

**TL82X/TL893/TL896 Automated Tape Library
for DLT™ Cartridges**

Operator's Guide

EK-TL820-OP

Revision C01

EK-TL820-OP, Revision C01, February 13, 1997, Made in USA.

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FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following 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 (DIGITAL APPARATUS) Interference-Causing Equipment Standard ICES-003 Issue 2

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

Cer appareil numerique de la classe A respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

CISPR-22 WARNING!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

ACHTUNG!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmassnahmen verantwortlich ist.

ATTENTION!

Ceci est un produit de classe A. Dans un environnement domestique, ce produit peut causer des interférences radio lectriques. Il appartient alors a l'utilisateur de prendre les mesures appropriées.

NOTICE FOR USA AND CANADA ONLY

If shipped to USA, use the UL LISTED power cord specified below for 100-120 V operation. If shipped to CANADA, use the CSA CERTIFIED power cord specified below for 100-120V operation.

| | |
|----------|---|
| Plug Cap | Parallel blade with ground pin (NEMA 5-15P Configuration) |
| Cord | Type: SJT, three 16 or 18 AWG wires |
| Length | Maximum 15 feet |
| Rating | Minimum 10 A, 125 V |

ATTENTION

LIRE LA REMARQUE DANS LE MODE D'EMPLOI

REMARQUE

CETTE REMARQUE NE CONCERNE QUE LES ÉTATS-UNIS ET LE CANADA.

En cas d'envoi aux États-Unis, utiliser le cordon d'alimentation certifié UL et convenant pour 100-120 V.

En cas d'envoi au CANADA, utiliser le cordon d'alimentation CERTIFIÉ CSA et convenant pour 100-120 V.

| | |
|----------|---|
| Fiche | Broches paralléus avec une broche de mise à la terre (configuration NEMA 5-15P) |
| Cordon | Type: SJT, trifilaire 16 ou 18 AWG |
| Longeur | Maximum 15 pieds |
| Capacité | Minimum 10 A, 125 V |

ZU IHRER SICHERHEIT

Vorsicht

Um Feuergefahr und die Gefahr eines elektrischen Schlages zu vermeiden, darf das Gerät weder Regen noch Feuchtigkeit ausgesetzt werden.

Um einen elektrischen Schlag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur einem Fachmann.

Achtung

Da der interne Laserstrahl in Ihre Augen eindringen und Verletzungen verursachen kann, darf das Gehäuse nicht selbst geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur einem Fachmann.

Die Verwendung von Brillen, Kontaktlinsen usw. vergrößert die Gefahr.

Zur besonderen Beachtung

Zur Sicherheit

Sollte ein fester Gegenstand oder Flüssigkeit in das Geräteinnere gelangen, trennen Sie das Gerät von der Wandsteckdose ab und lassen Sie es von einem Fachmann überprüfen, bevor Sie es weiter verwenden.

Zum Abziehen des Kabels fassen Sie stets am Stecker und niemals am Kabel selbst an.

Zur Aufstellung

Stellen Sie das Gerät weder auf einer weichen Unterlage (z. B. Decke, Teppich) noch in der Nähe von Vorhängen, Tapeten usw. auf, da hierdurch die Ventilationsöffnungen blockiert werden können.

Zur Reinigung

Verwenden Sie zur Reinigung des Gehäuses, des Bedienungspultes und der Bedienelemente ein trockenes, weiches Tuch oder ein weiches, leicht mit mildem Haushaltsreiniger angefeuchtetes Tuch. Lösemittel wie Alkohol oder Benzin dürfen nicht verwendet werden, da diese die Gehäuseoberfläche ungreifen.

LASER STATEMENT

CLASS 1 LASER PRODUCT

CAUTION - This product contains a Class II laser. Laser light - DO NOT stare into beam. Avoid Exposure - Laser Light is emitted from the bar code scanner.

CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure.

LASER KLASSE 1

VORSICHT : Dieses Produkt Enthdlt Einen Laser Der Kategorie II. Laserstrahlen - Der Strichcode-scanner Gibt Laserstrahlen aus. VERMEIDEN SIE jeden Blickkontakt und direkten kvrperlichen Kontakt mit diesen Strahlen.

VORSICHT : Ein nicht ordnungsgemd_er (siehe hier enthaltene Anweisungen) Einsatz bzw. Dnderungen der Betriebsleistung kvnnen einen gesundheitsgefhdrenden Kontakt zur Folge haben.

APPAREIL À LASER DE CLASSE 1

ATTENTION : ce produit relhve de la classe laser II. Rayonnement laser - NE PAS fixer des yeux le rayon. Eviter les expositions - Le rayonnement laser est imis' partir du lecteur optique de code barre.

ATTENTION : L'utilisation de contrtles ou d'ajustements de performance des procidures autres que ceux indiquis ici peut entranner une exposition dangereuse.

PRODUCTO LÁSER DE CLASE 1

¡ATENCIÓN! Este producto contiene laser de clase II. Luz de laser - NO mire el rayo. Evite el contacto con la luz: la luz de laser se emite desde el explorador de código de barras.

¡ATENCIÓN! El uso de los controles o ajustes para realizar procedimientos que no son especificados puede provocar una situación peligrosa.

LUOKAN 1 LASERLAITE

ATTENZIONE: questo prodotto emette una luce laser di Classe II. NON guardare il fascio di luce ed evitare di esporsi alla fonte del laser. Il fascio di luce laser h emesso dal dispositivo di scansione del codice a barre.

ATTENZIONE: l'uso di comandi o regolazioni per eseguire le procedure che non siano quelli specificati in questa documentazione pur causare rischi all 'incolumit' delle persone.

Table of Contents

Introduction

| | |
|--------------------------------------|-----|
| Purpose | 1-3 |
| Conventions Used in this Guide | 1-3 |
| Related Documentation | 1-4 |

Library Overview

| | |
|---|------|
| TL82X/TL893/TL896 Library Description | 2-3 |
| Front Control Panel | 2-8 |
| Tape Drive Status Control Panel | 2-10 |
| Door Handle and Safety Switch | 2-12 |
| Rear Connector Panel | 2-13 |
| Multi-Unit Controller | 2-13 |
| Host SCSI Cabling | 2-13 |
| Pass Through Mechanism | 2-19 |
| Inport/Outport Device | 2-20 |
| Cartridge/Tape Drive Compatibility | 2-21 |
| Automatic Drive Cleaning Feature | 2-22 |

Operating Instructions

| | |
|--|------|
| Mounting Bin Packs and Loading Cartridges | 3-3 |
| Mounting a Bin Pack on the Carousel | 3-3 |
| Inserting and Removing DLT™ Cartridges | 3-4 |
| Loading and Unloading Cartridges via the IOD | 3-6 |
| Loading Cartridges into the IOD Inport Door | 3-6 |
| Unloading Cartridges from the IOD Outport Door | 3-6 |
| Manually Unloading a Tape Drive | 3-8 |
| Cleaning and Lubrication | 3-10 |
| Cleaning and Lubricating the Vertical Rails | 3-10 |
| Cleaning and Lubricating the Extension Rails | 3-11 |

Troubleshooting

| | |
|--|-----|
| Error Messages sent to the Host. | 4-3 |
| Control Panel Status Display Codes | 4-3 |
| Other Problems. | 4-7 |

Glossary

Index

List of Figures

| | |
|--|------|
| Figure 1: Library Front View | 2-5 |
| Figure 2: Library with Door Open | 2-6 |
| Figure 3: Library Rear View | 2-7 |
| Figure 4: Front Control Panel | 2-8 |
| Figure 5: Tape Drive Status Control Panel | 2-10 |
| Figure 6: Front Door Handle | 2-12 |
| Figure 7: TL820 Rear Connector Panel Cabling | 2-14 |
| Figure 8: TL822 Rear Connector Panel Cabling | 2-15 |
| Figure 9: TL826 Rear Connector Panel Cabling | 2-16 |
| Figure 10: TL893 Rear Connector Panel Cabling | 2-17 |
| Figure 11: TL896 Rear Connector Panel Cabling | 2-18 |
| Figure 12: PTM Location | 2-19 |
| Figure 13: IOD Location | 2-20 |
| Figure 14: Mounting a Bin Pack on the Carousel | 3-5 |
| Figure 15: Inporting Cartridges | 3-7 |
| Figure 16: DLT™ Tape Drive Status Control Panel | 3-9 |
| Figure 17: DLT™ Tape Drive Insert/Release Handle | 3-9 |

List of Tables

| | | |
|-----------|---|------|
| Table 1: | Related Documentation | 1-4 |
| Table 2: | Library Models..... | 2-3 |
| Table 3: | Tape Drive Specifications..... | 2-3 |
| Table 4: | Front Control Panel Description | 2-9 |
| Table 5: | Tape Drive Status Control Panel Description | 2-11 |
| Table 6: | TL820 SCSI Port/ID..... | 2-14 |
| Table 7: | TL822 SCSI Port/ID..... | 2-15 |
| Table 8: | TL826 SCSI Port/ID..... | 2-16 |
| Table 9: | TL893 SCSI Port/ID..... | 2-17 |
| Table 10: | TL896 SCSI Port/ID..... | 2-18 |
| Table 11: | Cartridge/Tape Drive Compatibility..... | 2-21 |
| Table 10: | Status Codes..... | 4-3 |
| Table 11: | Common Library Problems | 4-7 |

Introduction

1

Purpose 1-3
Conventions Used in this Guide 1-3
Related Documentation. 1-4


Purpose

The TL82X/TL893/TL896 Operator's Guide describes the basic operating functions of the TL820, TL822, TL826, TL893, and TL896 automated tape libraries. This manual includes the following:

- Chapter 2, "Library Overview," describes the differences between the five models of libraries and provides an overview of the library components and functions.
- Chapter 3, "Operating Instructions" describes safety precautions, how to turn the power on and off, and how to load and remove bin packs and cartridges.
- Chapter 4, "Troubleshooting," describes how to diagnose problems and determine whether you can fix a problem, or if an authorized field service representative is required.
- This manual also includes a Glossary for reference. Use the Table of Contents, List of Figures, List of Tables, and Index to find a specific section or to locate information on a particular subject.

Conventions Used in this Guide

 **WARNING** *When the warning icon accompanies text, it indicates that a potential hazard to your personal safety exists and is included to help prevent injuries.*

 **CAUTION** *When the caution icon accompanies text, it indicates that a potential hazard to equipment or data exists and is included to help prevent damage.*

Related Documentation

To obtain further information and/or copies of documentation on this product, contact:

U.S. Software Supply Business
Digital Equipment Corporation
10 Cotton Road
Nashua, New Hampshire 03063-1260

The part number of each document will be required at the time of order.

Table 1: Related Documentation

| Document No. | Document Title | Document Description |
|--------------|--|--|
| EK-TL820-SM | TL82X/TL893/TL896 Diagnostic Software User's Manual | Describes how to install and use the TL82X/TL893/TL896 Diagnostic Software Package, developed for field service personnel. |
| EK-TL820-PG | TL82X/TL893/TL896 Facilities Planning & Installation Guide | This guide describes facility requirements and installation procedures for the TL82X/TL893/TL896 library. |
| EK-TL820-IG | TL82X/TL893/TL896 Software Interface Guide | This guide is for software engineers and programmers developing applications that control the libraries. |
| EK-TL820-SV | TL82X/TL893/TL896 Field Service Manual | Contains procedures for repair/replacement of faulty components and guidelines for periodic maintenance. |
| 6207125 | TL82X/TL893/TL896 IOD Instn Instr | This document describes how to install the Inport/Outport Device (IOD). |
| 6207126 | TL82X/TL893/TL896 MUC Instn Instr | This document describes how to install a multi-unit library system. |
| EK-OTZ87-OM | TZ87 Series Tape Subsystem Owner's Manual | This document describes the TZ87 tape drive and provides operating and troubleshooting procedures. |
| EK-TZ88X-OM | TZ88 Series Tape Subsystem Product Manual | This document describes the TZ88 tape drive and provides operating and troubleshooting procedures. |
| EK-TZ89N-UG | TZ89 DLT™ Series Tape Drive User's Guide | This document describes the TZ89 tape drive and provides operating and troubleshooting procedures. |

Library Overview

2

| | |
|---|------|
| TL82X/TL893/TL896 Library Description | 2-3 |
| Front Control Panel | 2-8 |
| Tape Drive Status Control Panel | 2-10 |
| Door Handle and Safety Switch | 2-12 |
| Rear Connector Panel | 2-13 |
| Multi-Unit Controller | 2-13 |
| Host SCSI Cabling | 2-13 |
| Pass Through Mechanism | 2-19 |
| Inport/Outport Device | 2-20 |
| Cartridge/Tape Drive Compatibility | 2-21 |
| Automatic Drive Cleaning Feature | 2-22 |

TL82X/TL893/TL896 Library Description

The TL820, TL822, TL826, TL893, and TL896 libraries are automated tape libraries for Digital Linear Tape (DLT™) cartridges. These libraries are identical except for the model and number of DLT™ drives installed, and the DLT™ cartridge capacity. Libraries with more tape drives have less cartridge capacity.

The term TL82X/TL893/TL896 refers to all five models of libraries.

Table 2 describes the different library configurations.

Table 2: Library Models

| Library Model # | Number of Drives | DLT™ Drive Type | DLT™ Cartridge Capacity |
|-----------------|------------------|-----------------|-------------------------|
| TL820 | 3 | TZ87 | 264 |
| TL822 | 3 | TZ88 | 264 |
| TL826 | 6 | TZ88 | 176 |
| TL893 | 3 | TZ89 | 264 |
| TL896 | 6 | TZ89 | 176 |

Table 3 describes the DLT™ tape drive specifications.

Table 3: Tape Drive Specifications

| Model Number | Native Mode | | With 2:1 Compression | |
|--------------|---------------|-----------|----------------------|-----------|
| | Transfer Rate | Capacity | Transfer Rate | Capacity |
| TZ87 | 1.25 Mbytes/s | 10 Gbytes | 2.5 Mbytes/s | 20 Gbytes |
| TZ88 | 1.5 Mbytes/s | 20 Gbytes | 3.0 Mbytes/s | 40 Gbytes |
| TZ89 | 5 Mbytes/s | 35 Gbytes | 10 Mbytes/s | 70 Gbytes |

The basic library uses a SCSI or EIA/TIA-574 (RS-232 for 9-pin connector) serial link to interface with the host computer. The Multi-Unit Controller (MUC) allows up to five units to be connected together and driven by a single host. The Pass Through Mechanisms (PTMs) transfer cartridges between units.

Figure 1 through Figure 3 show the dimensions and major components of the TL82X/TL893/TL896 library. The library has a front door that can be opened for easy bulk loading of bin packs, each containing a maximum of 11 cartridges. The bin packs are arranged on an eight-sided carousel providing two or three bin packs per face, each containing multiple cartridges.

Each library also contains a robotic controller and a bar code reader for obtaining quick and accurate inventories. The Inport/Outport Device (IOD) allows single cartridges to transfer in and out without interrupting library operation.

The tape drives are mounted in the housing above the carousel and in-line with the carousel front face. A gripper moves horizontally on an extension axis which in turn is attached to vertical rails in the front door.

Upon receipt of the appropriate command from the host computer, the control electronics command the robotic mechanism to remove a cartridge from a storage bin, raise it up in front of a tape drive, and insert the cartridge into the drive. The host computer, also directs the tape drives by issuing commands such as read, write, unload and clean.

An infrared light curtain is emitted from the base of the library up the front of the carousel and the tape drives, and is detected at the top of the library cabinet. If the infrared beam is interrupted for any reason all robotics motion is halted until the source of the interruption is removed.

Figure 1: Library Front View

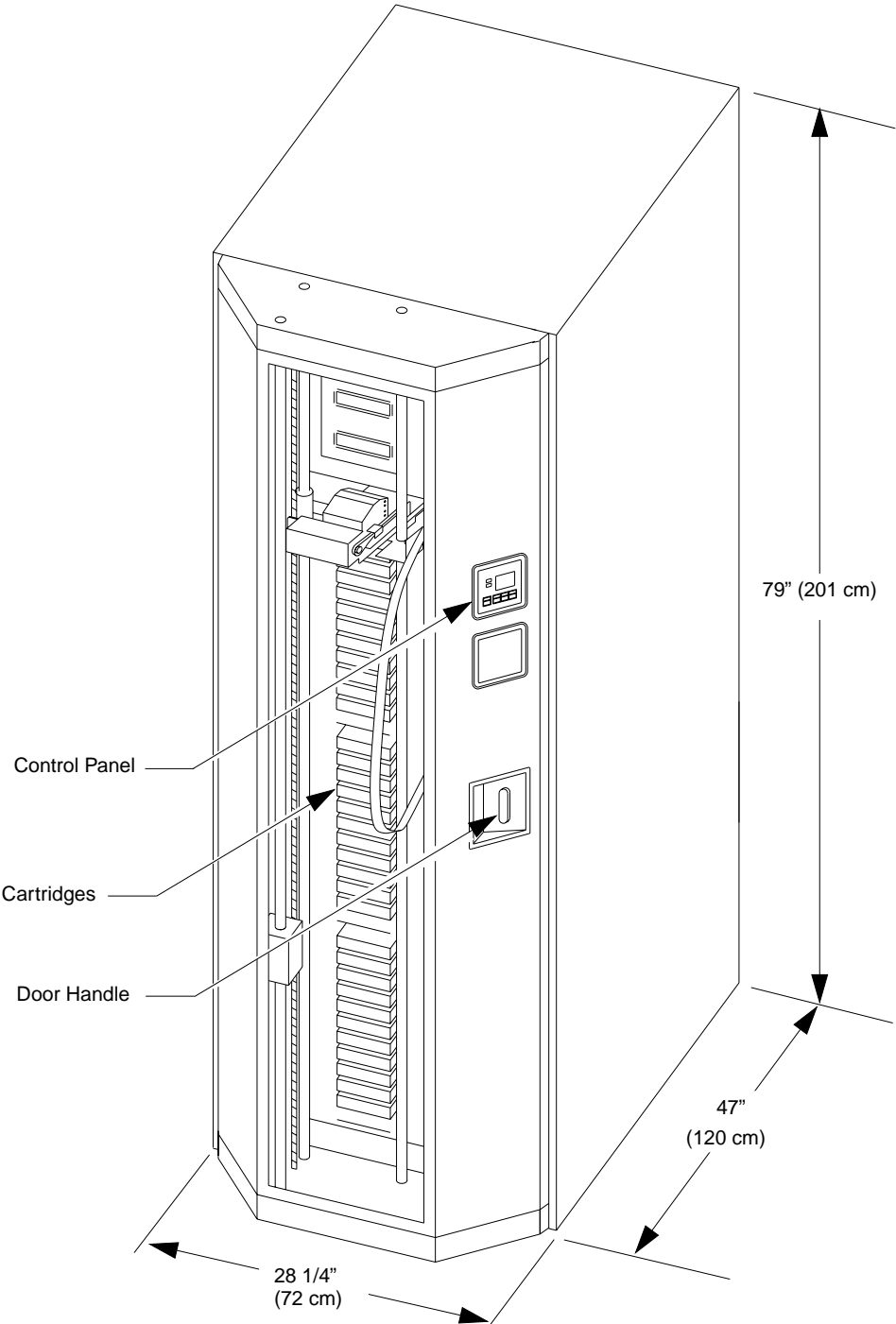


Figure 2: Library with
Door Open

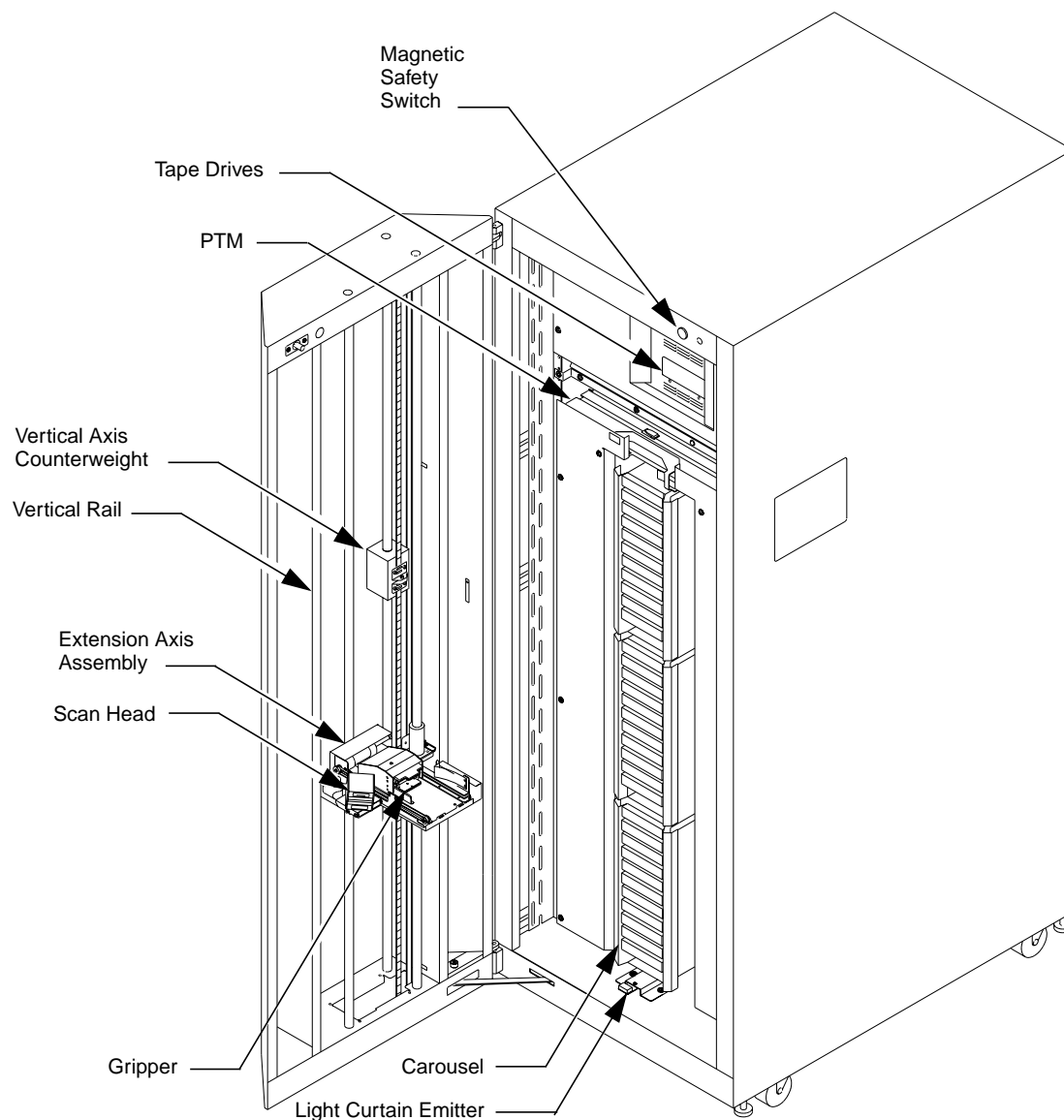
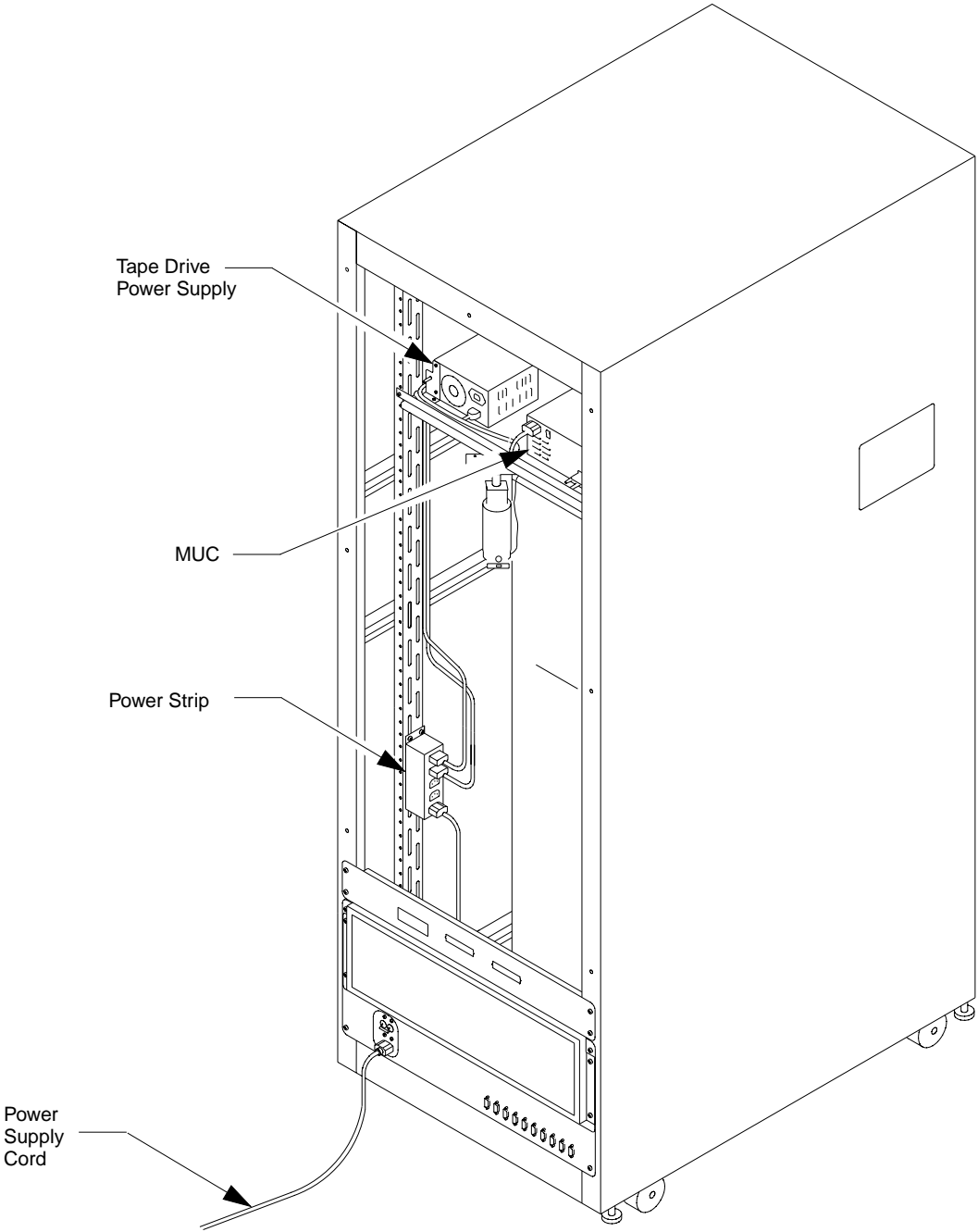


Figure 3: Library Rear View



(Note: TL820 Library Shown)

Front Control Panel

The front control panel, located on the front door of the TL82X/TL893/TL896 library, is shown in Figure 4. The FAULT and STANDBY indicators, along with the status display are located on the top half of the control panel. The STOP, STANDBY, and ← → control buttons are located on the lower half.

Figure 4: Front Control Panel

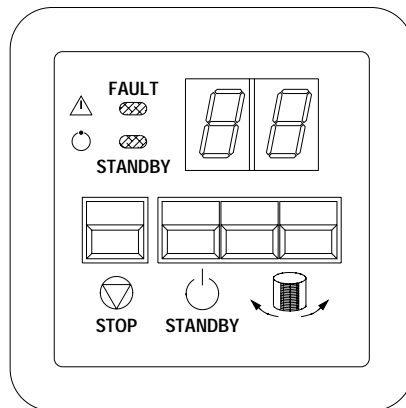

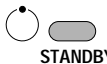
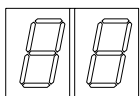
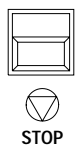
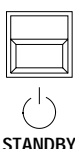
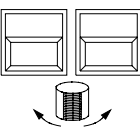


Table 4: Front Control Panel Description

| Button/Indicator | Description | Function |
|---|-------------------|---|
|  | FAULT indicator | Lights when one of the following occurs: 1) the library door is open. 2) the rear panel is removed. 3) you press the STOP button. 4) there is a system failure. |
|  | STANDBY indicator | Lights when you press the STANDBY button to take the library off-line. |
|  | status display | Displays codes that describe the operating state of the library. For status display code descriptions, see Chapter 4. |
|  | STOP button | Allows you to disconnect power to the library's robotic equipment for the following situations: 1) opening the door to access the bin packs. 2) during the power-off procedure. 3) in an emergency. Press the STOP button to disconnect power to the robotic equipment. |
|  | STANDBY button | Toggles the library between the on-line and off-line states. Press the STANDBY button to place the library off-line. When the library is off-line it cannot receive commands from the host. |
|  | ← and → | Rotates the carousel. Used when mounting or removing bin packs or individual cartridges. The system must be off-line for these buttons to operate. |

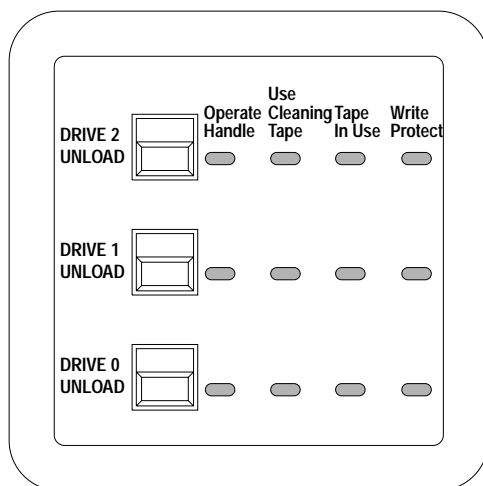
Tape Drive Status Control Panel

The tape drive status control panel is located inside the front door on the tape drive cosmetic panel. Figure 5 illustrates the control panel for the TL82X/TL893/TL896 libraries.

The TL820, TL822, and TL893 which each have three tape drives, have one tape drive status control panel. The TL826 and TL896 which each have six tape drives have two tape drive status control panels. One status control panel is used for each bank of three tape drives.








The tape drive unload buttons and indicators are described in Table 5 on page 2-11.

Figure 5: Tape Drive Status Control Panel



Note *The control panel is functionally identical to the TZ87, TZ88, or TZ89 tape drive front panel described in their respective owner's manuals. See the appropriate owner's manual for a more detailed description of the tape drive unload buttons and indicators.*

Table 5: Tape Drive
 Status Control Panel
 Description

| Button/Indicator | Description | Function |
|---|-----------------------------------|--|
| DRIVE 2 UNLOAD  | DRIVE 2 UNLOAD button | The three drive unload buttons correspond to the three tape drives, which are numbered 0 through 2 from bottom to top. Pressing the unload button(s) causes the: 1) tape to rewind. 2) drive to reset. 3) cartridge to unload if possible. |
| DRIVE 1 UNLOAD  | DRIVE 1 UNLOAD button | |
| DRIVE 0 UNLOAD  | DRIVE 0 UNLOAD button | |
| Operate Handle  | Operate Handle indicator(s) | Lights when the insert/release tape drive handle is ready to operate. IMPORTANT! The tape must be completely rewound and unloaded before you remove the cartridge from the drive. Depending on tape position, this operation may take from 10 seconds to 2 minutes. |
| Use Cleaning Tape  | Use Cleaning Tape indicator(s) | Lights when the drive head needs cleaning, or the current cartridge is bad. After unloading the cleaning cartridge, this indicator remains lit when one of the following occurs: 1) the cleaning operation was not complete. 2) the current cartridge is bad. 3) the cleaning cartridge has exceeded maximum usage and must be replaced. |
| Tape In Use  | Tape In Use indicator(s) | Lights after the cartridge is loaded and the tape loads into the drive. |
| Write Protect  | Write Protect indicator(s) | Lights when the tape is write-protected. |

Door Handle and Safety Switch

Use the front door handle, which is located on the middle of the right column of the front door, to open and close the door. Keep the front door closed except when performing a procedure that requires it to be open, such as mounting a bin pack on the carousel.

1. To open the door, turn the door handle counterclockwise.
2. To close the door, push the door shut and turn the door handle clockwise.

The door has a safety switch (see Figure 2 on page 2-6) that disconnects power to the library's robotic equipment when the door is open. The safety switch automatically resets when the door is closed.

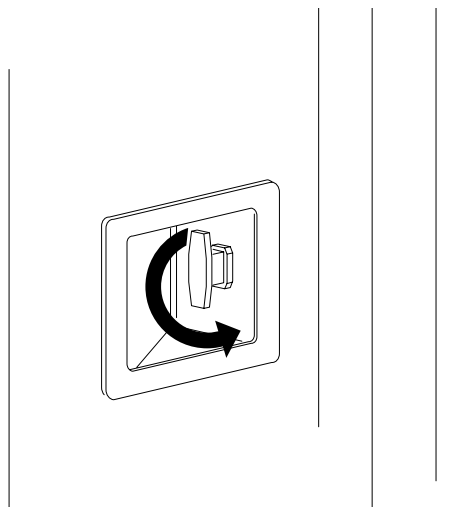


DO NOT override the safety switch. Operating the library with the safety switch defeated could cause personal injury from moving components, electrical shock, or damage the unit.




To prevent injury from moving components, always press the STOP button before opening the front door.

Figure 6: Front Door Handle



Rear Connector Panel

The rear connector panel is located at the bottom rear of the TL82X/TL893/TL896 library. All power and communications cable connections to the library are made on the rear connector panel.

 **CAUTION** *DO NOT remove the rear panel of the cabinet. There are no operator serviceable parts inside the rear of the cabinet.*

Multi-Unit Controller

The Multi-Unit Controller (MUC) serves two functions:

- It is a SCSI adapter that allows the SCSI interface to control communications between the host and the library.
- It permits the host to control up to five attached library units in a multi-unit configuration.

Host SCSI Cabling

The TL820 SCSI port and SCSI addressing, and the rear panel cabling is shown in Table 6, and Figure 7 on page 2-14

The TL822 SCSI port and SCSI addressing, and the rear panel cabling is shown in Table 7, and Figure 8 on page 2-15

The TL826 SCSI port and SCSI addressing, and the rear panel cabling is shown in Table 8, and Figure 9 on page 2-16

The TL893 SCSI port and SCSI addressing, and the rear panel cabling is shown in Table 9, and Figure 10 on page 2-17

The TL896 SCSI port and SCSI addressing, and the rear panel cabling is shown in Table 10, and Figure 11 on page 2-18

Table 6: TL820 SCSI Port/ID

| Library SCSI Port | Device | SCSI ID (Default) |
|-------------------|----------------------------|-------------------|
| B | TZ87 Tape Drive 2 (top) | 5 |
| | TZ87 Tape Drive 1 (middle) | 4 |
| A | TZ87 Tape Drive 0 (bottom) | 3 |
| | MUC | 2 |

Figure 7: TL820 Rear Connector Panel Cabling

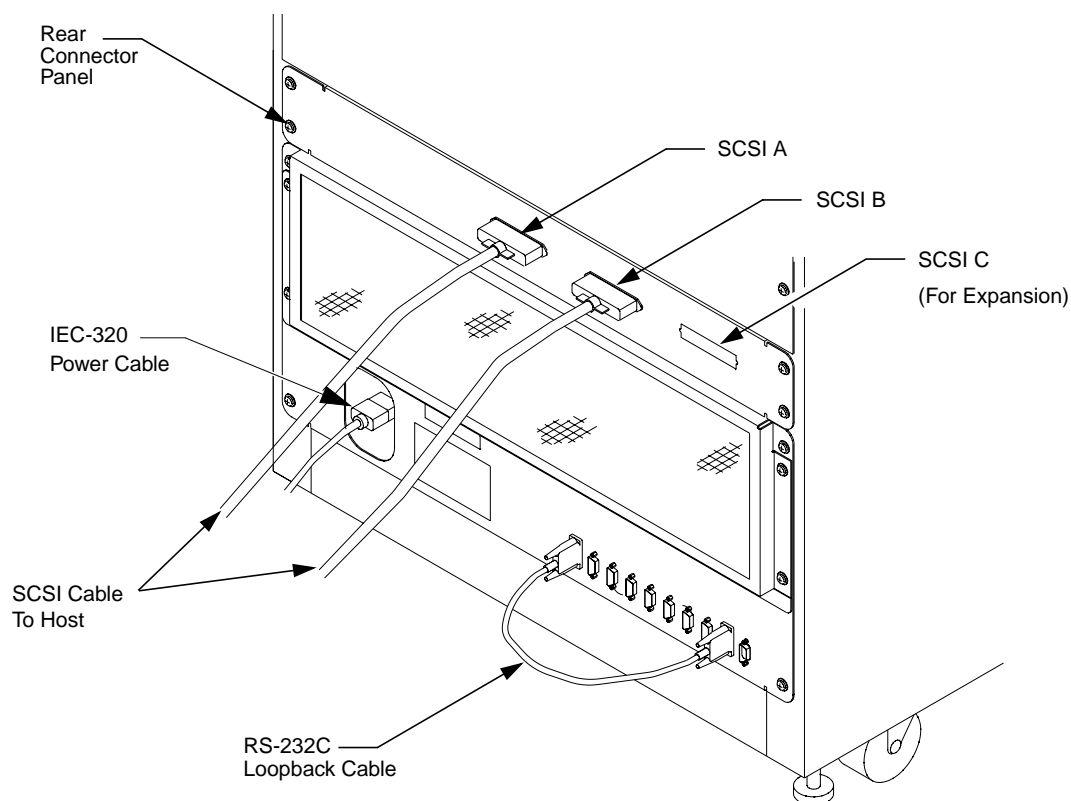
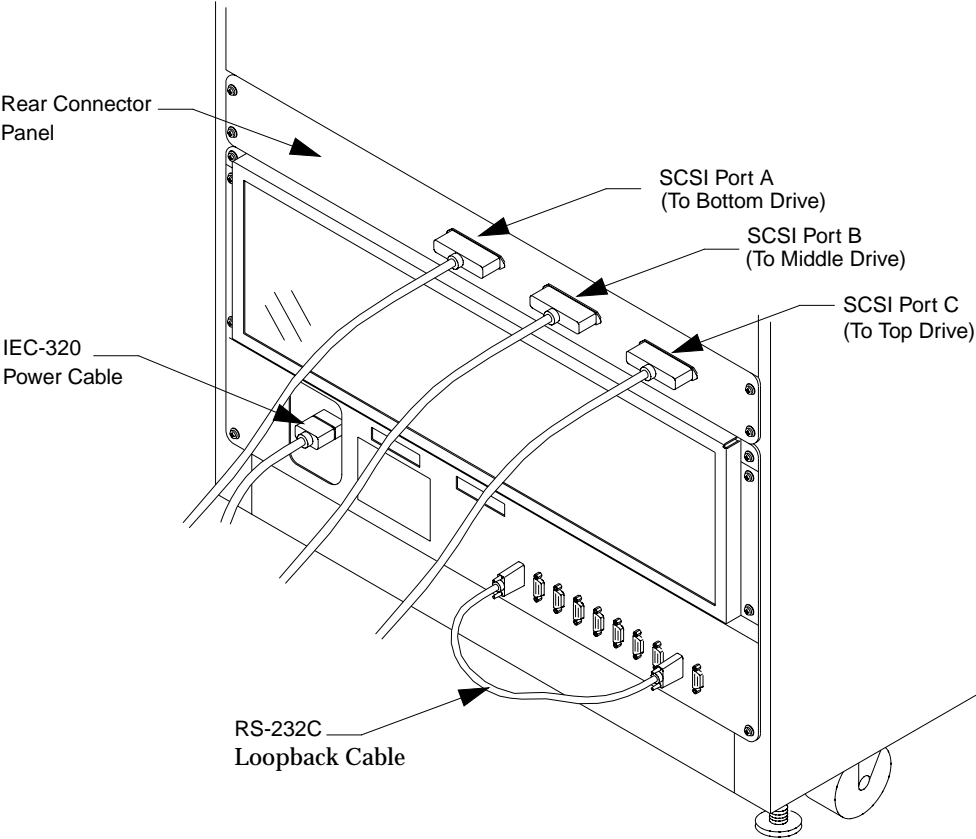


Table 7: TL822 SCSI Port/ID

| Library SCSI Port | Device | SCSI ID (Default) |
|-------------------|----------------------------|-------------------|
| C | TZ88 Tape Drive 2 (top) | 5 |
| B | TZ88 Tape Drive 1 (middle) | 4 |
| A | TZ88 Tape Drive 0 (bottom) | 3 |
| | MUC | 2 |

Figure 8: TL822 Rear Connector Panel Cabling



TD00007a

Table 8: TL826 SCSI Port/ID

| Library SCSI Port | Device | SCSI ID (Default) |
|-------------------|----------------------------|-------------------|
| D | MUC | 2 |
| | TZ88 Tape Drive 5 (top) | 5 |
| E | TZ88 Tape Drive 4 | 4 |
| F | TZ88 Tape Drive 3 | 3 |
| A | TZ88 Tape Drive 2 | 5 |
| B | TZ88 Tape Drive 1 | 4 |
| C | TZ88 Tape Drive 0 (bottom) | 3 |

Figure 9: TL826 Rear Connector Panel Cabling

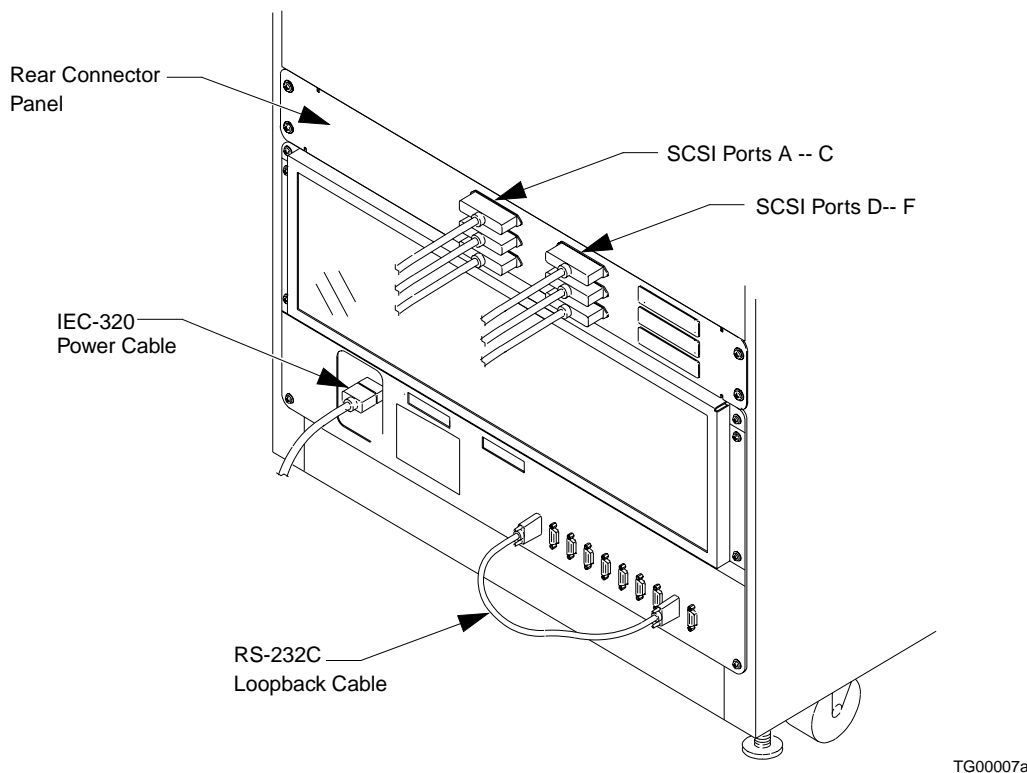
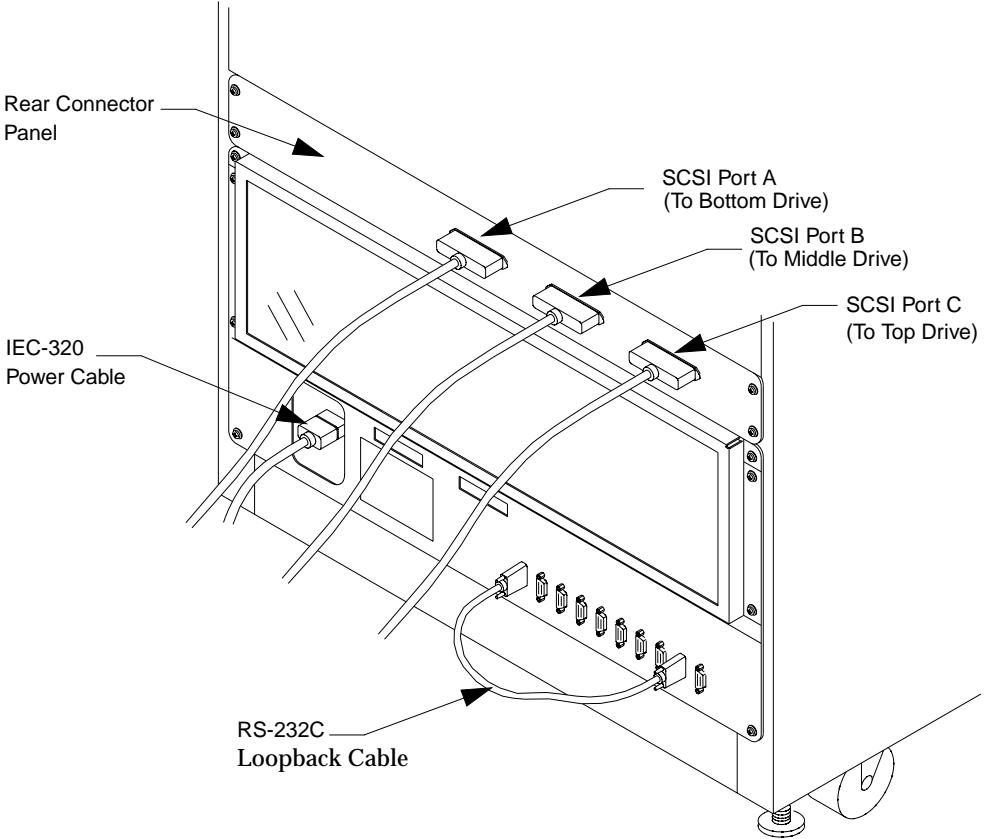


Table 9: TL893 SCSI Port/ID

| Library SCSI Port | Device | SCSI ID (Default) |
|-------------------|----------------------------|-------------------|
| C | TZ89 Tape Drive 2 (top) | 5 |
| B | TZ89 Tape Drive 1 (middle) | 4 |
| A | TZ89 Tape Drive 0 (bottom) | 3 |
| | MUC | 2 |

Figure 10: TL893 Rear Connector Panel Cabling

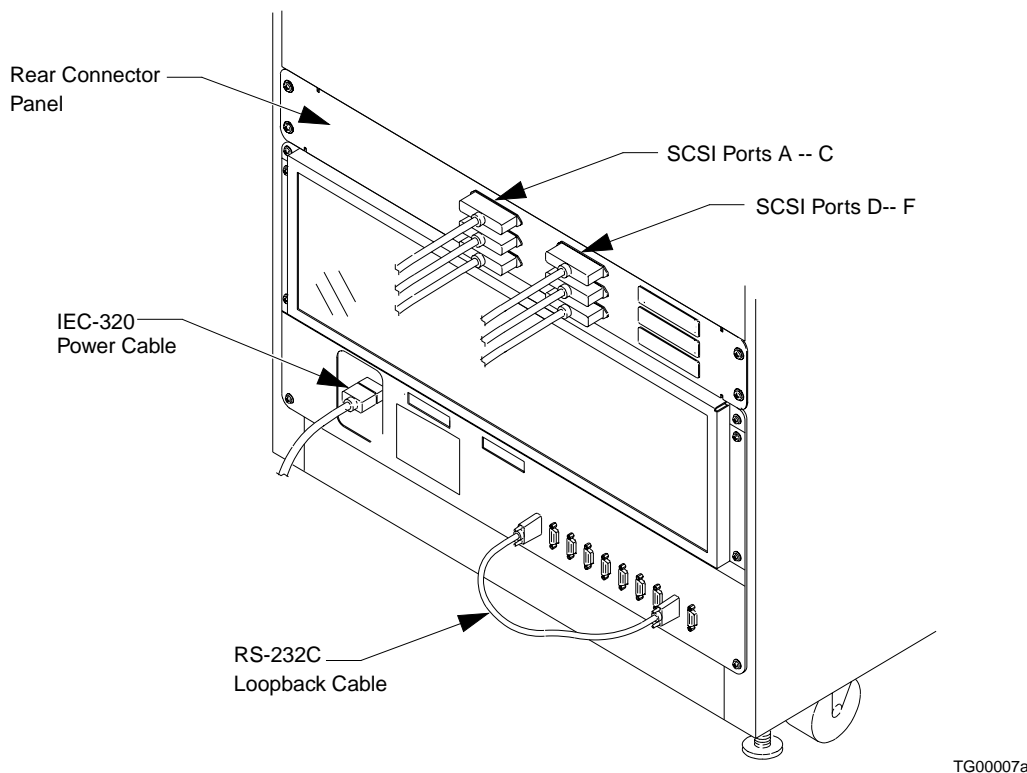


TD00007a

Table 10: TL896 SCSI Port/ID

| Library SCSI Port | Device | SCSI ID (Default) |
|-------------------|----------------------------|-------------------|
| D | MUC | 2 |
| | TZ89 Tape Drive 5 (top) | 5 |
| E | TZ89 Tape Drive 4 | 4 |
| F | TZ89 Tape Drive 3 | 3 |
| A | TZ89 Tape Drive 2 | 5 |
| B | TZ89 Tape Drive 1 | 4 |
| C | TZ89 Tape Drive 0 (bottom) | 3 |

Figure 11: TL896 Rear Connector Panel Cabling

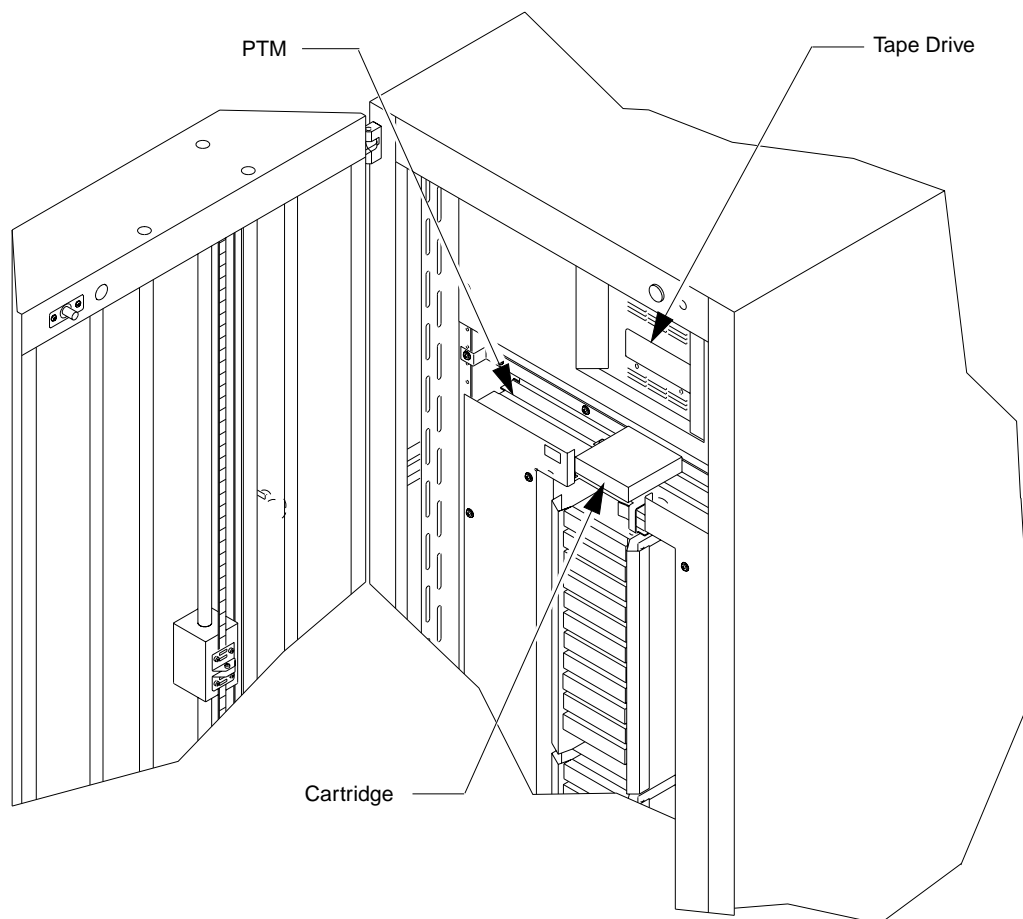


Pass Through Mechanism

The Pass Through Mechanism (PTM) allows cartridges to transfer between an IOD and the TL82X/TL893/TL896, or between units in a multi-unit configuration. The PTM is located between the storage carousel and the tape drives.

The library controller controls the PTM when host commands request cartridges to move into, or out of, the library.

Figure 12: PTM Location

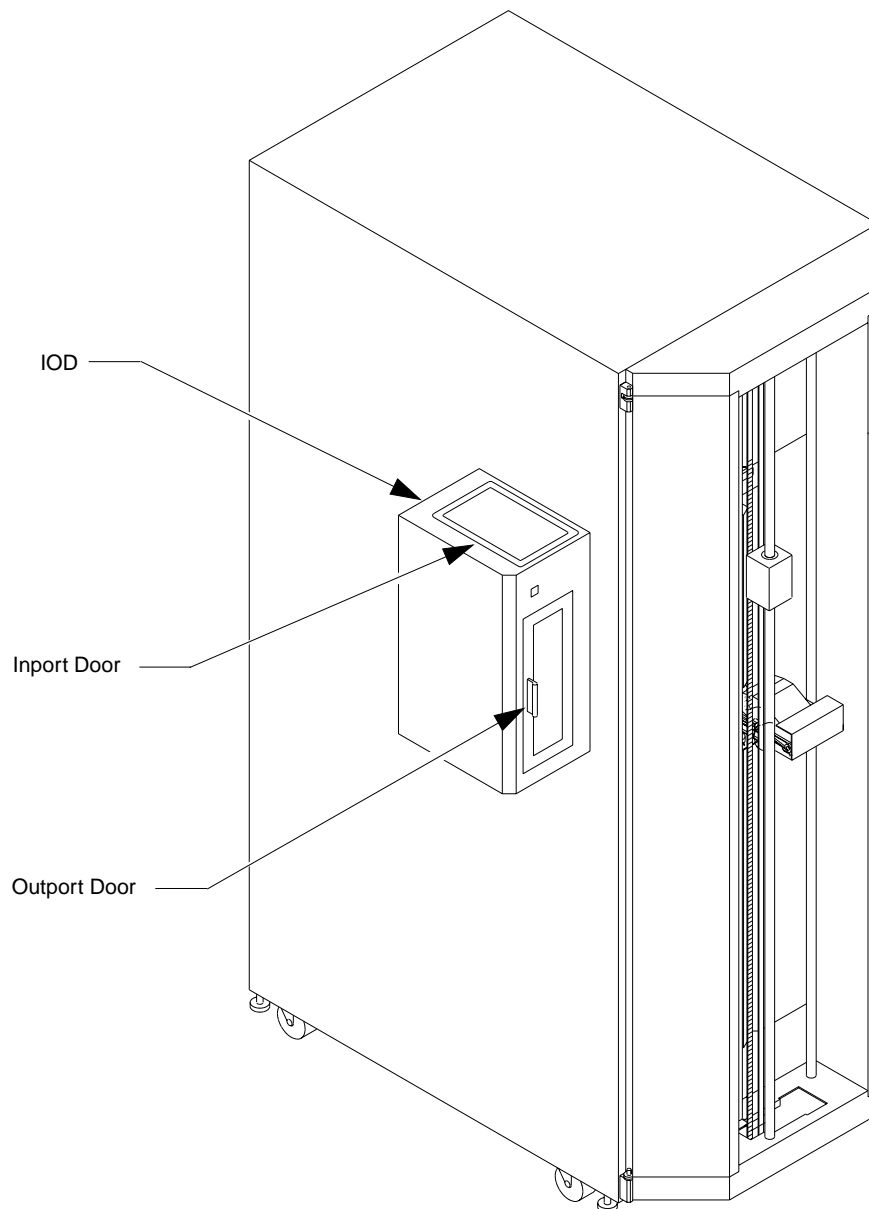


Inport/Output Device

Without interrupting operation, the inport/output device (IOD) allows you to load single cartridges and unload up to 12 cartridges.

The IOD is located on the front door hinge-side of the cabinet. In a multi-unit library configuration, the IOD is mounted on the left end unit.

Figure 13: IOD Location




Cartridge/Tape Drive Compatibility

The library is capable of supporting TZ87, TZ88, or TZ89 tape drives. The library is also capable of supporting DLTtape™ III, DLTtape™ IIIXT, and DLTtape™ IV cartridges, which are dark gray and black, respectively. When loading the library with cartridges, observe the compatibility of cartridges and tape drives as defined in Table 11.

Table 11: Cartridge/Tape Drive Compatibility

| Cartridge Type | TZ87 Tape Drive | TZ88 Tape Drive | TZ89 Tape Drive |
|----------------|-----------------|-----------------|-----------------|
| DLTtape™ III | compatible | compatible | compatible |
| DLTtape™ IIIXT | not compatible | compatible | compatible |
| DLTtape™ IV | not compatible | compatible | compatible |

 **CAUTION** *DO NOT USE DLTtape™ I or DLTtape™ II cartridges in this library.*

Bar code labels are supplied in the library accessories kit for labeling your DLT™ tape cartridges. To speed the library inventory process, install the bar code labels on all tape cartridges before placing the cartridges in the library. With a completely full carousel, the inventory process takes approximately four minutes if bar code labels are installed on all tape cartridges and over fifty minutes if bar code labels are not installed.

Note *Bar code labels will speed the inventory process even if the bar code information is not used by the application software driving the library. Removing empty bin packs will also speed the inventory process.*

 **CAUTION** *Examine all cartridges before loading them into the library or tape drives. Look for label stock or other foreign material that may be clinging to them.*

Note *Your facility may have its own requirements regarding the order of cartridges in bin packs. Refer to these requirements when loading cartridges.*

Automatic Drive Cleaning Feature

The Automatic Drive Cleaning (auto-clean) feature has two modes of drive cleaning support: Host Initiated and Fully Automatic.

In Host Initiated Cleaning Mode, drive cleaning is enabled by your System Administrator at the host computer. Although the library unit will internally track cleaning cartridge movement and use, the library unit provides no cleaning support in this mode. The host is responsible for all cleaning functions such as detecting when a drive requires cleaning, tracking and selecting cleaning cartridges, initiating media movement of the cleaning cartridge to the drive and determining when a cleaning cartridge has been “used up.”

Drive cleaning in the Fully Automatic Cleaning Mode is also enabled by your system administrator at the host computer. However, in this mode, the library unit monitors each drive's status to determine when a drive requires cleaning and initiates action when that determination is made. In this case, the library unit selects an available cleaning cartridge, handles media movement of the cleaning cartridge to and from the drive and supervises the cleaning operation in the drive. The library unit tracks cleaning cartridges within the library, monitors cleaning cartridge use and determines when a cleaning cartridge has been “used up,” then exports it from the library.

Note *The library is shipped with Automatic Drive Cleaning disabled. The Automatic Drive Cleaning feature can be enabled using the Diagnostic Software Package. However, when the library power is cycled, the feature is disabled. If the Automatic Drive Cleaning feature is enabled from the Host Controller via the Mode Select command, then the feature will remain enabled even if power is cycled.*

Operating Instructions **3**

| | |
|--|------|
| Mounting Bin Packs and Loading Cartridges | 3-3 |
| Mounting a Bin Pack on the Carousel | 3-3 |
| Inserting and Removing DLT™ Cartridges | 3-4 |
| Loading and Unloading Cartridges via the IOD. | 3-6 |
| Loading Cartridges into the IOD Inport Door | 3-6 |
| Unloading Cartridges from the IOD Outport Door | 3-6 |
| Manually Unloading a Tape Drive | 3-8 |
| Cleaning and Lubrication | 3-10 |
| Cleaning and Lubricating the Vertical Rails | 3-10 |
| Cleaning and Lubricating the Extension Rails | 3-11 |

Mounting Bin Packs and Loading Cartridges

Cartridges are stored in the TL82X/TL893/TL896 library in bin packs that hold up to 11 cartridges each. Periodically, you may need to load and unload cartridges from the bin packs, as well as mount and remove the bin packs from the carousel.


Mounting a Bin Pack on the Carousel

When mounting bin packs, it is best to completely fill one face of the carousel from top to bottom, and then fill the next face (either to the right or left). Filling each face simplifies mounting, and minimizes carousel rotation during library operation. To mount a bin pack:

1. Place the library off-line, by pressing the STANDBY button. The STANDBY indicator lights and "01" displays.
2. Rotate the carousel by pressing the ← and → buttons until the desired carousel face is at the front.
3. Press the STOP button.
4. Open the front door.
5. Mount the bin pack on the carousel face as shown in Figure 14 on page 3-5. The mounting holes on the back of the bin pack are tear-drop shaped to lock the bin pack in place.
6. Pull on the top and bottom of the bin pack to insure it is mounted properly on all four mounting buttons.
7. If not done already, load the bin pack with cartridges. (See "Inserting and Removing DLT™ Cartridges" on page 3-4.)
8. Run your hand down the front face of the cartridges on the exposed carousel face to make sure they are seated properly.
9. Repeat the previous steps for any other bin packs that need to be mounted.
10. Close the front door.

Inserting and Removing DLT™ Cartridges

If needed, you can load individual cartridges into bin packs that are already mounted on the carousel.

 **CAUTION** *DO NOT USE DLTtape™ I, DLTtape™ II or DLTtape™ IIIXT cartridges in your TL82X/TL893/TL89 automated tape library.*

 **CAUTION** *Examine all cartridges for label stock or foreign material before loading them into the library.*

To load a cartridge into a bin pack that is mounted on the carousel:

1. Place the library off-line by pressing the STANDBY button. The STANDBY indicator lights and “01” displays.
2. Rotate the carousel by pressing the ← and → buttons until the desired carousel face is at the front.
3. Press the STOP button.
4. Open the front door.
5. Insert the cartridges into the bin pack with the bar code label slot facing out and the cartridge spindle facing down.

Note *It is impossible to fully insert a cartridge into a bin pack incorrectly. If the cartridge does not fit into the cartridge slot, reorient it as described in step 5, and reinsert the cartridge.*

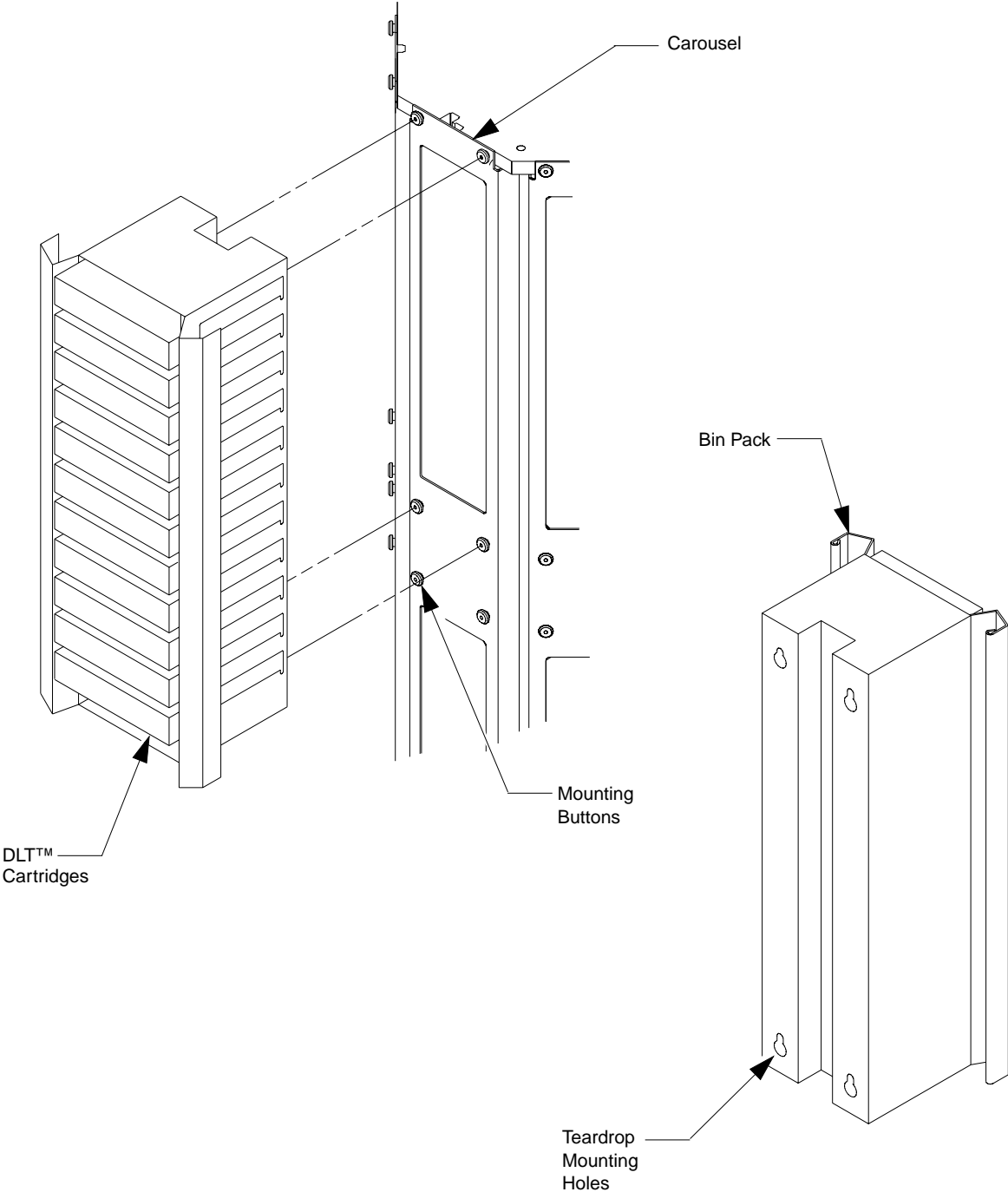
6. Run your hand down the front face of the cartridges on the exposed carousel face to make sure they are seated properly.
7. Close the front door.
8. Release the STOP button.
9. Place the library on-line, by releasing the STANDBY button.

The library will reinventory the following:

- the front face of the carousel.
- any other faces that were exposed while the door was open.
- the tape drives.
- the PTM if a cartridge is detected on the tray.

During inventory, “2d” appears in the status display. When the inventory is completed successfully, the status display reads “00”. If any other code is displayed on the status display, see Chapter 4.

Figure 14: Mounting a Bin Pack on the Carousel



Loading and Unloading Cartridges via the IOD

You can also load and unload individual cartridges through the IOD without interrupting the library operation.

 **CAUTION** *DO NOT USE DLTtape™ I or DLTtape™ II cartridges in your TL82X/TL893/TL89 automated tape library.*

 **CAUTION** *Examine all cartridges before loading them into the library or tape drives. Look for label stock or other foreign material that may be clinging to them.*

Loading Cartridges into the IOD Inport Door

To load a cartridge into the library via the IOD inport door:

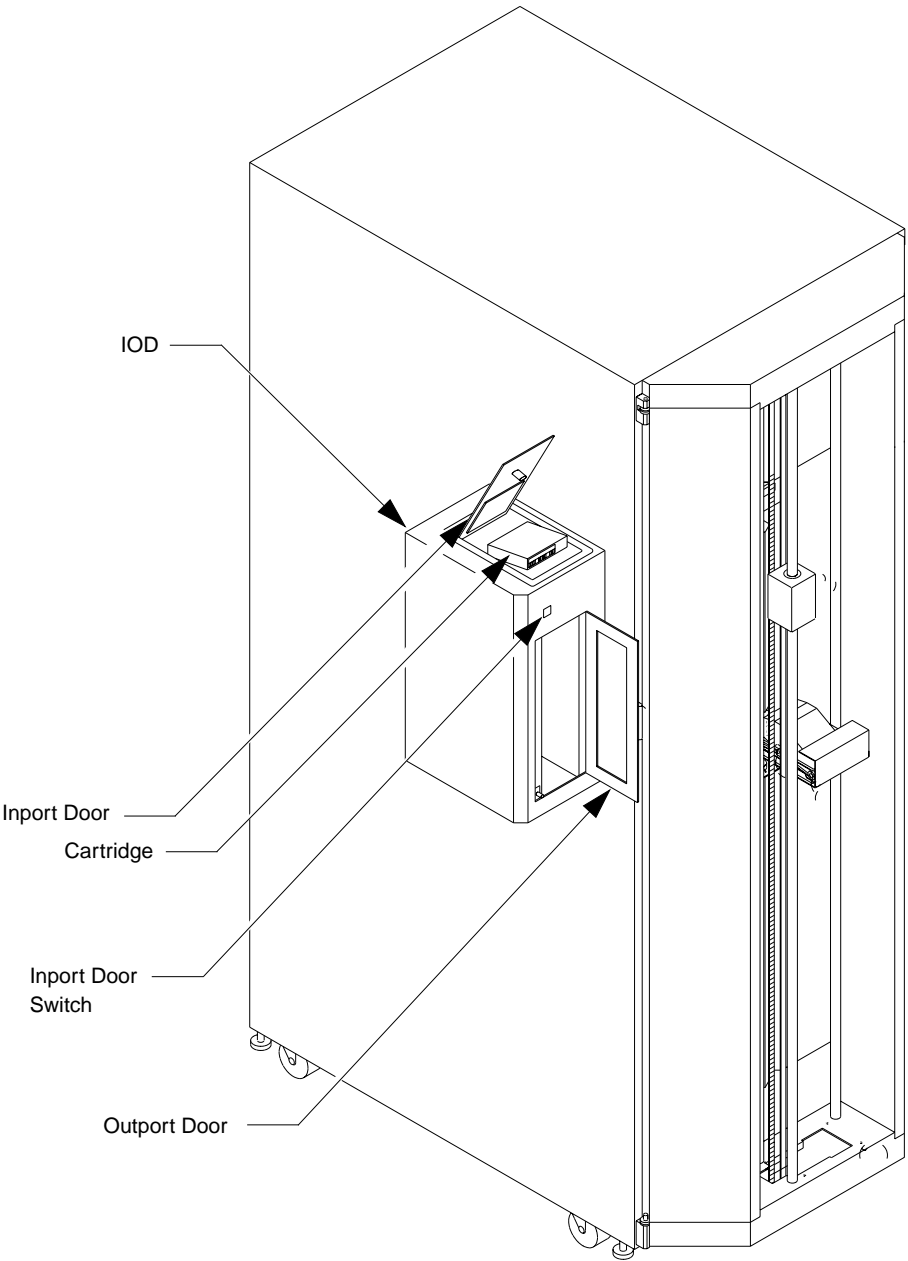
1. Through the host, issue the command that enables the IOD inport door switch, or from the Diagnostic Software enable the User Op IOD option. After the switch is enabled, it will illuminate.
2. Press the switch to release the IOD inport door. The door will open to allow you to place the cartridge into the IOD.
3. With the bar code label facing you and the cartridge spindle facing downward, load the front end of the cartridge first, then gently push the back end down and into the inport.
4. Close the inport door.
5. When the host commands the library to load the cartridge, it transfers from the IOD through the PTM(s) and to the appropriate drive or bin.

Unloading Cartridges from the IOD Outport Door

To unload cartridges from the IOD outport door, do the following.

1. Make sure the PTM is not in the process of exporting a cartridge to the IOD.
2. Open the IOD outport door by gently pulling the handle toward you.
3. Pull the cartridges out of the outport section. The tray beneath the bottom cartridge will return to its topmost position to accept the next exported cartridge.

Figure 15: Inporting
Cartridges




Manually Unloading a Tape Drive

When manually unloading cartridges from a TZ87, TZ88, or TZ89 tape drive, there is a possibility that the take-up leader and the cartridge leader may fail to unbuckle. This condition may occur if the ejected cartridge is allowed to eject freely when the handle is opened and is caused by the cartridge ejecting too far and too fast. To ensure a successful unbuckle of the leaders, use the procedure below and Figure 16.

1. Press and release the control panel STANDBY switch and verify that:
 - the STANDBY indicator illuminates and
 - the status display reads "01" (standby).
2. Open the library front door.
3. On the tape drive status control panel, press and release the DRIVE UNLOAD switch of the drive to be unloaded and verify that the Operate Handle indicator is lit.

Note *When you press DRIVE UNLOAD, the tape will completely rewind. Depending on the tape position, it will take 10 to 120 seconds before the Operate Handle indicator lights.*

4. Place a finger approximately 1/4" in front of the drive mouth of the drive to be unloaded and with the Operate Handle indicator lit, raise the insert/release handle to eject the DLT™ cartridge (see Figure 17).

 **CAUTION** *If the cartridge leader is buckled to the take-up leader, push the cartridge all the way back into the drive mouth and return to Step #3. Otherwise, continue to Step #5.*

5. Pause for two seconds, then pull the cartridge completely out of the drive.
6. Close and latch the library front door.
7. Press and release the control panel STANDBY switch and verify that the status display reads "2d" (system initializing/taking inventory).
8. After successful initialization and inventory, verify that the status display reads "00" (on-line).

Figure 16: DLT™ Tape Drive
Status Control Panel

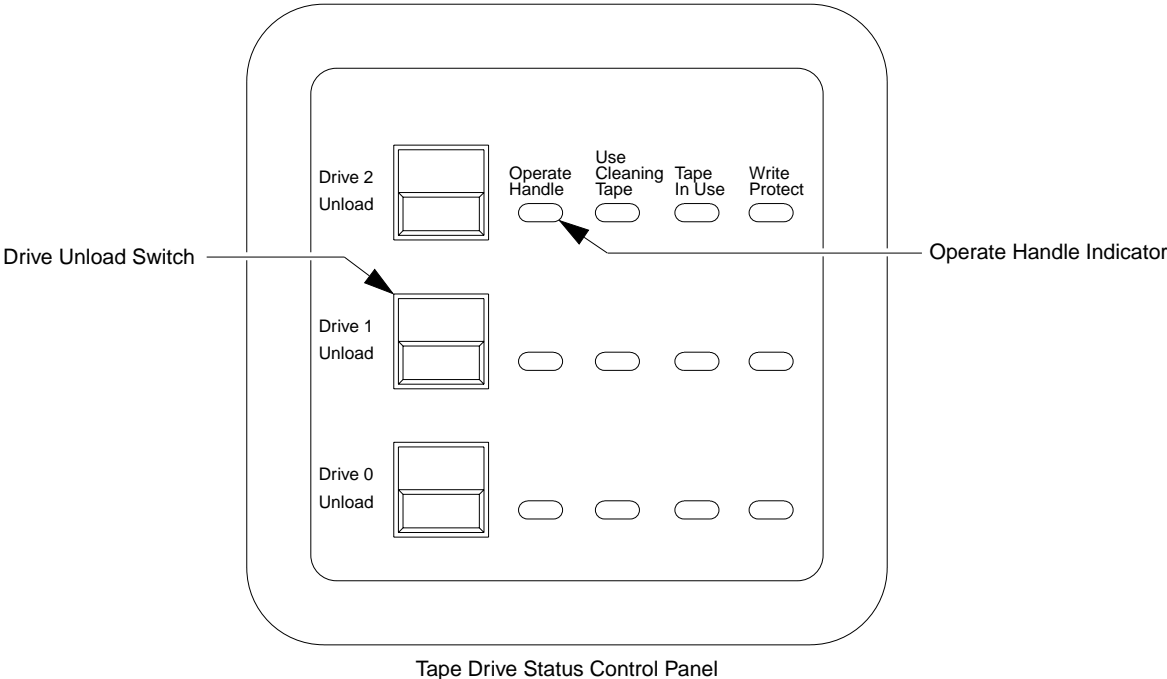
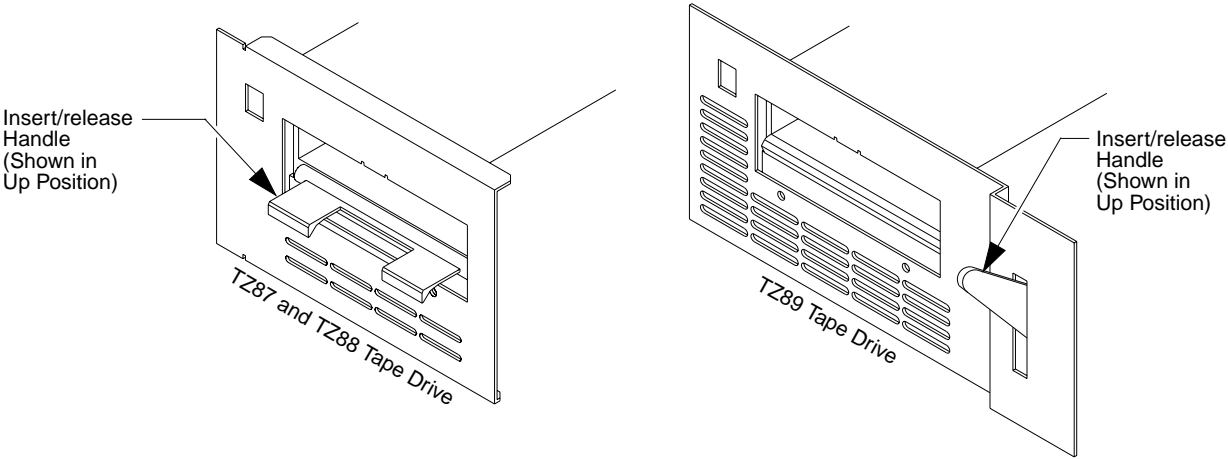


Figure 17: DLT™ Tape Drive
Insert/Release Handle



Cleaning and Lubrication

It is recommended that you clean and lubricate the vertical axis rails, extension axis rails and gripper every 90 days. The cleaning and lubrication accessories kit shipped with your library includes the following supplies:

- (1) container of light grease
- 25 swabs
- 10 lint free cloths

Cleaning and Lubricating the Vertical Rails

1. Remove power from the library by turning off the circuit breaker switch, which is located on the lower left corner of the rear connector panel.
2. Open the front door of the library.
3. Using a lint free cloth and isopropyl alcohol, clean all three of the vertical rails removing all dust and debris.
4. Using a second lint free cloth and light grease, lightly lubricate each of the vertical rails by rubbing the cloth up and down the entire length of the rail.
5. Manually move the vertical carriage up and down the vertical rails to completely distribute the applied lubricant, while checking for smooth vertical travel.

Cleaning and Lubricating the Extension Rails

1. Remove power from the library by turning off the circuit breaker switch, which is located on the lower left corner of the rear connector panel.
2. Open the front door of the library.
3. Using a lint free cloth and isopropyl alcohol, clean the extension rail on the extension axis assembly.

Note *Gently move the gripper assembly forward and back on the rail to gain access to the entire length of the rails for cleaning.*

4. Using a second lint free cloth and light grease, lightly lubricate the entire length of both extension rails by rubbing the lubricated cloth forward and back on the rails.
5. Manually move the gripper assembly forward and back on the rails to completely distribute the applied lubricant, while checking for smooth extension travel.

Troubleshooting **4**

Error Messages sent to the Host. 4-3
Control Panel Status Display Codes 4-3
Other Problems. 4-7

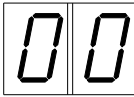

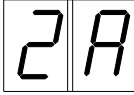
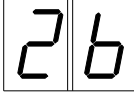
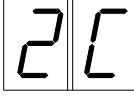
Error Messages sent to the Host

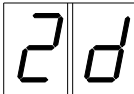

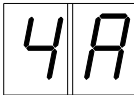
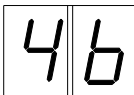
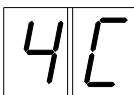
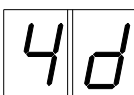
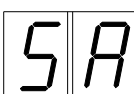
When an error condition occurs on the TL82X/TL893/TL896 library, error codes are sent from the library unit to the host. Refer to the documentation for the host software for a description of how these error codes are received and processed. A list of Sense Data Values (error codes) is also provided in the *TL82X/TL893/TL896 Field Service Manual* and *Software Interface Guide*.

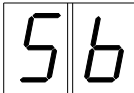
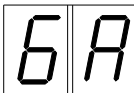
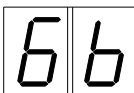
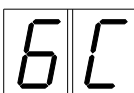
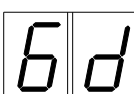
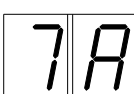
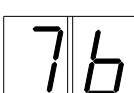
Control Panel Status Display Codes

Table 10 lists Control Panel Status Display Codes and what steps you should to take to resolve any problems associated with them.

Table 10: Status Codes

| Code | Code Description | Action to Resolve |
|---|---|---|
|  | System is on-line and ready to accept host commands. | No action is needed. |
|  | System is off-line and ready to accept diagnostic commands. | Release the STANDBY button by pressing it once. This places the library on-line. |
|  | STOP button is pressed. | Release the STOP button by pressing it once. |
|  | Either the front door is open or the rear panel is removed | Check the front door and rear panel. |
|  | System is performing a power-up sequence. | This code should only be displayed for 5-10 seconds during the power-up sequence. If it continues to display, call for field service. |

| Code | Code Description | Action to Resolve |
|---|--|---|
|  | System is initializing actuators and taking inventory. | If this code persists and the robotic equipment inside the library unit does not move, call for field service. |
|  | Inventory failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Release the STANDBY button to put the library back on-line.3) If the code still persists, ask the system administrator to refer to the error codes from the library to the host, which will indicate the cause of the failure. |
|  | Extension home failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Release the STANDBY button to put the library back on-line.3) If the code still persists, call for field service. |
|  | Extension test failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Release the STANDBY button to put the library back on-line.3) If the code still persists, call for field service. |
|  | Carriage A/D failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Release the STANDBY button to put the library back on-line.3) If the code still persists, call for field service. |
|  | Carriage diagnostic test failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Release the STANDBY button to put the library back on-line.3) If the code still persists, call for field service. |
|  | Vertical home failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Release the STANDBY button to put the library back on-line.3) If the code still persists, call for field service. |

| Code | Code Description | Action to Resolve |
|---|-------------------------------|--|
|  | Vertical test failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |
|  | Carousel home failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |
|  | Carousel test failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |
|  | Carousel A/D test failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |
|  | Carousel digital test failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |
|  | Gripper home failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |
|  | Gripper test failed. | <ol style="list-style-type: none"> 1) Press the STANDBY button to put the library off-line. 2) Release the STANDBY button to put the library back on-line. 3) If the code still persists, call for field service. |

| Code | Code Description | Action to Resolve |
|------|--------------------------------------|---|
| | Light curtain test failed. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line and open the front door.2) Remove/replace any objects that may be in the way of the light beam, such as a tape partially ejected from a tape drive or a cartridge not properly seated in a bin pack. Close the front door.3) Release the STANDBY button to put the library back on-line.4) If the code still persists, call for field service. |
| | Light curtain broken. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line and open the front door.2) Remove/replace any objects that may be in the way of the light beam, such as a tape partially ejected from a tape drive or a cartridge not properly seated in a bin pack. Close the front door.3) Release the STANDBY button to put the library back on-line.4) If the code still persists, call for field service. |
| | Carousel is on face indicated (0-7). | These codes are only displayed for a few seconds when you press the ← and → to move the carousel. No action is needed. |
| | MPU failure or +5 vdc is low. | Call Field Service |

Other Problems

Table 11 lists other possible problems and resolutions.

Note *The resolution of all problems should be coordinated through the system administrator.*

Table 11: Common Library Problems

| Problem | Resolution |
|--|---|
| Tape cartridge is not loading or ejecting properly from the tape drive. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Open the front door, and manually insert or eject the cartridge using the controls on the tape drive. DO NOT manually put a cartridge into the gripper.3) Close the door and release the STANDBY button to put the library back on-line.4) If the problem recurs, refer to the tape drive manual or call for tape drive service. |
| One or more cables have become disconnected from the rear connector panel. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Reconnect the cables. (See Chapter 2.)3) Close the door and release the STANDBY button to put the library back on-line. |
| Bar code scanner laser remains on when door is open. | Contact your field service engineer. |
| The PTM stops before the cartridges reach the center PTM opening, the IOD, or another PTM. | <ol style="list-style-type: none">1) Press the STANDBY button to put the library off-line.2) Open the front door, and manually push (with your index finger) the cartridge along the PTM to the center PTM opening or the IOD. If you move the cartridge to the center of the PTM, the PTM will be inventoried when the door is closed.3) Close the door and release the STANDBY button to put the library back on-line.4) If the problem reoccurs, contact your field service engineer. |

Note *For any other problems not listed here or in the previous section, call for field service.*

Glossary

| | |
|-----------------------------|---|
| TL820 library | An automated library system developed for storing and handling DLT™ cartridges. Contains three TZ87 DLT™ tape drives and a maximum of 264 cartridges. |
| TL822 library | An automated library system developed for storing and handling DLT™ cartridges. Contains three TZ88 DLT™ tape drives and a maximum of 264 cartridges. |
| TL826 library | An automated library system developed for storing and handling DLT™ cartridges. Contains six TZ88 DLT™ tape drives and a maximum of 176 cartridges. |
| TL893 library | An automated library system developed for storing and handling DLT™ cartridges. Contains three TZ89 DLT™ tape drives and a maximum of 264 cartridges. |
| TL896 library | An automated library system developed for storing and handling DLT™ cartridges. Contains six TZ89 DLT™ tape drives and a maximum of 176 cartridges. |
| alignment | In the context of this manual, alignment refers to the mechanical adjustments required for successful operation of a library. |
| alignment toolkit | A set of alignment aids available to authorized field service personnel. |
| auto-clean | This term refers to the Automatic Drive Cleaning feature. Two modes of drive cleaning support are available: Host Initiated and Fully Automatic. |
| automated cartridge library | A robotic storage and retrieval system for cartridges. |
| bar code | In the context of this manual, the machine-readable label on DLT™ cartridges. |
| bar code scan head | The portion of the bar code scanner which senses the bar code and is mounted on the vertical carriage. |
| bin pack | A removable rack that attaches to the carousel and stores up to eleven DLT™ cartridges inside a tape library. |
| calibration | In the context of this manual, calibration refers to the software measurements and configuration required for successful operation of the library. |

| | |
|-------------------------|--|
| carousel | The eight-sided rotating prism in the center of the library which holds bin packs with DLT™ cartridges. |
| carousel belt | The drive belt connecting the carousel motor/gearbox to the carousel. |
| carousel face | One side of the eight-sided carousel. |
| control panel | The panel containing the display, fault light, and control buttons on the front door of the library. |
| door interconnect board | The electronics board located on the front door to which the cables crossing the hinge are connected. |
| EIA/TIA-574 | A serial communications cabling and protocol standard for nine-pin connectors, sometimes referred to as RS-232. |
| electronics module | The metal enclosure holding the logic power supply and the robotic control and actuator driver electronics. |
| extension axis assembly | Mounted onto the vertical axis, the extension axis assembly consists of the gripper assembly and the horizontal axis on which the gripper assembly is mounted. |
| extension axis belt | The drive belt connecting the extension motor/gearbox to the gripper. |
| FCC Class A | Standard established by the U.S. Federal Communications Commission governing electromagnetic emissions. |
| FSE | Field Service Engineer, a.k.a., FE (Field Engineer). |
| gripper assembly | The assembly which mounts on the extension axis and grips cartridges; sometimes called the gripper. |
| host | Host computer. |
| host computer | The computer which issues high-level pick and place commands to control the TL82X/TL893/TL896 library. |
| IOD | The Inport/Outport Device, located at the cutout on the left side of a library, allows insertion and removal of single cartridges into and out of the library. |
| LED | Light Emitting Diode. |
| library | A single TL82X/TL893/TL896 cabinet and the robotics therein. |
| MTBF | Mean Time Between Failures. |
| MTTR | Mean Time To Repair. |

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|--------------------------------|--|
| MUC | The Multi-Unit Controller serves two functions. It is a SCSI adapter and it permits the library host computer to control up to five attached basic or expansion libraries. |
| on-line | Ready for communication with a host computer. |
| PC | Personal Computer. |
| pick | The act of removing a cartridge from one location in preparation for placing it in another location. |
| place | The act of placing a cartridge in a location after it has been picked from another location. |
| power distribution box | A box located in the left rear of the library cabinet which contains receptacles for providing power to the various components of the library and switches for turning the power on and off. |
| PTM | The Pass Through Mechanism is the motor-driven, high-speed conveyor that transports cartridges between adjacent libraries in a multi-unit tape library system. It is used in conjunction with the IOD when importing or exporting single cartridges. |
| PROM | Programmable Read-Only Memory. |
| rear connector panel | Located at the bottom rear of the cabinet, the rear connector panel contains the connectors for attaching external cabling to the library. |
| SCSI | Small Computer System Interface communications standard for attaching peripheral equipment to computers. |
| tape drive | The mechanism that reads and writes data from and to a tape. |
| tape drive alignment cartridge | An alignment aid in the general form of a DLT™ cartridge which has flanges to keep it from being stuck in a drive. |
| UL | Underwriters Laboratories. |
| vertical belt | The drive belt connecting the vertical motor to the vertical axis assembly. |
| vertical carriage assembly | The crossbar and linear bearings mounted onto the vertical rails and everything mounted on the crossbar. |
| ZIF connector | A Zero Insertion Force connector used for electrical wiring. |

Index

A

auto-clean 2-22, Glossary-1

B

bar code scanner, troubleshooting 4-7

bin packs 2-4

 inserting cartridges into 3-4

 loading cartridges via 3-3

 mounting on carousel 3-3–3-5

 removing cartridges from 3-4

C

cabling

 host computer 2-15

 rear connector 2-14–2-16, 2-17–2-18

carousel

 rotating 2-9, 3-3, 4-6

 status code 4-5

carriage A/D status code 4-4

cartridges

 inserting into bin packs 3-4

 loading via IOD 3-6

 removing from bin packs 3-4

 unloading via IOD 3-6

cleaning and lubricating 3-10–3-11

 extension rails 3-11

 vertical rails 3-10

control panel

 front 2-8–2-9

 status codes 4-3–4-6

 tape drive status 2-10–2-11

conventions 1-3

D

dimensions

 uncrated 2-6

door handle 2-12

drive unload button 2-11

E

EIA/TIA-574 2-4

error messages sent to host 4-3

extension axis

 cleaning and lubricating rails 3-10

 status code 4-4

F

FAULT indicator 2-9

front control panel 2-8–2-9

fully automatic cleaning mode 2-22

G

gripper 2-4

 status code 4-5

H

host initiated cleaning mode 2-22

I

initialize actuators status code 4-4

inport/output device 2-4, 2-20

 loading cartridges into 3-6

 location 2-20

 unloading cartridges from 3-6

inventory status code 4-4

L

left arrow button 2-9

light curtain 2-4

light curtain status code 4-6

lubrication 3-10–3-11

M

multi-unit controller 2-4, 2-13

O

operate handle indicator 2-11

P

pass-through conveyor mechanism 2-4, 2-19
 location 2-19
 troubleshooting 4-7
power-up sequence 4-3

R

rear connector panel 2-13
 cabling 4-7
right arrow button 2-9

S

safety switch 2-12
STANDBY button 2-9
STANDBY indicator 2-9
status codes 4-3–4-6
 when mounting bin packs 3-4
status display 2-9
STOP button 2-9

T

tape drive status control panel 2-10–2-11
tape drives
 troubleshooting 4-7
tape in use indicator 2-11
TL826 2-16
TL896 2-18

U

use cleaning tape indicator 2-11

V

vertical axis
 cleaning and lubricating rails 3-10

status code 4-5

W

write protect indicator 2-11