII** |
| 00 | Null | 30 | 0 | 41 | A | 4A | J | 54 | T |
| 20 | Space | 31 | 1 | 42 | B | 4B | K | 55 | U |
| | | 32 | 2 | 43 | C | 4C | L | 56 | V |
| | | 33 | 3 | 44 | D | 4D | M | 57 | W |
| | | 34 | 4 | 45 | E | 4E | N | 58 | X |
| | | 35 | 5 | 46 | F | 4F | O | 59 | Y |
| | | 36 | 6 | 47 | G | 50 | P | 5A | Z |
| | | 37 | 7 | 48 | H | 51 | Q | 5F | _ |
| | | 38 | 8 | 49 | I | 52 | R | | |
| | | 39 | 9 | | | 53 | S | | |
| **Note:** All codes are not shown. | | | | | | | | | |

Figure 120 shows only the **errno** values pertaining to tape devices. The complete
list of **errno** values can be found in the AIX **/usr/include/sys/errno.h** header file.

| AIX errno | Device Driver Error Code | Description |
|-----------|--------------------------|-------------|
| | *Figure 120 (Page 1 of 2). Device Driver to AIX ERRNO Translation* | |
| 1 | EPERM | **General:**The process does not have adequate permission to perform the desired function. |
| 5 | EIO | **Open:**An I/O error occurred that indicates a failure to operate the device.<br>**Write:**The physical end of medium was detected, or it is a general error state indicating a failure to write to device.<br>**IOCTL:**An I/O error occurred during the operation.<br>**Close:**An I/O error occurred during the operation. |
| 6 | ENXIO | **General:**The device has not been configured and is not receiving requests.<br>**Write:**A write operation was attempted after the device had reached end of medium. |
| 9 | EBADF | **General:**A bad file descriptor was passed.<br>**Write:**A write operation was attempted on a device that was opened for read only. |
| 11 | EAGAIN | **Read:**The device is already opened. |
| 12 | ENOMEM | **General:**Insufficient memory available for some internal memory operation.<br>**Read:**The number of bytes requested in a read of a variable block record was less than the size of the block. This is referred to as an over-length condition. |
| 14 | EFAULT | **General:**A memory failure occurred due to an invalid pointer or address. |
| 16 | EBUSY | **General:**An excessive busy state was encountered.<br>**Open:**The device is reserved by another initiator or an excessive busy state was encountered. |
| 22 | EINVAL | **Open:**The operation requested had invalid parameters or an invalid combination of parameters.<br>**Write:**The operation requested had invalid parameters or an invalid combination of parameters, or the number of bytes requested in the write was not a multiple of the block size for a fixed block transfer, or the number of bytes requested in the write was greater than the maximum block size allowed by the device for variable block transfers. |
| 28 | ENOSPC | **Write:**A write operation failed because it had reached the early warning mark while running in label processing mode. This return code is only returned once at the moment early warning is reached. |
| 46 | ENOTREADY | **General:**The device is not ready for operation or a tape is not in the drive.<br>**Open:**If not opened with the O_NONBLOCK or O_NDELAY, the drive is not ready for operation or there is no tape in drive. If the non-blocking flags are used, the drive is not ready for operation. |

| Figure 120 (Page 2 of 2). Device Driver to AIX ERRNO Translation | | |
|---|---|---|
| **AIX errno** | **Device Driver Error Code** | **Description** |
| 47 | EWRPROTECT | **Open:**An open operation with the O_RDWR or O_WRONLY flag was attempted on a write-protected tape.<br>**Write:**A write operation was attempted on a write-protected tape.<br>**IOCTRL:**An operation that would modify the media was attempted on a write-protected tape or a device that was opened for O_RDONLY. |
| 78 | ETIMEDOUT | **General:**A command has timed out. |
| 110 | EMEDIA | **General:**An unrecoverable media error was detected. |

## Message Codes

| Figure 121. Message Code Descriptions | | |
|---|---|---|
| **Message Code Hex** | **Message Code ASCII** | **Description** |
| 3030 | 00 | **No Message:** This is the default message indicating that the device does not have an error to report. |
| 3430 | 40 | **Operator Intervention Required:** An operator action is required at the device. For example, a magazine is full and needs to be replaced or emptied. Check the device error log for possible repair action. |
| 3431 | 41 | **Device Degraded:** The device is performing in a degraded state, but can be used. A FID is displayed with the error message. Check the device error log for possible repair action. |
| 3432 | 42 | **Device Hardware Failure:** The device can not be used. A FID is displayed with the error message. Check the device error log for possible repair action. |
| 3433 | 43 | **Service Circuits Failed, Operations not Affected:** This error does not affect the performance of the device. The failure only affects circuits used for non-operational testing. A FID is displayed with the error message. Check the device error log for possible repair action. |
| 3535 | 55 | **Clean Device:** Load a cleaning cartridge in the device. The drive returns the cleaning cartridge following the cleaning procedure. This message is not posted if attached to a 3494 tape library. |
| 3537 | 57 | **Device has been cleaned:** The drive has been cleaned by a cleaning cartridge. |
| 3630 | 60 | **Bad Media, Read Only Permitted:** MIM message. |
| 3631 | 61 | **Rewrite Media if Possible:** MIM message. |
| 3634 | 64 | **Bad Media, Cannot Read or Write:** MIM message. |
| 3732 | 72 | **Replace Cleaner Cartridge:** MIM message. |

# Exception Messages

*Figure 122. Exception Message Descriptions*

| Exception Message Hex | Exception Message ASCII | Description |
|---|---|---|
| 32 | 2 | **Data Degraded:** |
| 34 | 4 | **Medium Degraded:** |
| 36 | 6 | **Block 0 Error:** |
| 37 | 7 | **Medium Exception:** |

# TAPEUTIL Analysis

Tapeutil is a tool that allows the exercise of libraries and devices that attach to the Atape Driver. To use Tapeutil, simply type **Tapeutil** at the prompt. The following screen appears.

```
--------------------------------------------------------------------------------
General Commands:
   1. Open a Device          5. Inquiry          9. Log Sense Page
   2. Close a Device         6. Test Unit Ready  1 . Mode Sense Page
   3. Device Info            7. Reserve Device   11. Release Device
   4. Tape Drive Service Aids  8. Request Sense    Q. Quit Program
Medium Changer Commands:
  12. Element Information    16. Move Medium
  13. Position To Element    17. Load/Unload Medium
  14. Element Inventory      18. Initialize Element Status
  15. Prevent Medium Removal  19. Allow Medium Removal
Tape Commands:
  2 . Query/Set Parameters   3 . Read and Write Tests
  21. Load Tape              31. Unload Tape
  22. Rewind                 32. Erase
  23. Erase Gap              33. Write Filemarks
  24. Forward Space Filemarks 34. Backward Space Filemarks
  25. Forward Space Records   35. Backward Space Records
  26. Space to End of Data    36. Query/Set Tape Position
  27. Log Sense              37. Library Sequence Number
  28. Display Message         38. Read or Write Files
  29. Synchronize Buffers    39. Recover Buffer Data
Enter Selection:
--------------------------------------------------------------------------------
```

To open a device, perform the following:

```
--------------------------------------------------------------------------------
Enter Selection: 1 <enter>
Enter device special file name:   name   <enter>
     (example: /dev/rmt ): /dev/rmt3)
Select mode:   name   <enter>
     (example: 1=Read/Write, 2=Read Only, 3=Write only, 4=Append)
Opening Device. . .
Hit <enter> to continue. . .   <enter>
--------------------------------------------------------------------------------
```

When the screen appears again, make any selection required to verify library and/or drive operation.

# USING TAPEUTIL LINE COMMANDS

An alternate form of using Tapeutil is with line commands. Examples follow:

1. **tapeutil -f/dev/rmt3 move -s11 -24** ( Move medium from a cell location to a drive. )

2. **tapeutil -f/dev/rmt3 inventory** ( Perform an inventory. )

3. **Usage: Tapeutil (-f Device) (Subcommand (Subcommand))**

   **General Subcommands:**

   | | | | | |
   |---|---|---|---|---|
   | devinfo | inquiry | print "Text" | vpd | reset |
   | reserve | release | reqsense | tur | |

   **Medium Changer Subcommands:**

   | | | |
   |---|---|---|
   | audit | mount (Slot) | unmount (Slot) |
   | inventory | allow | move -s Source -d Destination |
   | elementinfo | prevent | position -d Destination |

   **Tape Subcommands:**

   | | | |
   |---|---|---|
   | append | bsf (Count) | bsr (Count) |
   | autoload | eof (Count) | weof (Count) |
   | compress | fsf (Count) | fsr (Count) |
   | nocompress | erg | volid "Name" |
   | load | erase | display "Message" |
   | mtdevice | rewind | read -d Destination |
   | qrypos | retension | write -s Source |
   | setpos | status | rtest (-b Blocksize) (-c Count) (-r Repetition) |
   | offline | parms | wtest (-b Blocksize) (-c Count) (-r Repetition) |
   | rewoffl | sync | rwtest (-b Blocksize) (-c Count) (-r Repetition) |
   | unload | logsense | |

   **Service Aid Subcommands:**

   | | | | |
   |---|---|---|---|
   | dump | fmrtape | resetdrive | ucode "Name" |

# Drive Fault Symptom Description

### Drive Fault Symptom Code

This byte provides an alternate means of obtaining fault information from the drive. This information can be used individually or in conjunction with the Sense Key and ASC/ASCQ to understand each specific error condition. The following table describes the supported FSC error codes and their relationship with the other error indicators.

**Note:** For the CAUSE column, T=Tape and D=Drive.

*Figure 123 (Page 1 of 9). Fault Symptom Code and Error Recovery Procedures*

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 05 | 50 | 01 | 02 | Invalid position for WRITE | No Log, Return "Illegal Request" | 2 | - |
| 07 | 27 | 00 | 03 | Tape is write protected for WRITE | No Log, "Disable Write Protect" | 5 | - |
| 00 | 00 | 02 | 04 | LEOT encountered on current WRITE | No Log, Notify User | 10 | - |
| 0B | 00 | 00 | 05 | Operation has aborted (as requested) | Log, Aborted Command | 11 | - |
| 00 | 00 | 02 | 06 | LEOT encountered on the last WRITE | No Log, Notify User | 10 | - |
| 0B | 10 | 00 | 08 | Compression data integrity check failed | Log, Hardware Error | 12 | D=100% |
| 00 | 00 | 02 | 09 | Detected LEOT during READ | No Log, Notify User | 10 | - |
| 00 | 00 | 00 | 0A | Length mismatch on READ | No Log, Notify User | 15 | - |
| 03 | 11 | 01 | 0B | Uncorrectable block on READ | Log Medium Error | 8,6 | T=90% D=10% |
| 08 | 00 | 05 | 0C | EOD encountered on READ | No Log, Notify User | 13 | - |
| 00 | 00 | 01 | 0D | Filemark encountered during a READ | No Log, Notify User | 10 | - |
| 05 | 00 | 05 | 0E | Illegal condition for READ | No Log, Return "Illegal Request" | 2 | - |
| 08 | 00 | 05 | 0F | READ issued at blank tape | No Log, Notify User | 4 | - |

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 0B | 00 | 00 | 10 | READ operation has aborted (as requested) | Log, Aborted Command | 11 | - |
| 03 | 11 | 03 | 11 | Too many permanent READ errors, cannot sync | Log Medium Error | 8,6 | T=90% D=10% |
| 03 | 00 | 02 | 14 | PEOT or PEOP encountered on READ or VERIFY | Log Medium Error | 2,8,6 | - |
| 09 | 15 | 02 | 15 | Bad Filemark encountered during a READ | Log, Notify User | 8,6 | T=100% |
| 03 | 14 | 00 | 16 | Medium error detected during a READ | Log Medium Error | 8,6 | T=90% D=10% |
| 04 | 11 | 00 | 17 | Hardware error during a READ | Log Hardware Error | 12 | D=100% |
| 04 | 11 | 00 | 18 | READ decompression failed--HW error | Log Hardware Error | 12 | D=100% |
| 04 | 11 | 02 | 19 | READ decompression CRC failed | Log Hardware Error | 12 | D=100% |
| 03 | 30 | 01 | 1C | Unknown or incompatible format | Display "Tape Format Bad" | 14 | T=100% |
| 00 | 00 | 03 | 1D | Hit setmark on read | No Log, Notify User | 10 | - |
| 05 | 50 | 01 | 26 | Not at legal place to WFM | No Log, Return "Illegal Request" | 2 | - |
| 07 | 27 | 00 | 27 | Tape is write protected for WFM | No Log, "Disable Write Protect" | 5 | |
| 00 | 00 | 02 | 28 | LEOT encountered during WFM | No Log, Notify User | 10 | - |
| 00 | 00 | 03 | 31 | Setmark detected on Space/Locate | No Log, Notify User | 10 | - |
| 00 | 00 | 01 | 32 | Filemark detected during SPACE/LOCATE | No Log, Notify User | 10 | - |

*Figure 123 (Page 3 of 9). Fault Symptom Code and Error Recovery Procedures*

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 05 | 00 | 05 | 33 | EOD encountered on SPACE/LOCATE | No Log, Notify User | 10 | - |
| 03 | 00 | 02 | 34 | PEOT encountered on SPACE/LOCATE | Log Medium Error | 8,6,2 | - |
| 00 | 00 | 04 | 35 | PBOT encountered on SPACE/LOCATE | No Log, Notify User | 2 | - |
| 03 | 31 | 00 | 36 | Format error during SPACE/LOCATE | Log Medium Error | 8,6 | T=80% D=20% |
| 03 | 11 | 00 | 37 | Uncorrectable block during a SPACE/LOCATE | Log Medium Error | 8,6 | T=90% D=10% |
| 03 | 14 | 00 | 38 | Medium error during SPACE/LOCATE | Log Medium Error | 8,6 | T=80% D=20% |
| 09 | 15 | 02 | 3A | Wrong file number in filemark during SPACE (2.3 GB mode only) | Log, Notify User | 3 | T=100% |
| 0B | 00 | 00 | 3B | SPACE/LOCATE has aborted (as requested) | Log, Aborted Command | 11 | - |
| 03 | 15 | 00 | 3D | Lost in Space | Log Medium Error | 8,6 | T=80% D=20% |
| 03 | 30 | 00 | 47 | Incompatible Medium Rejected after Loading | No Log, Notify User | 14 | - |
| 05 | 50 | 01 | 4B | Illegal position for ERASE | No Log, Return "Illegal Request" | 2 | - |
| 07 | 27 | 00 | 4C | Tape is write protected for ERASE | No Log, "Disable Write Protect" | 5 | - |
| 0B | 00 | 00 | 4E | ERASE has aborted (as requested) | Log, Aborted Command | 11 | - |
| 04 | 00 | 00 | 58 | Hardware error during SEND DIAGNOSTIC | Log, Hardware Error | 12 | D=100% |
| 05 | 26 | 02 | 61 | Header in wrong format when loading ucode | Display "Software Bad" | 8,6 | T=100% |

*Figure 123 (Page 4 of 9). Fault Symptom Code and Error Recovery Procedures*

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 05 | 26 | 02 | 63 | Control load image not valid | Display "Software Bad" | 8,6 | T=100% |
| 05 | 26 | 02 | 65 | EEPROM load image not valid | Display "Software Bad" | 8,6 | T=100% |
| 05 | 26 | 01 | 66 | Boot code old | Display "Software Bad" | 8,6 | T=100% |
| 04 | 00 | 00 | 67 | Cannot program one of the memories | Log Hardware Error | 12 | D=100% |
| 03 | 26 | 02 | 69 | CRC in load image was not correct | Display "Software Bad" | 8,6 | T=100% |
| 04 | 00 | 00 | 6D | Read buffer command failed | Log Hardware Error | 12 | D=100% |
| 05 | 50 | 01 | 71 | Illegal position to format partition. | | 2 | |
| 0D | 00 | 02 | 72 | Partitions are too big for tape | | 2 | |
| 03 | 31 | 01 | 74 | Partition format of tape failed | No Log, Notify User | 8,6 | - |
| 0B | 00 | 00 | 75 | Partition format aborted | | 8,6 | |
| 03 | 31 | 00 | 79 | Failed position to a new partition | | 8,6 | |
| 0B | 00 | 00 | 7A | Partition switch aborted | | 8,6 | |
| 04 | 44 | 00 | 8C | Software hang, we are very confused | Log Hardware Error | 12 | D=100% |
| 04 | 40 | 80 | 8D | Software detects a hardware problem | Log Hardware Error | 12 | D=100% |
| 0D | 00 | 02 | 93 | Detect PEOP | | 10 | |
| 03 | 03 | 02 | 94 | Write Setmark failure | No Log, Notify User | 6 | - |
| 03 | 50 | 01 | 95 | WRITE failure after retry limit exceeded | Log Medium Error | 8,6 | T=70% D=30% |
| 03 | 03 | 02 | 96 | WFM failure after retry limit exceeded | Log Medium Error | 8,6 | T=70% D=30% |

*Figure 123 (Page 5 of 9). Fault Symptom Code and Error Recovery Procedures*

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 03 | 03 | 02 | 97 | Write EOD failure after retry limit exceeded | Log Medium Error | 8,6 | T=70% D=30% |
| 04 | 44 | 00 | 98 | Fill error, invalid BRT | Log Hardware Error | 12 | D=100% |
| 04 | 44 | 00 | 99 | Fill error, buffer empty | Log Hardware Error | 12 | D=100% |
| 04 | 08 | 01 | 9A | Deformatter Intrp timeout on search | Log Hardware Error | 12 | D=100% |
| 03 | 03 | 02 | 9B | Overwrite (bad readback check block type) | Log Medium Error | 8,6 | T=50% D=50% |
| 04 | 08 | 01 | 9C | Formatter Intrp timeout on WRITE | Log Hardware Error | 12 | D=100% |
| 03 | 03 | 02 | 9D | Permanent write error, write recovery fail | Log Medium Error | 8,6 | T=70% D=30% |
| 03 | 03 | 02 | 9E | Permanent write error, rewrite threshold | Log Medium Error | 8,6 | T=70% D=30% |
| 03 | 03 | 02 | 9F | Servo zone readback check failure | Log Medium Error | 8,6 | T=70% D=30% |
| 04 | 0C | 00 | A1 | Head sync error during WRITE | Log Hardware Error | 8,6 | D=90% T=10% |
| 04 | 44 | 00 | A2 | Underrun error during WRITE | Log Hardware Error | 12 | D=100% |
| 0B | 08 | 02 | A3 | IPORT write buffer parity error | Log Hardware Error | 12 | D=100% |
| 04 | 08 | 02 | A4 | DPORT WRITE parity error | Log Hardware Error | 12 | D=100% |
| 04 | 08 | 02 | A5 | PPORT WRITE parity error | Log Hardware Error | 12 | D=100% |
| 0B | 08 | 02 | A6 | IPORT READ parity error | Log Hardware Error | 12 | D=100% |
| 04 | 08 | 02 | A7 | DPORT READ parity error | Log Hardware Error | 12 | D=100% |
| 04 | 08 | 02 | A8 | PPORT READ parity error | Log Hardware Error | 12 | D=100% |

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 04 | 44 | 00 | AC | Servo software error | Log Hardware Error | 12 | D=100% |
| 04 | 15 | 01 | AD | Servo hardware error | Log Hardware Error | 8,6 | D=90% T=10% |
| 03 | 09 | 00 | AE | Not tracking | Log Medium Error | 8,6 | T=60% D=40% |
| 0D | 00 | 02 | AF | EOT encountered during a motion command | | 2 | - |
| 03 | 09 | 00 | B0 | Not tracking--loss of PLL | Log Medium Error | 8,6 | T=60% D=40% |
| 03 | 03 | 02 | B3 | LBOT WRITE failure | Log Medium Error | 8,6 | T=70% D=30% |
| 03 | 0C | 00 | B4 | LBOT ATM write failure | Log Medium Error | 8,6 | T=70% D=30% |
| 03 | 11 | 00 | B5 | Read manager could not read LBOT | Log Medium error | 8,6 | T=70% D=30% |
| 0D | 00 | 02 | B6 | EOT encountered during buffer flush | | 2 | - |
| 06 | 29 | 00 | C0 | Power-on reset occurred | No Log, Reissue Failing Command | 3 | - |
| 06 | 28 | 00 | C1 | Tape may have been changed | No Log, Reissue Failing Command | 3 | - |
| 06 | 2A | 01 | C2 | Mode Select parameters have changed | No Log, Reissue Failing Command | 3 | - |
| 06 | 3F | 01 | C3 | New ucode was loaded | No Log, Reissue Failing Command | 3 | - |
| 06 | 5A | 01 | C4 | Operator requested media removal | No Log, Reissue Failing Command | 11 | - |
| 06 | 30 | 00 | C5 | Incompatible media was rejected | No Log, Notify User | 14 | - |
| 02 | 04 | 00 | C6 | Not ready, cause not known | No Log, Return "Not Ready" | 7,3 | - |

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 02 | 04 | 01 | C7 | Not ready, in process of becoming ready | No Log, Return "Not Ready" | 3 | - |
| 02 | 04 | 00 | C8 | A backup positioning command is required | No Log, Issue a Backup Command | 2 | - |
| 02 | 3A | 00 | C9 | Command requires a tape and none is loaded | No Log, Return "Not Ready" | 7,3 | - |
| 06 | 5B | 01 | CA | Log Threshold met | No Log, Reissue Failing Command | 3 | |
| 06 | 2A | 02 | CB | Log Parameter changed | No Log, Reissue Failing Command | 3 | |
| 05 | 1A | 00 | CC | Parameter List Length error in CDB | No Log, Return "Illegal Request" | 2 | - |
| 05 | 20 | 00 | CD | Illegal Operation Code | No Log, Return "Illegal Request" | 2 | - |
| 05 | 24 | 00 | CE | Invalid field or reserved bits set in CDB | No Log, Return "Illegal Request" | 2 | - |
| 05 | 25 | 00 | CF | This LUN is not supported | No Log, Return "Illegal Request" | 2 | - |
| 05 | 26 | 00 | D0 | Invalid field in Parameter List (Mode Data) | No Log, Return "Illegal Request" | 2 | - |
| 05 | 25 | 00 | D1 | Illegal bit set in Identify Message | No Log, Return "Illegal Request" | 2 | - |
| 05 | 53 | 02 | D2 | Media removal is prevented | No Log, Return "Illegal Request" | 2 | - |
| 05 | 81 | 00 | D3 | Command has mode mismatch (variable/fixed) | No Log, Return "Illegal Request" | 2 | - |
| 05 | 1A | 00 | D4 | Illegal Transfer Length in CDB | No Log, Return "Illegal Request" | 2 | - |

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 05 | 84 | 00 | D6 | Tried to change Mode Parms and not at LBOT | No Log, Return "Illegal Request" | 2 | - |
| 05 | 30 | 02 | D7 | Can't read medium, incompatible format | No Log, Return "Illegal Request" | 14 | - |
| 05 | 4E | 00 | D8 | Overlapped commands attempted, bad ITL nexus | No Log, Return "Illegal Request" | 2 | - |
| 05 | 3D | 00 | DA | Illegal bits set in ID message | No Log, Return "Illegal Request" | 2 | - |
| 05 | 30 | 00 | DB | Cannot write to tape; not AME | No Log, Return "Illegal Request" | 14 | T=100% |
| 01 | 37 | 00 | DC | Rounding has occurred | No log, return "Illegal Request" | 10 | |
| 02 | 04 | 00 | DD | Not ready--head sync tape | No log, return "Illegal Request" | 7 | |
| 05 | 30 | 05 | DE | Density not supported | No Log, Return "Illegal Request" | 2 | - |
| 0B | 43 | 00 | E0 | Aborted in CDB phase, parity or other error | Log, Aborted Command | 12 | - |
| 0B | 43 | 00 | E1 | Aborted prior to Data phase, bad message | Log, Aborted Command | 12 | - |
| 0B | 48 | 00 | E2 | Aborted in data phase, init detected error | Log, Aborted Command | 12 | - |
| 0B | 43 | 00 | E3 | Aborted in Data phase, bad message | Log, Aborted Command | 12 | - |
| 0B | 43 | 00 | E4 | Aborted after data phase, bad message | Log, Aborted Command | 12 | - |
| 0B | 43 | 00 | E5 | Aborted after Data phase, other error | Log, Aborted Command | 12 | - |
| 0B | 47 | 00 | E6 | ABORT caused by SCSI Bus Parity Error | Log, Aborted Command | 12 | - |

*Figure 123 (Page 9 of 9). Fault Symptom Code and Error Recovery Procedures*

| SKEY | ASC | ASCQ | FSC | DESCRIPTION | SCSI ERROR DESCRIPTION | ERP # | CAUSE |
|------|-----|------|-----|-------------|------------------------|-------|-------|
| 0B | 00 | 00 | E7 | ABORT sent by initiator has been completed | Log, Aborted Command | 12 | - |
| 01 | 00 | 17 | E8 | Drive needs cleaning | Clean Log, Notify User | 1 | - |
| 05 | 26 | 00 | EA | Invalid mode (2.3 GB) for data compression | No Log, Return "Illegal Request" | 2 | - |
| 0B | 00 | 00 | EB | download in progress | Log, Aborted Command | 3 | - |
| 01 | 5B | 02 | EC | Log parameter overflow (recovered error) | | 10 | |
| 00 | 5D | 00 | EE | Service required | Log Hardware Error | 12 | D=70% T=30% |
| 04 | 00 | 00 | FA | Serial number invalid or blank | Reprogram EEPROM | 12 | D=100% |
| 04 | 00 | 00 | FC | Head sync value in EEPROM out of range | Reprogram EEPROM | 12 | D=100% |
| 04 | 00 | 00 | FD | EEPROM contains meaningless information | Reprogram EEPROM | 12 | D=100% |

# Drive Error Recovery Procedures

If two or more ERP codes are listed for the Fault Symptom Code, perform the action for the first code, then perform the action for the second code, and so on.

| ERP | Recommended Error Recovery Procedure |
|-----|--------------------------------------|
| | *Figure 124. ERP # (Recommended error recovery procedures)* |
| 1 | Warning Message, clean drive |
| 2 | Application program error or user error using application. Retry operation. If this problem continues, notify application provider. |
| 3 | Reissue the failed command or command sequence. |
| 4 | Application attempted to read a blank tape. Either write to the tape or replace the tape with a tape containing data. |
| 5 | Tape is write protected and a write or erase was attempted. Either write enable the tape or insert a write enabled tape. |
| 6 | Perform the following until the operation can be completed.<br><br>1. Clean the drive<br>2. Retry operation<br>3. Clean the drive<br>4. Replace the tape cartridge<br>5. If the error still persists and there is an error in the system error log, call your maintenance provider. |
| 7 | Insert a data cartridge into the tape drive. |
| 8 | Perform one of the following actions:<br><br>Reset the tape drive by holding down the unload button until the "RESET" message appears in the drive LCD display; then release the button.<br>Send a SCSI bus reset ("hard" reset). |
| 9 | Clean the tape drive and repeat the operation. |
| 10 | No action is necessary. |
| 11 | User has pushed the eject button. No action is required, tape drive performed the requested operation. |
| 12 | The tape drive requires maintenance. |
| 13 | Tape drive has encountered the end of the media on a Read or Write. Mount the next tape and continue the tape operation. |
| 14 | Media type is not supported. Clean the drive and retry the operation with supported media. |
| 15 | Blocksize requested on Read operation does not match blocksize the tape was written at. Change blocksize the application is attempting to read at. |

# Appendix C.  Parts Diagram and Parts List

This chapter provides a parts diagram and parts list required to service the 8mm Tape Library.

## How To Use This Parts Listing

**Similar Assemblies**    If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts unique to one of the assemblies are listed separately and identified by description.

**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.

**NS**    (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:

| Figure 125. Indenture 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 |

        **187**

# 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 |

# Assemblies

Assemblies with their component parts lists follow.

# Assembly 1: External Library, Model 305 - Stand Alone Tower



A34M0173
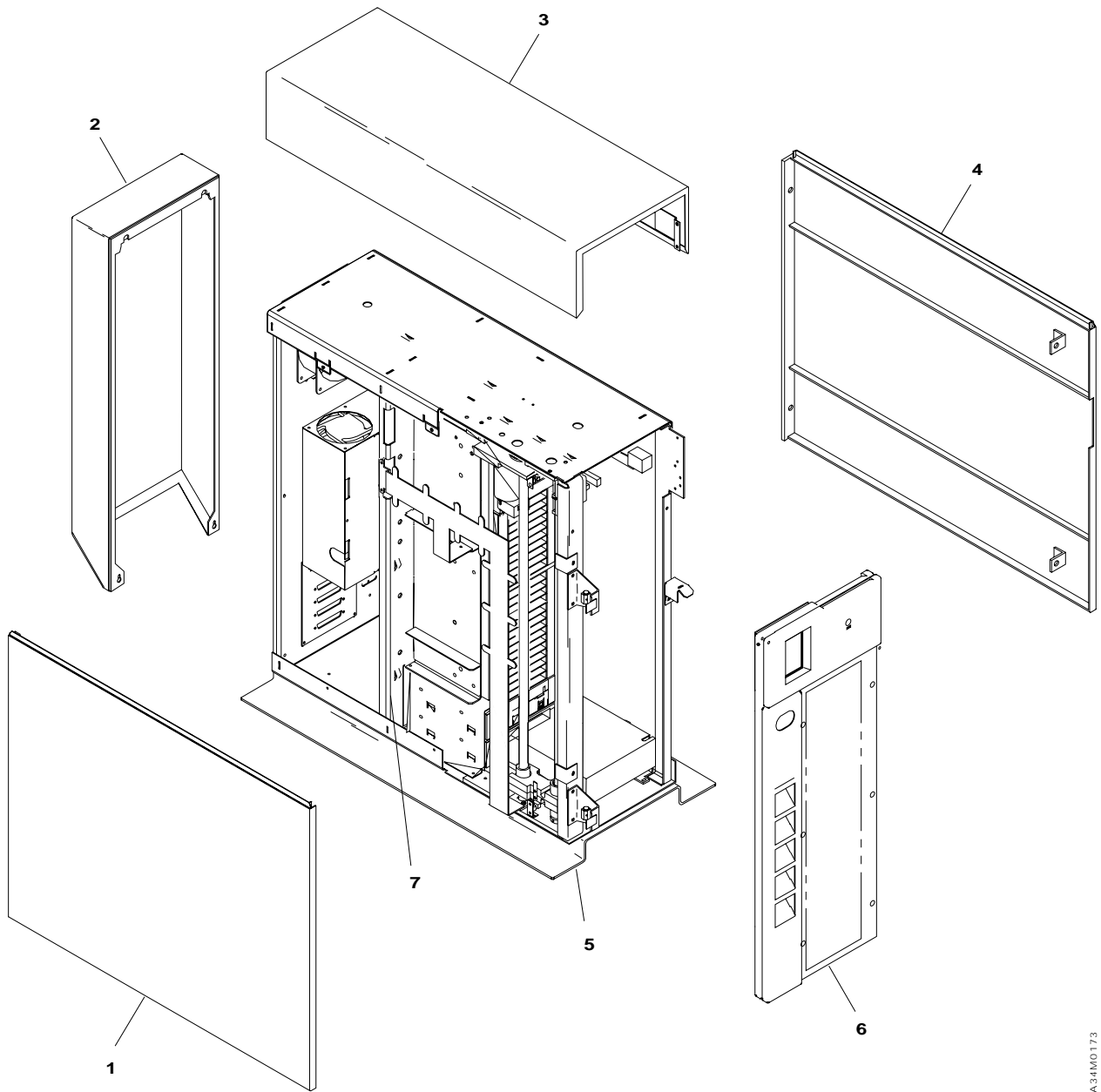
| Asm–Index | Part Number | Units | Description |
|---|---|---|---|
| | | | Stand-Alone Cover Assembly |
| 1– | 87G5109 | 1 | Stand Alone Cover Assembly - White |
| –1 | NP | 1 | Cover (Left) |
| –2 | NP | 1 | Cover (Rear) |
| –3 | NP | 1 | Cover (Top) |
| –4 | NP | 1 | Cover (Right) |
| –5 | NP | 1 | Pedestal, Shale Grey |
| –6 | 59H3408 | 1 | Front Door Assembly - White |
| – | 87G1517 | 2 | Clevis (Door Hinge Pin) |
| – | 87G1518 | 1 | Access Door Latch |
| – | 87G1519 | 1 | Door Lock (Key) |
| – | 87G1520 | 1 | Solenoid (Door Lock) |
| – | 87G1525 | 1 | Catch (Access Door) |
| – | 87G1527 | 1 | Bracket (Strike) |
| –7 | NP | 1 | Frame Assembly |
| | | | Fasteners required for the Stand-Alone Library External Assemblies |
| – | 87G1874 | 2 | M3X6 PH Screw with washer (Rear of Top Cover) |
| – | 87G1874 | 8 | M3X4 PH Screw (Top and Rear Cover) |
| – | 87G1874 | 8 | M3X6 PH Screw (Side Covers) |
| – | 87G1874 | 4 | M4X8 PH Screw (Pedestal Mount) |
| – | 87G1874 | 2 | M3X6 PH Screw (Strike Bracket) |
| – | 87G1874 | 4 | M3X4 PH Screw (SCSI Panel) |
| | | | Part number 87G1874 consists of a package containing four of each kind of screw in the 7331 Tape Library. |

# Assembly 2:  Internal Library, Model 305



A34M0185

| Asm–Index | Part Number | Units | Description |
|---|---|---|---|
| 2–1 | 86G9258 | 1 | Accessor Assembly |
| – | NP | 2 | Accessor Travel Limit sensor (Bottom & Top) |
| – | NP | 1 | Accessor Sensor |
| – | 86G9299 | 1 | Magazine Mounting Plate Assembly |
| –2 | NP | 2 | Magazine Mounting Plates (Right & Left) |
| – | NP | 2 | Magazine Mounting Plate Sensors |
| – | 86G9260 | 1 | Sensor Group |
| – | NP | 1 | Upper/Lower Magazine Sensor Cable |
| – | NP | 1 | Accessor Bottom Travel Limit Cable |
| – | NP | 1 | Accessor Top Travel Limit and Lock Cable |
| – | NP | 1 | Accessor Motor Tach Cable |
| – | NP | 1 | Accessor Obstructed Sensors (Emitter & Receiver) |
| –3 | 86G9326 | 1 | Fan Assembly |
| – | 81F7977 | 4 | Rubber Isolator Mount (Fan) |
| –4 | 86G9274 | 1 | Power Supply |
| –5 | 59H3410 | 1 | Controller Logic Card |
| –6 | 59H2842 | 2 | Tape Drive Assembly, 206GB |
| – | 87G1885 | 1 | Internal SCSI Cable Group |
| – | NP | 2 | Drive Cables |
| – | 87G1558 | 1 | SCSI Jumper Cable |
| –7 | 86G9310 | 2 | Magazine Assembly, 10-Slot |
| –8 | 86G9312 | 1 | 2-Slot Magazine |
| –9 | 59H3409 | 1 | Picker Assembly without Bar Code Reader |
| –10 | 87G1835 | 1 | Picker Cover |
| – | NP | 1 | Picker Umbilical Cable |
| –11 | 44H3620 | 1 | Bar Code Reader with Flex Cable Assembly |
| –12 | 87G1531 | 1 | Control Panel Assembly |
| – | 6272886 | 1 | Sensor (Door) |
| | | | Fasteners required for the Library Internal Assemblies |
| – | 87G1874 | 1 | M3X4 PH Screw (Power Supply Mount) |
| – | 87G1874 | 4 | M3X6 PH Screw (Accessor Mount) |
| – | 87G1874 | 12 | M4X8 PH Screw (Magazine Mount) |
| – | 87G1874 | 4 | M4X8 PH Screw (Controller Card Mount) |
| – | 87G1874 | 2 | M4X10 PH Screw (Controller Card Mount) |
| – | 87G1874 | 8 | M3X4 PH Screw (Drive to Tray) |
| – | 87G1874 | 4 | M3X4 PH Screw (Tray to Sleeve) |
| – | 87G1874 | 2 | Screw (2-Slot Magazine Mount) |
| – | 87G1874 | 2 | M3X6 PH Screw (Picker Panel) |
| – | 87G1874 | 2 | M3X12 PH Screw (Picker Panel) |
| | | | Part number 87G1874 consists of a package containing four of each kind of screw in the 7331 Tape Library. The 7331 Tape Library can be configured with one or two tape drives. |

# Assembly 3: Tape Library Cables and Miscellaneous, Model 305

| Asm–Index | Part Number | Units | Description |
|---|---|---|---|
| 3– | 52G4337 | 1 | System-to-Device Cable, External (1.5 M) |
| – | 52G4291 | 1 | Device-to-Device Cable, External (0.6 M) |
| – | 52G4233 | 1 | Device-to-Device Cable, External (2.5 M) |
| – | 67G1263 | 1 | System-to-Device Cable, External (14.0 M) |
| – | 87G1554 | 1 | Door Open/Close Sensor Cable, Internal |
| – | 59H3038 | 1 | SCSI ID Cable, Internal |
| – | 87G1544 | 1 | Control Panel Cable, Internal |
| – | 1675209 | 1 | Jumper, Internal (Tape Drive, Controller Card) |
| – | 61G8324 | 1 | Terminator |
| – | 59H2678 | 1 | Cartridge, Data - 170m |
| – | 59H2898 | 1 | Cartridge, Cleaning |
| – | 59H2677 | 1 | Cartridge, Test - 22m |

# Assembly 4:  Library Model 355 - Stand Alone — External

A34M0173
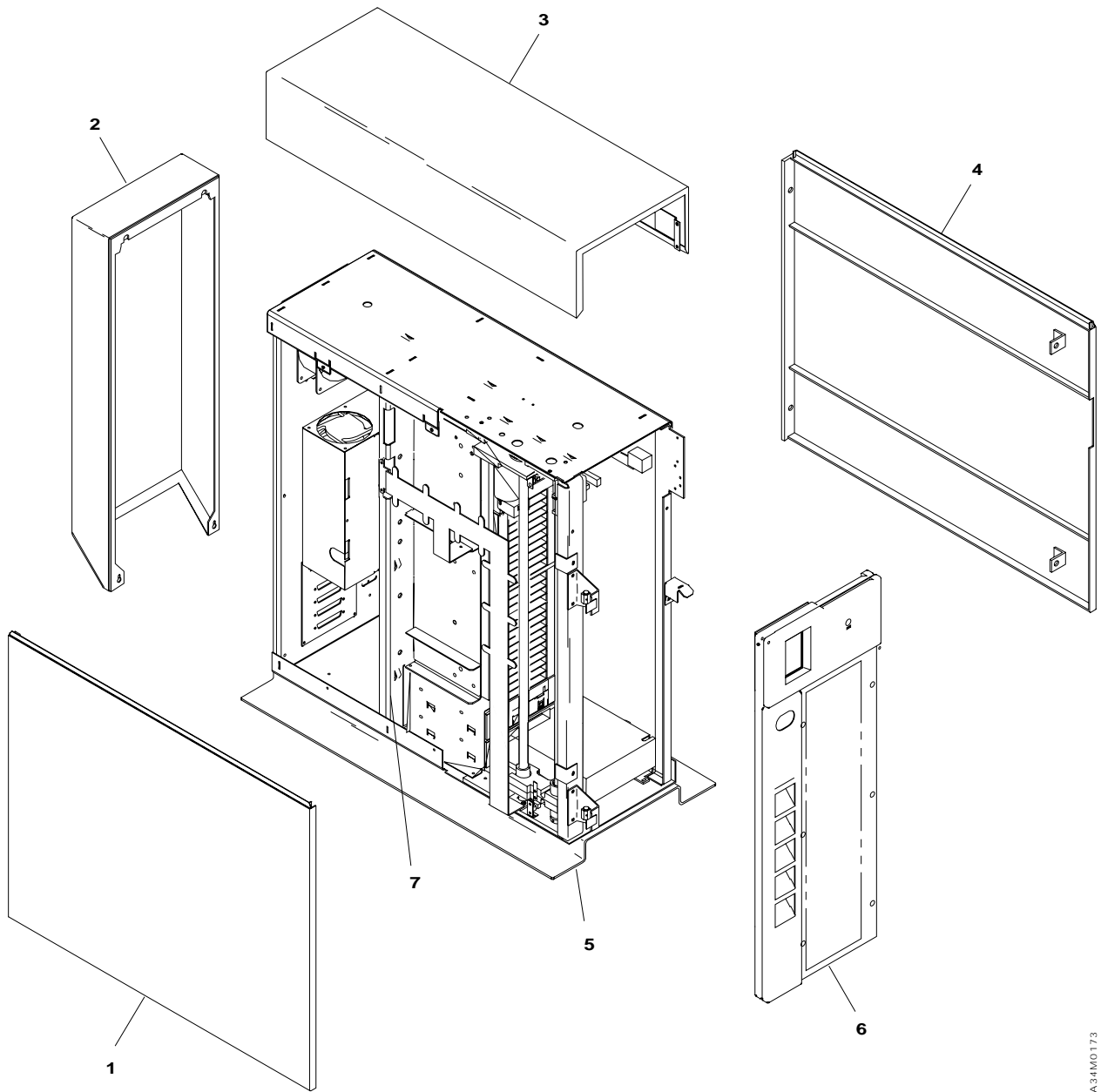
| Asm–Index | Part Number | Units | Description |
|---|---|---|---|
| 4– | 87G1589 | 1 | Top & Side Cover Assembly, Black (includes Rear, Top, Left, and Right covers) |
| –1 | NP | 1 | Cover (Left) |
| –2 | NP | 1 | Cover (Rear) |
| –3 | NP | 1 | Cover (Top) |
| –4 | NP | 1 | Cover (Right) |
| –5 | NP | 1 | Pedestal, Black |
| – | 87G1874 | 2 | M3x6 PH Screw with washer (Rear of Top Cover) |
| – | 87G1874 | 8 | M3x4 PH Screw (Top and Rear Cover) |
| – | 87G1874 | 8 | M3x6 PH Screw (Side Covers) |
| – | 87G1874 | 4 | M3x8 PH Screw (Pedestal Mount) |
| – | 59H3915 | 1 | Front Door Assembly, Black with Logo (includes lock, solenoid, and sensor) |
| – | 87G1517 | 2 | Clevis (Door Hinge Pin) |
| – | 87G1518 | 1 | Access Door Latch |
| – | 87G1519 | 1 | Door Lock (Key) |
| – | 87G1520 | 1 | Solenoid (Door Lock) |
| – | 87G1525 | 1 | Catch (Access Door) |
| – | 87G1527 | 1 | Bracket (Strike) |
| – | 87G1874 | 2 | M3x6 PH Screw (Strike Bracket) |
| –7 | NP | 1 | Frame Assembly |
| – | NP | 1 | SCSI Panel |
| – | 87G1874 | 4 | M3x4 PH Screw (SCSI Panel) |
| – | 87G1558 | 1 | SCSI Jumper, External (Controller Card) |
| – | 61G8324 | 1 | Terminator |
| – | 59H2678 | 1 | Cartridge, Data, 170M |
| – | 59H2898 | 1 | Cartridge, Cleaning |
| – | 59H2677 | 1 | Cartridge, Test, 22M |

> A dash (-) in the Index Number column indicates the part is either not shown or not called out.
> NP in the Part Number column indicates the part is nonprocurable.
> P/N 87G1874 contains 4 each of all required screws.

# Assembly 5: Library Model 356 - Rack Mount— External
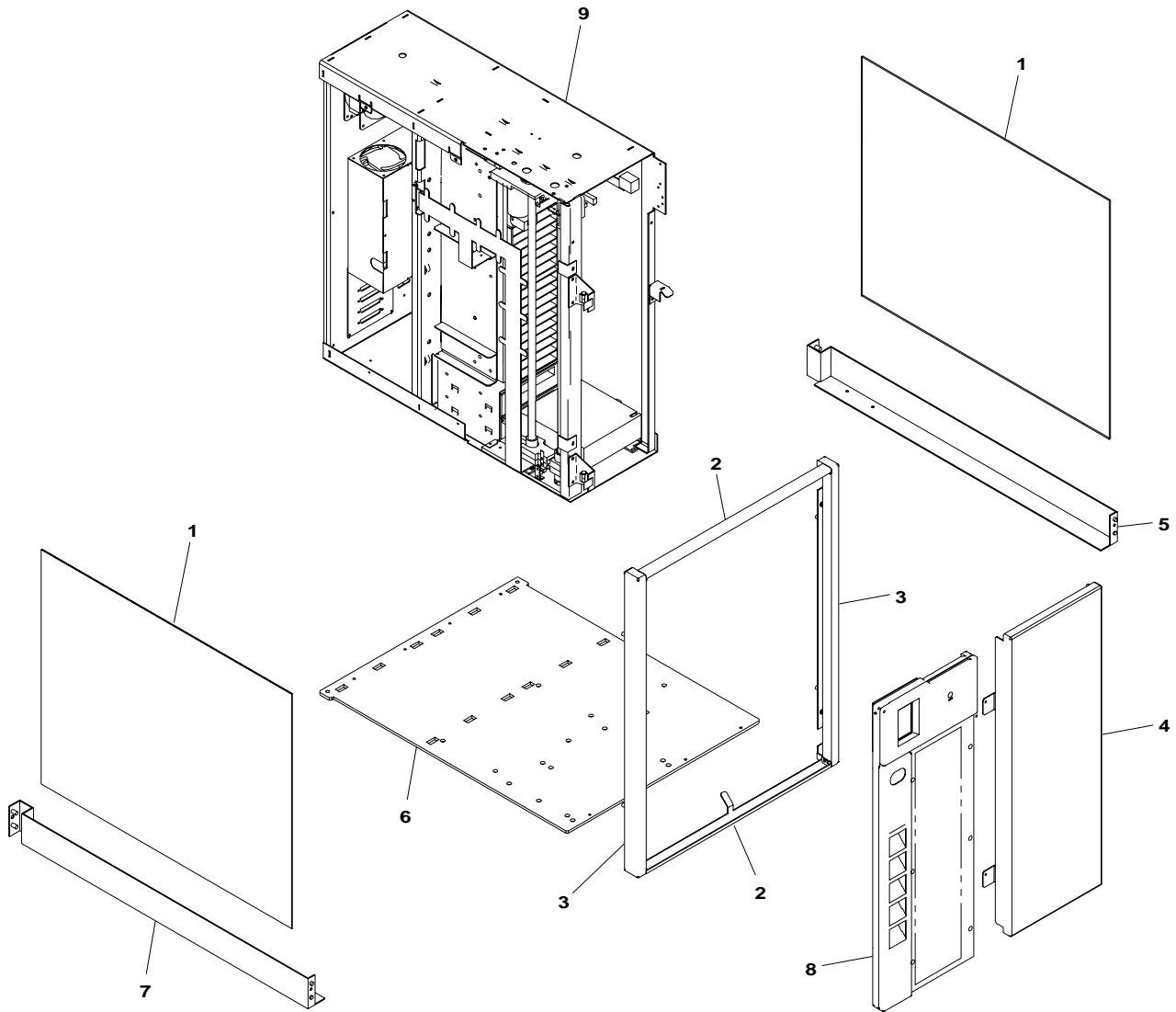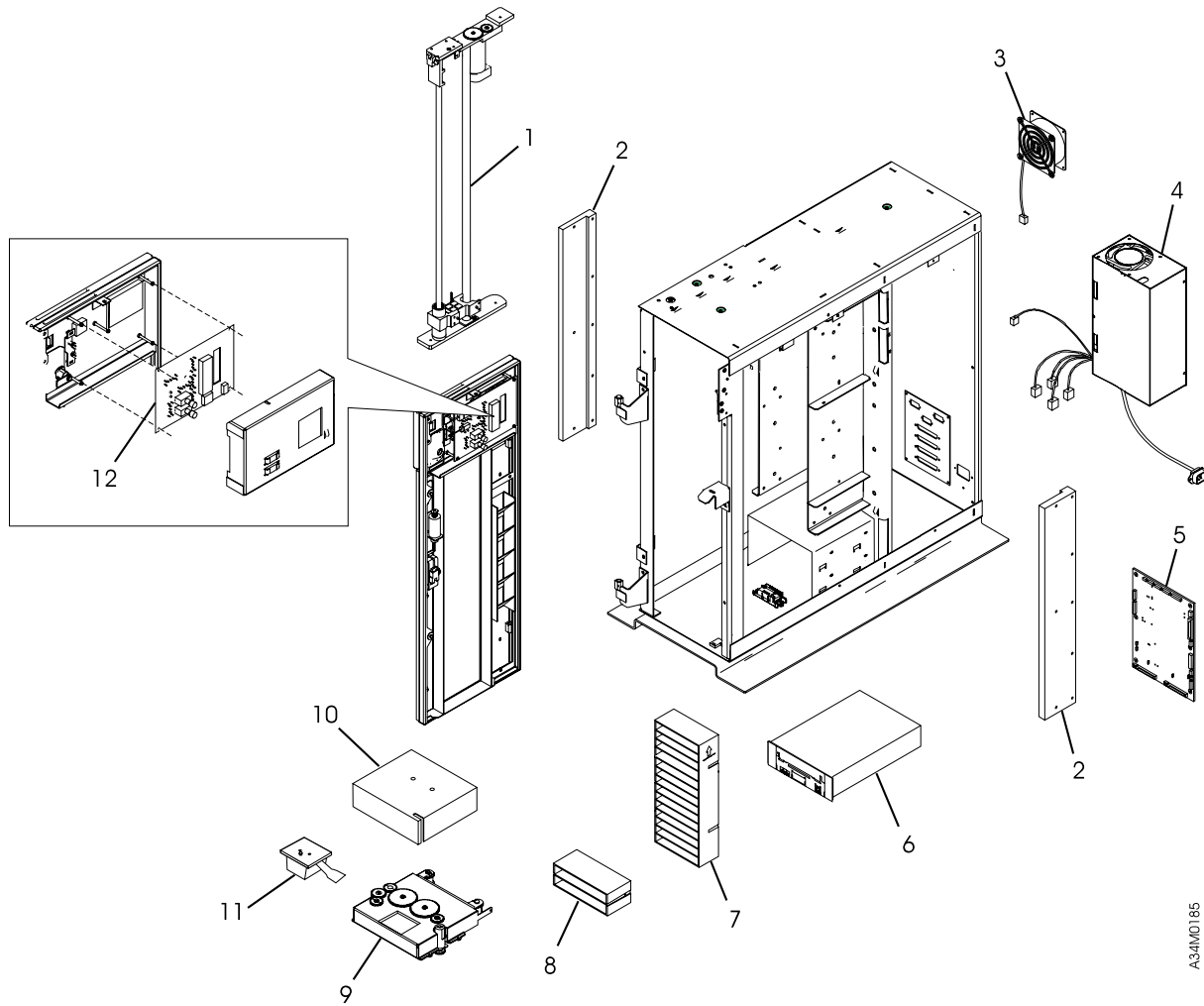
ASPART3-00

| Asm–Index | Part Number | Units | Description |
|---|---|---|---|
| 5–1 | 87G1534 | 2 | Left & Right Internal Covers |
| – | 87G1874 | 4 | M3x8 PH Screw (Library — to — Base) |
| – | 87G1874 | 8 | M3x6 PH Screw (Left and Right Internal Side Covers) |
| – | | 1 | Rack Mount Assembly (includes the following) |
| – | 59H3896 | 1 | Filler Strip |
| – | 59H3839 | 1 | Rack, Bezel |
| – | 59H3897 | 1 | Filler Panel |
| – | 59H3838 | 1 | Rail (Right) |
| – | 87G1533 | 1 | Rack, Plate |
| – | 59H3837 | 1 | Rail (Left) |
| – | 1624779 | 2 | M5 Fastener |
| – | 1255289 | 2 | M6 Fastener |
| – | 59H3915 | 4 | M3x8 PH Screw (Rack Mount) |
| –7 | | 1 | Front Door Assembly with Logo (includes lock, solenoid, and sensor) |
| – | 87G1517 | 2 | Clevis (Door Hinge Pin) |
| – | 87G1518 | 1 | Access Door Latch |
| – | 87G1519 | 1 | Door Lock (Key) |
| – | 87G1520 | 1 | Solenoid (Door Lock) |
| – | 87G1525 | 1 | Catch (Access Door) |
| – | 87G1527 | 1 | Bracket (Strike) |
| – | 87G1874 | 2 | M3x6 PH Screw (Strike Bracket) |
| –8 | NP | 1 | Frame Assembly |
| – | NP | 1 | SCSI Panel |
| – | 87G1874 | 4 | M3x4 PH Screw (SCSI Panel) |
| – | 67G1263 | 1 | System to Device SCSI Cable (14m) |
| – | 61G8324 | 1 | Terminator |
| – | 59H2678 | 1 | Cartridge, Data, 170m |
| – | 59H2898 | 1 | Cartridge, Cleaning |
| – | 59H2677 | 1 | Cartridge, Test, 22m |
| – | 59H3900 | 1 | IBM Fastwide SCSI Adapter |

A dash (-) in the Index Number column indicates the part is either not shown or not called out.
NP in the Part Number column indicates the part is nonprocurable.
P/N 87G1874 contains 4 each of all required screws.

# Assembly 6: Library Models 355 and 356

A34M0185

| Asm–Index | Part Number | Units | Description |
|---|---|---|---|
| 6–1 | 86G9258 | 1 | Accessor Assembly (includes Top and Bottom Travel Limit and Accessor Sensors) |
| – | 87G1874 | 4 | M3X6 PH Screw (Accessor Mount) |
| –2 | 86G9299 | 1 | Magazine Mounting Plate Assembly (included Left and Right Mounting Plates and Sensors) |
| – | 87G1874 | 12 | M4X8 PH Screw (Magazine Mount) |
| – | 86G9260 | 1 | Sensor Group (includes Accessor Obstructed Sensors, Accessor Bottom Travel Limit Cable, Accessor Top Travel Limit and Lock Cable, Accessor Motor Tach Cable, Upper and Lower Magazine Sensor Cable) |
| –3 | 86G9326 | 1 | Fan Assembly |
| – | 81F7977 | 4 | Rubber Isolator Mount (Fan) |
| –4 | 86G9274 | 1 | Power Supply |
| – | 87G1874 | 1 | M3X4 PH Screw (Power Supply Mount) |
| –5 | 59H3410 | 1 | Controller Logic Card |
| – | 87G1874 | 4 | M4X8 PH Screw (Controller Card Mount) |
| – | 87G1874 | 2 | M4X10 PH Screw (Controller Card Mount) |
| –6 | 59H2842 | 2 | Tape Drive Assembly, 20GB |
| – | 86G9255 | 1 | Internal SCSI Cable Group (includes Drive 1 and Drive 2 cables) |
| – | 59H3038 | 1 | Cable, Tape Drive SCSI ID |
| – | NP | 2 | Tray (Tape Drive) |
| – | 87G1874 | 8 | M3X4 PH Screw (Drive to Tray, 4 each drive) |
| – | NP | 1 | Sleeve (Tape Drive) |
| – | 87G1874 | 4 | M3X4 PH Screw (Tray to Sleeve) |
| –7 | 86G9310 | 2 | Magazine Assembly, 10-Slot (includes Magazine and Cover) |
| –8 | 86G9312 | 1 | 2-Slot Magazine |
| – | 87G1874 | 2 | Screw (2-Slot Magazine Mount) |
| –9 | 59H3409 | 1 | Picker Assembly without Bar Code Reader (includes Umbilical Cable) |
| – | 87G1874 | 2 | M3X6 PH Screw (Picker Mount) |
| – | 87G1874 | 2 | M3X12 PH Screw (Picker Mount) |
| –10 | 44H3620 | 1 | Bar Code Reader with Flex Cable Assembly |
| – | 87G1874 | 4 | Screw (Bar Code Reader) |
| –11 | 87G1531 | 1 | Operator Panel Assembly |
| – | 87G1544 | 1 | Operator Panel Cable |
| – | 6272886 | 1 | Sensor (Door) |
| – | 87G1544 | 1 | Door Open or Close Sensor Cable |

A dash (-) in the Index Number column indicates the part is either not shown or not called out.

NP in the Part Number column indicates the part is nonprocurable.

P/N 87G1874 contains 4 each of all required screws.

The 8mm Tape Library can be configured with one or two tape drives.

**Assembly 6:  (continued)**

The library can be configured with 1 or 2 tape drives.

# Appendix D. Power Cables for Model 305

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**) These 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 will be installed and marked 'HAR'."

Figure 126 lists the power cable part number, the country where the power cable can be used, and an index number to be matched with the receptacle illustrations shown in Figure 127 on page 205. Please contact your local dealer if your 7331 power cable does not match this information.

| Figure 126. Power Cable Information | | |
|---|---|---|
| **Part Number** | **Country** | **Index** |
| 1838574<br>US/Canada | 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<br>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<br>6 ft<br>Chicago | Chicago, U.S.A. | 2 |
| 13F9940<br>Australia | Argentina, Australia, New Zealand | 3 |
| 13F9979<br>France | Abu Dhabi, Austria, Belgium, Bosnia, Botswana, Bulgaria, Croatia, Egypt, Finland, France, Germany, Greece, Iceland, Indonesia, Korea (South), Lebanon, Luxembourg, Macau, Macedonia, Netherlands, Norway, Portugal, Saudi Arabia, Serbia, Slovenia, Spain, Sudan, Sweden, Turkey | 4 |
| 13F9997<br>Denmark | Denmark | 5 |
| 14F0015<br>South Africa | Bangladesh, Burma, Pakistan, South Africa, Sri Lanka | 6 |
| 14F0033<br>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<br>Switzerland | Liechtenstein, Switzerland | 8 |
| 14F0069<br>Italy | Chile, Ethiopia, Italy | 9 |
| 14F0087<br>Israel | Israel | 10 |
| 6952291<br>Colombia | Colombia, Paraguay, Uruguay | 11 |
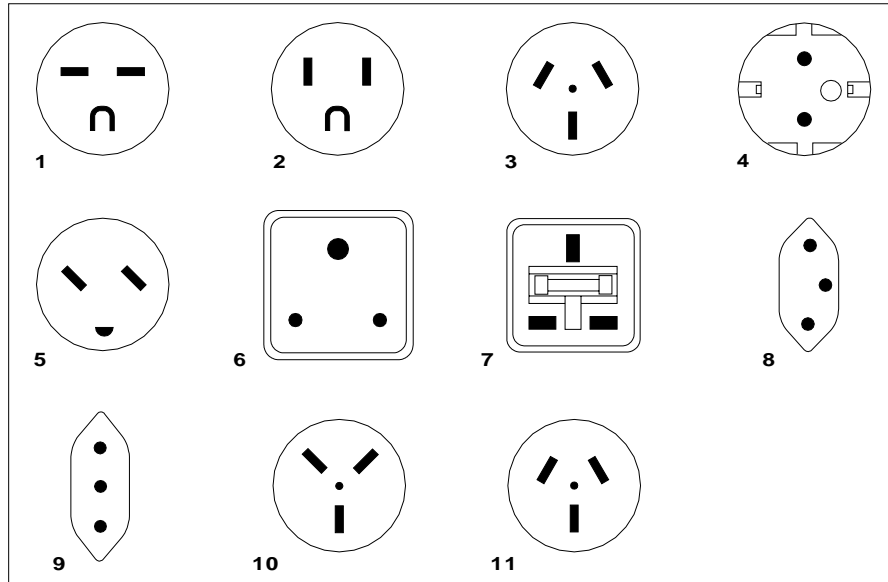
*Figure 127. Types of Receptacles*

# Appendix E. Statement of Limited Warranty

*The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. If you have any questions, contact IBM or your reseller.*

> **Machine:** 7331 and 3449 8mm Tape Library Model 3xx Service Guide
> **Warranty Period*:** One year
>
> *\*Contact your place of purchase for warranty service information.*

**Production Status**

Each Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

**The IBM Warranty for Machines**

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications.  The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if authorized by IBM, will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

For IBM or your reseller to provide warranty service for a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many of these transactions involve the removal of parts and their return to IBM. You represent that all removed parts are genuine and unaltered. A part that replaces a removed part will assume the warranty service status of the replaced part.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair it or replace it with one that is at least functionally equivalent, without charge. The replacement may not be new, but will be in good working order. If IBM or your reseller is unable to repair or replace the Machine, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

**Warranty Service**

To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-IBM-SERV (426-7378)**. In Canada, call IBM at **1-800-465-6666**. You may be required to present proof of purchase.

IBM or your reseller will provide certain types of repair and exchange service, either at your location or at IBM's or your reseller's service center, to restore a Machine to good working order.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service. You also agree to ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange. You agree to:

1. Obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
2. Where applicable, before service is provided —
   a. Follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
   b. Secure all programs, data, and funds contained in a Machine, and
   c. Inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

**Extent of Warranty**

IBM does not warrant uninterrupted or error-free operation of a Machine.

The warranties may be voided by misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, removal or alteration of Machine or parts identification labels, or failure caused by a product for which IBM is not responsible.

OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

**Limitation of Liability**

Circumstances may arise where, because of a default on IBM's part or other liability you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable only for:

1. Damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. The amount of any other actual direct damages or loss, up to the greater of U.S. $100,000 or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

1) THIRD-PARTY CLAIMS AGAINST YOU FOR LOSSES OR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

International Business Machines Corporation

Armonk, New York 10504, U.S.A.

# Index

# Readers' Comments — We'd Like to Hear from You

**7331 and 3449 8mm Tape Library**
**Model 3xx**
**Service Guide**

**Publication No. GA32-0377-00**

**Overall, how satisfied are you with the information in this book?**

|  | Very Satisfied | Satisfied | Neutral | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|
| Overall satisfaction |  |  |  |  |  |

**How satisfied are you that the information in this book is:**

|  | Very Satisfied | Satisfied | Neutral | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|
| Accurate |  |  |  |  |  |
| Complete |  |  |  |  |  |
| Easy to find |  |  |  |  |  |
| Easy to understand |  |  |  |  |  |
| Well organized |  |  |  |  |  |
| Applicable to your tasks |  |  |  |  |  |

**Please tell us how we can improve this book:**

Thank you for your responses.  May we contact you?     Yes     No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.
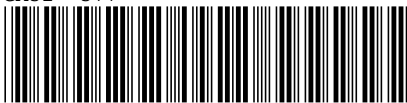
Name

Address

Company or Organization

Phone No.

IBM

# IBM

Part Number: 59H3447

Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

GA32- 377-

IBM    7331 and 3449 8mm Tape Library Model 3xx                                      Service Guide

DSMKPO654E INVALID POSTSCRIPT FILE.
DSMMOM395I '.EDFPO' LINE 70: .po @E@P@S
DSMMOM397I '.EDFPO' WAS IMBEDDED AT LINE 910 OF '.EDFAWRK'
DSMMOM397I '.EDFAWRK' WAS IMBEDDED AT LINE 130 OF '.EDFARTA'
DSMMOM397I '.EDFARTA' WAS IMBEDDED AT LINE 3769 OF 'A49S0MST'
DSMBEG323I STARTING PASS 2 OF 4.
DSMKPO654E INVALID POSTSCRIPT FILE.
DSMMOM395I '.EDFPO' LINE 70: .po @E@P@S
DSMMOM397I '.EDFPO' WAS IMBEDDED AT LINE 910 OF '.EDFAWRK'
DSMMOM397I '.EDFAWRK' WAS IMBEDDED AT LINE 130 OF '.EDFARTA'
DSMMOM397I '.EDFARTA' WAS IMBEDDED AT LINE 3769 OF 'A49S0MST'
DSMBEG323I STARTING PASS 3 OF 4.
DSMKPO654E INVALID POSTSCRIPT FILE.
DSMMOM395I '.EDFPO' LINE 70: .po @E@P@S
DSMMOM397I '.EDFPO' WAS IMBEDDED AT LINE 910 OF '.EDFAWRK'
DSMMOM397I '.EDFAWRK' WAS IMBEDDED AT LINE 130 OF '.EDFARTA'
DSMMOM397I '.EDFARTA' WAS IMBEDDED AT LINE 3769 OF 'A49S0MST'
DSMBEG323I STARTING PASS 4 OF 4.
DSMKPO654E INVALID POSTSCRIPT FILE.
DSMMOM395I '.EDFPO' LINE 70: .po @E@P@S
DSMMOM397I '.EDFPO' WAS IMBEDDED AT LINE 910 OF '.EDFAWRK'
DSMMOM397I '.EDFAWRK' WAS IMBEDDED AT LINE 130 OF '.EDFARTA'
DSMMOM397I '.EDFARTA' WAS IMBEDDED AT LINE 3769 OF 'A49S0MST'