Removing Constraint Packaging

Once the library has been moved to its final destination, do the following:

1. Remove the outer cellophane wrapping and cardboard protecting the library.
2. Remove the eye-bolt, located at the top of the library door. Store the eye-bolt for reshipment.
3. Open the front door of the library and remove the accessories box.
4. Remove the tie-downs marked by yellow flags. The flagged tie-downs can be found restraining the vertical belt and IOD cables.

Note ***The tie-downs may be removed by using diagonal cutters. Tie-downs will be required to immobilize the robotics during reshipment.***

5. Remove the tie-downs that hold the bin packs in place.

CAUTION ***Note that the bottom bin pack on each face of the carousel has been turned upside down for shipping purposes.***

6. Before loading cartridges, turn the bottom bin pack on each face of the carousel right side up.

Note ***Make sure the cartridge retention springs (metal pieces located on the sides of the bin packs) are properly positioned.***

Crating the Library for Reshipment

Before moving the library, perform the following steps:

1. Remove all cartridges from the bin packs, tape drives and PTM.
2. Remove the IOD if installed.
3. Turn the bottom bin pack on each face of the carousel upside down and use tie-downs to hold the bin packs in place.
4. Use tie-downs to restrain the vertical belt and IOD cables. Place the vertical belt tie-down around both sides of the vertical belt and tighten it so that the belt teeth are securely interleaved. The counterweight should be resting at the bottom of the door.
5. Mount the eye-bolt at the top of the library door and restrain the free end of the vertical carriage to the eye-bolt.
6. Retract the feet of the cabinet (located on the underside of the cabinet at the four corners) so they do not cause obstruction when the unit is being moved. Tighten them counterclockwise (when viewed from the top) to approximately 20 in-lb. (2.3 N-m) to assure that they are fully retracted.
7. Place protective material on the front window, such as cardboard over the front to protect the window, door, and front cabinet corners, and shrink-wrap to hold everything securely in place.
8. Perform the procedure “Removing the Library from the Pallet” in reverse order to place the library on the pallet.
9. Perform the procedure “Connecting the Top / Ramp to the Pallet” in reverse order to detach the top / ramp from the pallet.

It is recommended that the steel straps be tightened to approximately 200 lbs of tension.

Keep the unit upright when moving. Do not tilt it more than 10°.

10. Perform the procedure “Uncrating the Library” in reverse order to crate the library for reshipment.

4 Installing the TL82X Library

Installation Tools

- A 3/4” open-end wrench or medium-size (9" long) pair of channel locks, for adjusting the leveling feet, and a level are required for leveling the cabinet.
- A 32 oz. force gauge is required for checking the vertical axis belt tension. A 2 in-lb (minimum) torque wrench is required for setting the tension on the carousel belt.
- A flashlight and standard non-metric tools, such as screwdrivers, nutdrivers, wrenches, scales, and allen wrenches are also needed.
- A personal computer (PC) with diagnostic software is required to perform powered testing of the library.
- An alignment tool kit is required to align and calibrate the extension axis relative to the carousel and drives.

Host Computer

The customer is expected to furnish the host computer to be used with the TL82X library. This also includes furnishing the host communications cabling.

The TL82X library has been designed to easily attach to most computers. All host computers need a SCSI communications interface to transfer data to and from the tape drives. The TL82X library robotics can be driven from the host using SCSI communications or a low-speed EIA/TIA-574 serial interface (RS-232 for 9-pin connectors) readily available on most computers.

On systems without a direct SCSI interface, external communications bus converters may be used.

Diagnostic PC and Software

An IBM-compatible personal computer (PC) is required for running the field engineer’s diagnostic software. Diagnostic software for testing the correct operation of each library is available. An EIA/TIA-574 serial cable (RS-232 for 9-pin connectors) is needed for connecting the PC to the library diagnostic port.

The Document EK-TL820-SM, *TL82X Diagnostic Software User’s Manual*, provides detailed instructions on using the FE diagnostic PC to check out the library. It is essential for this checkout procedure.

Installing the TL82X Library

CAUTION ***A trained, authorized FSE is required to install a TL82X library. The procedures listed below must be performed in the order that they appear in this section.***

Positioning the Library

For installation, it is recommended that the library be placed in an area with plenty of clearance around the cabinet for a field engineer to perform the inspection and alignment procedures. If the unit is being installed as part of a multi-unit configuration, some further repositioning may be required later (see "Cabinet-to-Cabinet Mounting" below).

Leveling

The TL82X library needs to be leveled within ±1° of true horizontal.

Note ***The front door may be difficult to open until you have lowered the leveling feet to the floor and adjusted them so that the door opens easily.***

If plans have been made for installing additional units in this location and this is the first library in the library system, it is important to level the unit so that additional units can be parallel to each other and still be within the foot adjustment capabilities of the cabinets.

To secure the library cabinet and to allow the front door to close properly, be sure that all four feet are resting securely on the floor (located on the underside of the cabinet at the four corners). Tighten each foot against the floor, taking the weight off the casters. If additional leveling is required, continue to raise or lower the individual foot as needed.

Opening the Doors

The door handle has a vertical orientation when the door is latched.

1. Unlatch the door, rotate the handle counterclockwise one-half turn. Use the door handle to open the door gently. The front door may not open easily until the cabinet feet have been leveled.

CAUTION ***Do not force the front door open wider than 130°. Doing so will damage the door and cause installation or operational failures.***

2. Remove the rear panel by removing the 11 screws that attach the panel to the cabinet.

Note ***Remember to remove the top middle screw last when removing the rear panel, and install it first when replacing the panel.***

Installing the Inport/Outport Device

If the library that you are currently installing is the master library, i.e., Logical Unit Number (LUN) 0, refer to the *TL82X IOD Installation Instructions*. After installing the IOD, proceed to "Unpowered Visual Inspections".

If this unit is not the master library, continue to "Installing the PTM Cutout Covers".

Installing the PTM Cutout Cover

If the library that you are currently installing is not the master library and will not be part of a multi-library system, perform the following procedure. Otherwise, proceed to "Unpowered Visual Inspections".

1. Remove the PTM Cutout Cover (cover) from the Accessories Kit.
2. If applicable, power-down the library and open the front door.
3. Orient the cover so that the adjustable bracket is up and the fixed bracket is down.
4. Place the cover against the library so that the window's bottom-edge is in-between the cover and fixed bracket and then push the cover down so that the fit is snug.
5. From the inside of the cabinet, push the adjustable bracket up so that the window's top-edge is in-between the cover and adjustable bracket and then tighten the two thumbscrews so that the fit is snug.
6. Reverse this procedure to remove a PTM Cutout Cover.

Unpowered Visual Inspections

To conduct an unpowered visual inspection, use Figure 12 and Figure 13 and do the following:

- Manually move the vertical axis through its full range in both directions.
- Manually rotate the carousel axis one revolution in each direction by gently pushing the octagon.

CAUTION ***To manually rotate the octagon with bin packs mounted, gently pull on the upper half of the top row of bin packs.***

- Manually extend and retract the gripper assembly on the extension axis.
- Verify that everything moves smoothly and that nothing appears broken. If there is a problem that cannot be readily fixed, refer to Document EK-TL820-SV, *TL82X Field Service Manual*.
- Reseat any electrical connections that appear loose or disconnected.
- Check all visible cable connections on the door interconnect board, extension axis assembly, control panel board, and power supplies. The control board and door interconnect board are visible on the inside of the front door.
- Verify that all power cables are plugged into the internal power distribution box, as shown in Figure 13 on page 4-9. Power cables should be connected to the logic power supply, motor power supply, and fans.
- Some important electronic connections are hidden by the electronics cover. Remove the cover and verify that the boards and PROMs are seated properly and that all connectors appear securely fastened. Leave the cover off until after the powered visual inspection (described in “Powered Visual Inspections”) is completed.
- Verify that the MUC is connected to the system integrator electronics side of the power distribution box so that it will not be shut off (taking the SCSI bus and host control with it) when the robotics power is shut off for maintenance.

Note ***The customer’s System Administrator must be present for the following procedure.***

- Remove the rear access panel from the library and set the SCSI identification for the library. (See Table 9 and Table 10.)

Note ***When removing the rear access panel, remove the top middle screw last. When installing it, replace the top middle screw first.***

SW1 is located on the MUC rear panel next to the SCSI cable connector.

Table 9: MUC SW1 Microswitch Functions

Microswitch	Function
1, 2 and 3	SCSI Identification (see Table 10)
4 and 5	Reserved for testing. (Must be in the DOWN position.)
6	Disable Bus Reset on Power-Up (Default=Disabled / UP)
7	Host Selection (DOWN=SCSI / UP=RS-232) **Note** When this microswitch is UP, Table 10 is not applicable.
8	Reserved for testing. (Must be in the DOWN position.)

Table 10: SCSI IDs

SW1	SW2	SW3	SCSI ID
DOWN	DOWN	DOWN	0
UP	DOWN	DOWN	1
DOWN	UP	DOWN	2
UP	UP	DOWN	3
DOWN	DOWN	UP	4
UP	DOWN	UP	5
DOWN	UP	UP	6
UP	UP	UP	7

Figure 12: MUC SW1

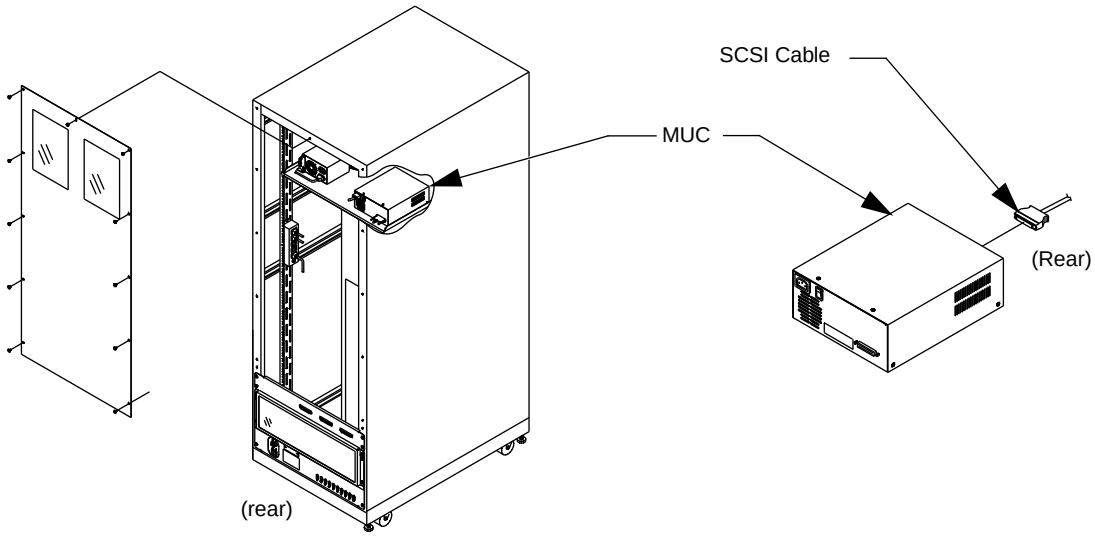
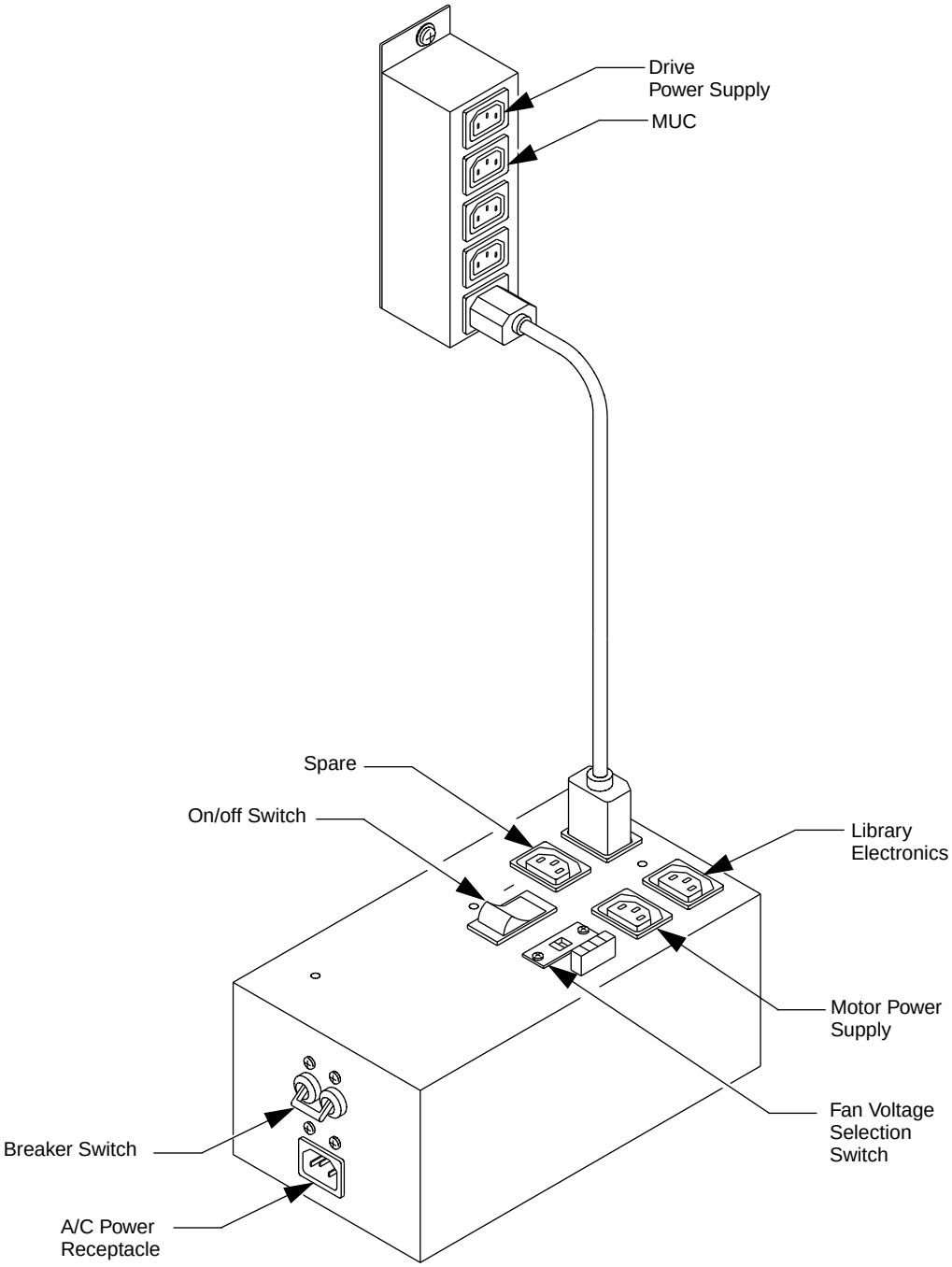


Figure 13: Internal Power Distribution Box



Adjusting Belt Tension

Belt tension must be checked and adjusted prior to activating the servos.

CAUTION ***Overtensioning the belts can result in damage to the belt and other drive components. Undertensioning can result in degraded performance and system failure.***

Vertical Axis Belt

To test the vertical axis belt tension, see Figure 14 and do the following:

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. Move the counterweight to the top of the door; this will position the vertical carriage at the base of the door.
4. Using a force gauge press on one side of the belt midway up the door.
5. Measure the force required to push the belt together so that the two sides just touch with the belt teeth interleaved.
6. The force should be between 18 and 22 ounces (510-623 g). If the belt tension is outside of this range, an adjustment is needed.

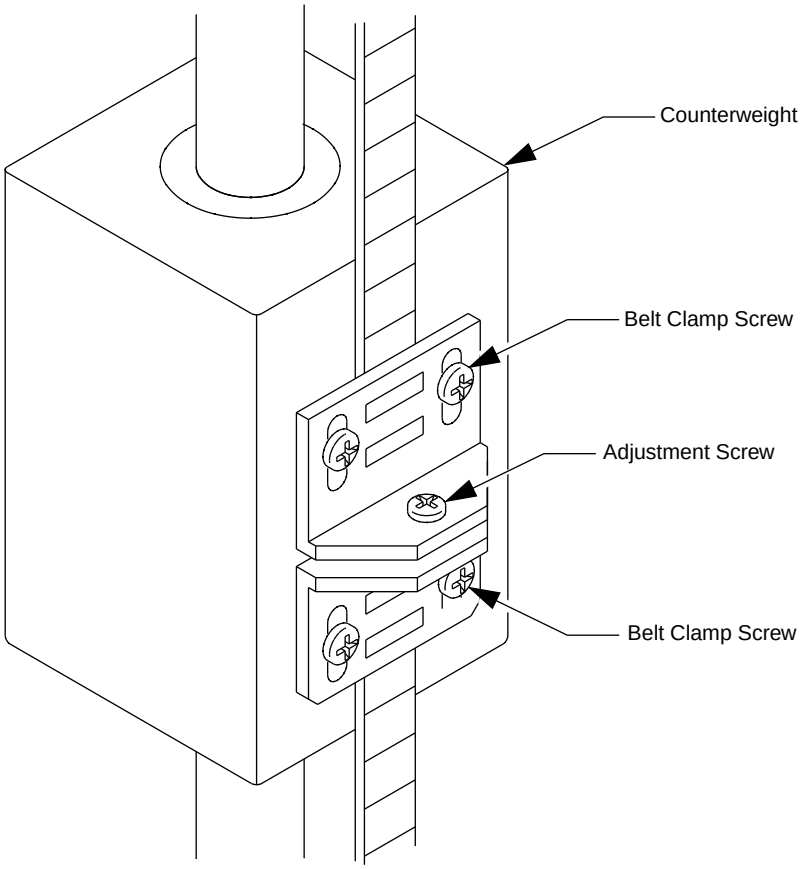
To adjust the vertical axis belt tension, see Figure 14 and do the following:

1. Loosen the belt clamp screws holding the belt onto the counterweight.
2. Loosen the screws one-half revolution:
   a. If the measured force was greater than 22 ounces (623 g), turn the adjustment screw counterclockwise (as viewed from below) and recheck the tension.
   b. If the measured force was less than 18 ounces (510 g), turn the adjustment screw clockwise.

Note ***The adjustment screw will not normally need to be turned more than two revolutions.***

3. Lastly, tighten the belt clamp screws to 30 in-lb. (3.39 N-m) and recheck the belt tension.

Figure 14: Vertical Axis Belt Tensioning



Extension Axis Belt

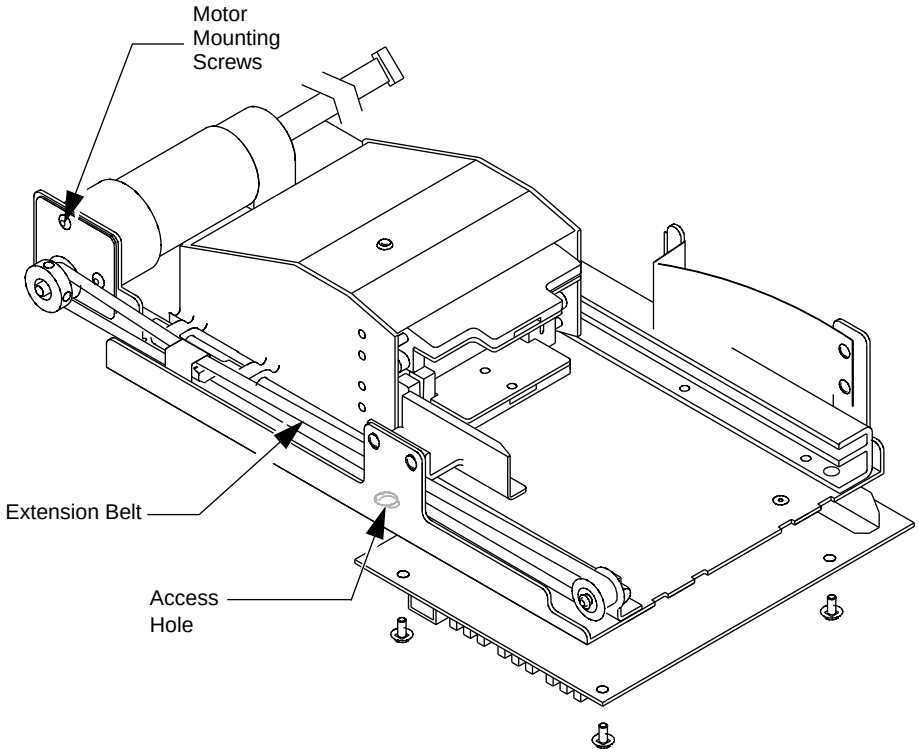
To test the extension axis belt tension, see Figure 15 and do the following:

1. Remove power from the library by turning off the circuit breaker switch located on the lower left corner of the rear connector panel.
2. Open the front door of the library.
3. Remove the extension axis cover:
   a. Remove the two screws that hold the cover to the extension axis.
   b. Slide the cover forward to disengage the cover from the notches at the front edge of the houseplate and rotate the cover down and upward between the extension axis and the library door window.
3. Move the gripper to the middle of the extension travel, which will position the extension belt clamp directly over the access hole in the baseplate.
4. Insert a force gauge through the access hole, and press up on the back of the bottom segment of the belt. Record the force reading with the belt just touching the bottom of the belt clamp.
5. The force should be between 2.7 and 3.7 ounces (76.6 - 105.0 g). If the belt tension is outside this range, an adjustment is needed.

   To adjust the extension axis belt tension, see Figure 15 and do the following:

   a. Loosen the three extension motor mounting screws one revolution.
   b. Grasp the motor by looping one finger over the sheet metal of the baseplate, and applying a light, steady force to tighten the belt. Snug the motor mounting screws while holding the motor.
   c. Recheck the belt tension and readjust if necessary.
   d. When the belt tension is correct, retighten the mounting screws to 6 in-lb., and recheck the tension.
   e. Reinstall the extension axis cover by pushing it back on the notches on the baseplate and retighten the screws to 12 in-lb.

Figure 15: Extension Axis Belt Tensioning



Carousel Axis Belt

To test the carousel axis belt tension, see Figure 16, and do the following:

1. Remove power from the library by turning off the circuit breaker switch located on the lower left corner of the rear connector panel.
2. Remove the rear access panel from the library.

Note ***Remove the top middle screw last, when removing the rear access panel and install it first, when replacing the panel.***

3. Loosen the motor assembly mounting screws one revolution.
4. Locate the carousel belt tensioning locknut just above the carousel motor assembly.
5. Loosen the carousel belt tensioning locknut.
6. Using a torque wrench, set the torque value on the belt adjustment screw to approximately 2 in-lb. (0.23 N-m).

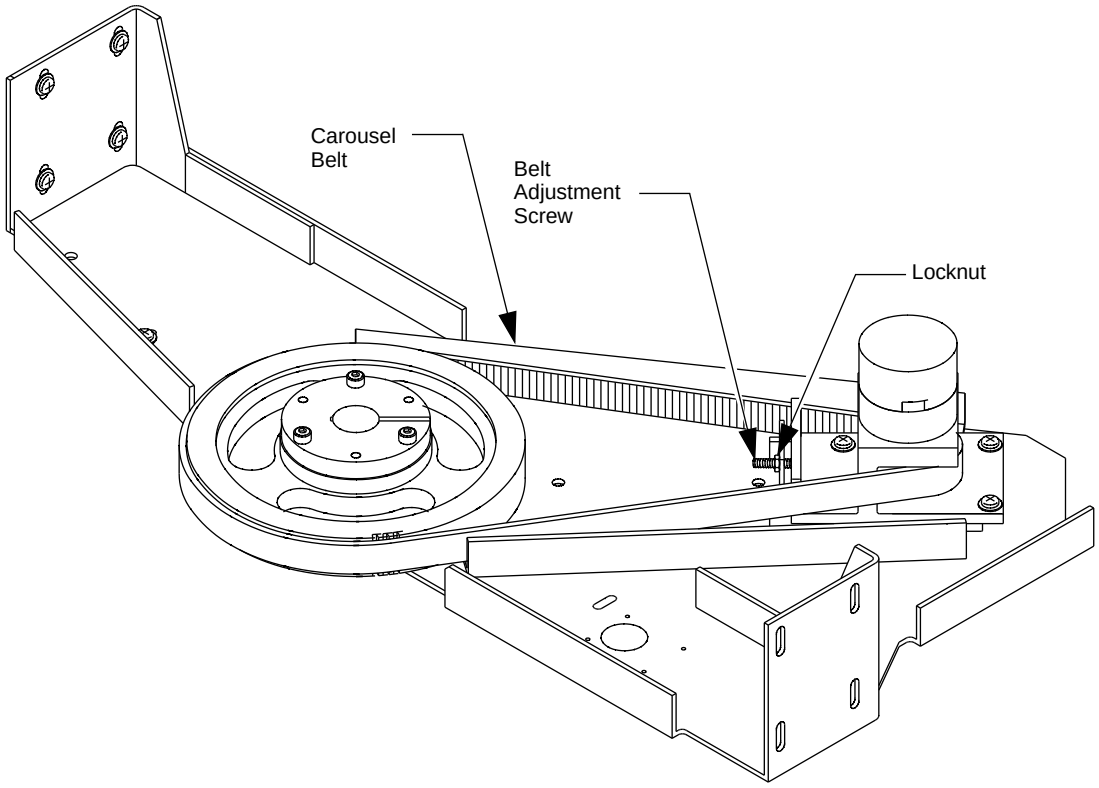
Note ***Adjust the carousel belt tension so that a force of 26.60±2.0 oz. applied at the center (±0.25") of the belt span and perpendicular to the belt will deflect the belt 0.20."***

7. Retighten the locknut to approximately 15±5 in-lb. (1.7 N-m)

Note ***When tightening the locknut, be sure to maintain the belt adjustment screw torque value.***

8. Retighten the motor assembly mounting screws to 35±3 in-lb.

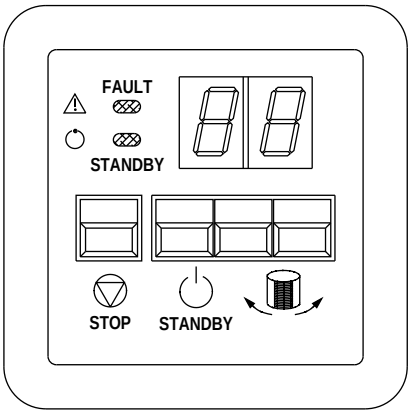
Figure 16: Carousel Belt Adjustment



Powered Visual Inspection

The library control panel shown in Figure 17 is located on the front door of the library. Make sure the STOP and STANDBY buttons on the control panel are pressed in preparation for applying power to the library.

Figure 17: Control Panel



1. Open the front door to activate the door safety switches, which provides further protection from unexpected power-up behavior.
2. On the power distribution box, push the circuit breaker switch to the down position, the ON / OFF switch to O (off) and the ventilation fan voltage selection switch to the proper position (see Figure 11 on page 4-9).

CAUTION ***Be sure that the fan 120/220 voltage selection switch is in the correct position for the power that will be supplied to the unit. Putting the switch in the incorrect position will damage the unit.***

3. Connect the supplied power cable to wall power using the appropriate connector for the country, and connect the other end of the cable to the male connector accessed through the rear connector panel. Push the circuit breaker switch to the up position (see Figure 13 on page 4-9).

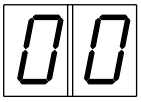
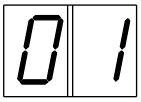
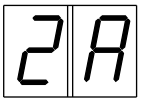
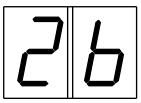
Note ***At this point, power is being supplied to the power distribution box and will be distributed to the rest of the library.***

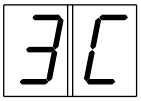
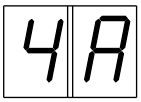
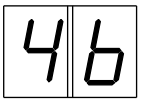
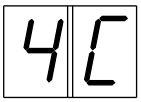
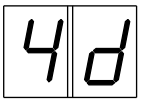
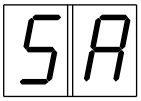
4. Push the ON / OFF switch to | (on) on the power distribution box (see Figure 13 on page 4-9) and perform the following tests:

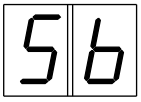
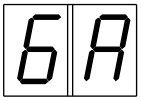
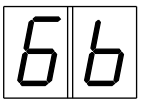
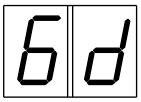
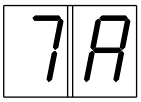
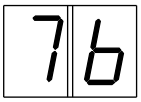
a. With the STOP and STANDBY buttons pressed, the front door closed and rear panel installed, the control panel status display should read “2A” and the FAULT and STANDBY indicators should be lit.
b. With the STOP and STANDBY buttons released, the rear panel installed and the front door open, the control panel status display should read “2b” and the FAULT indicator should be lit.
c. With the STOP and STANDBY buttons released, the front door closed and the rear panel removed, the control panel status display should read “2b” and the FAULT indicator should be lit.
d. With the STANDBY button pressed, the STOP button released, and the front door closed and rear panel installed, the control panel status display should read “01” and the FAULT indicator should be off.

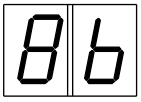
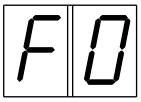
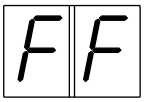
If the control panel status display does not operate as indicated above, see Table 11 for a list of the possible display codes and refer to the *TL82X Field Service Manual.*

Table 11: Front Control Panel 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.	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.	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.	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.	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.	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.	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.	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.	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.	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.	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.	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.	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.	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.	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. 3) If the code still persists, call for field service.
	Light curtain broken.	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	Call Field Service

Checking the Electronic LEDs

The next step is to visually check LEDs on the electronics to verify switch behavior. The electronics cover should be removed at this point if it was not left off after the unpowered visual inspection described in "Unpowered Visual Inspections".

The robotic controller has a series of LEDs indicating status information (see Figure 18 and Table 12).

If the LEDs do not operate as indicated, refer to Document EK-TL820-SV, *TL82X Field Service Manual.*

After checking all LEDs, turn off the breaker switch on the TL82X library electronics side of the power distribution box (see Figure 13 on page 4-9) and replace the electronics cover plate.

Figure 18: Electronic LEDs

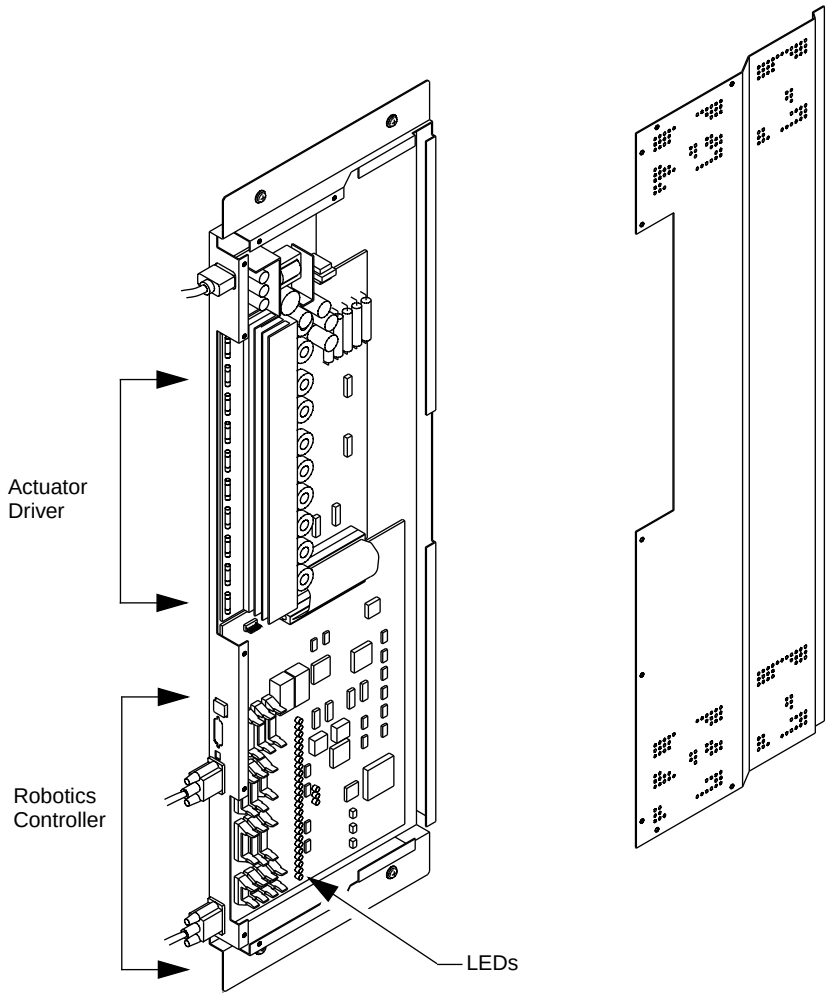


Table 12: Robotic Controller Board LED Function

LED	Color	Description	Function
1 (bottom)	yellow	vert home	LED 1 is on when the vertical carriage is at the home position (near eye level), LED 1 should be off for all other conditions.
2	yellow	vert limit	LED 2 is on when the vertical carriage is at the lower limit position (near the floor). LED 2 should be off for all other conditions.
16	red	front door open	LED 16 should be on when the front door is open. LED 16 should be off for all other conditions.
24	yellow	standby	LED 24 should be on when the STANDBY buttons on the control panel are pressed.
25 (top)	red	system stopped	LED 25 should be on when the STOP button on the control panel is pressed.
26	red	fault	LED 26 should be on when the STOP button on the control panel is released, when either door is opened, or whenever a fault condition exists.
28 (top)	green	+5V	LED 28 should be on when there is 5VDC present.

Figure 19: Robotic Controller Board LED Locations

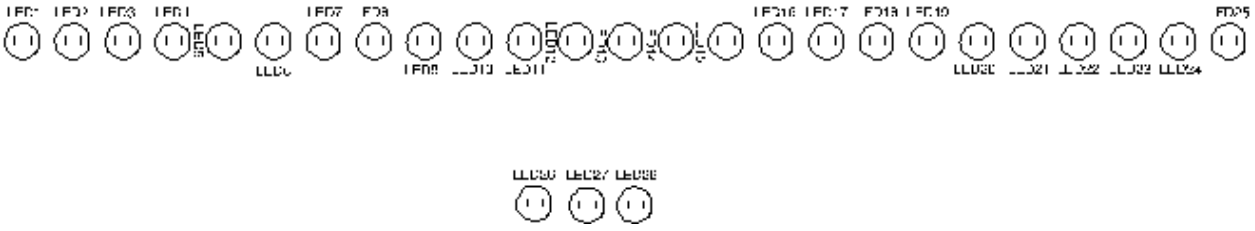
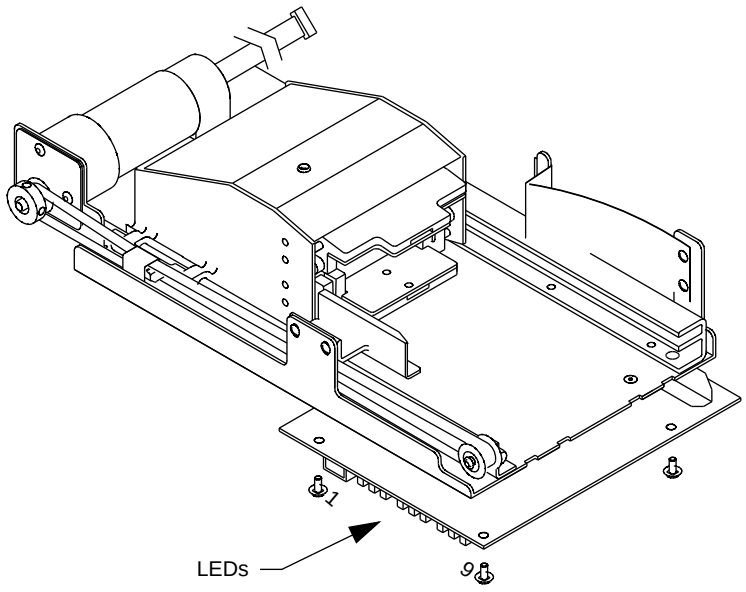


Table 13: Carriage QSPI LED Functions

LED	Color	Description	Function
1	green	+5V	LED 1 should be on when there is +5VDC present.
2	green	ex CIG #1	LED 2 (Rear Cartridge-in-Gripper) should be on when a cartridge is in the gripper.
3	green	ex CIG # 0	LED 3 (Front Cartridge-in-Gripper) should be on when a cartridge is in the gripper.
4	green	ext hall effect 0	LED 4 should be on when the gripper jaws are closed.
5	green	ext hall effect 1	LED 5 should flash on and off as the gripper jaws open and close.
6	red	motor err 2	LED 6 should be on when a failure in the gripper motor circuitry occurs.
7	green	ext limit	LED 7 should be on when the extension axis is at the forward limit position.
8	green	extension home	LED 8 should be on when the extension axis is at the home position.
9	red	mot err #1	LED 9 should be on when a failure in the extension motor circuitry occurs.

Figure 20: Carriage QSPI LED Location



Horizontal Alignment and Vertical Calibration

The gripper and all tape drives must be horizontally aligned. Additionally, the vertical location (calibration) of each bin slot, tape drive and the Passthrough Mechanism (PTM) must be identified prior to any diagnostic testing. To perform alignment and calibration procedures, refer to Document EK-TL820-SV, *TL82X Field Service Manual*.

Testing the Library

For the following procedures refer to Document EK-TL820-SM, *TL82X Diagnostic Software User's Manual,* and Figure 21 on page 4-27.

1. With library power applied, press and release the control panel STOP switch and then the STANDBY switch.
2. Verify that the control panel status display shows "01" (standby).
3. Connect the diagnostic PC cable to the rear connector panel as shown in Figure 21.
4. Open the front door of the library and place test cartridges in one or more bins of each face.

Note ***The customer's System Administrator must be present for the next step.***

The TL820 is designated as model TL820-XX, the TL822 is designated as model TL822-XX, and the TL826 designated as model TL826-XX.

5. Use the "Config" menu of the diagnostic software to configure the library. To configure the library, refer to "Config Menu" in Section 4 of the Document EK-TL820-SM, *TL82X Diagnostic Software User's Manual.*

CAUTION ***Verify that the actuator paths are clear of obstructions.***

6. Using the diagnostic software, run a self-test on the system. (This provides a limited check on the operation of the system without moving any of the axes significantly. If the unit does not pass this self-test or any of the following tests, refer to Document EK-TL820-SV, *TL82X Field Service Manual.*
7. After successfully completing a self-test, home all actuators.

Note ***Observe all "place" procedures carefully to verify that cartridges are inserted properly.***

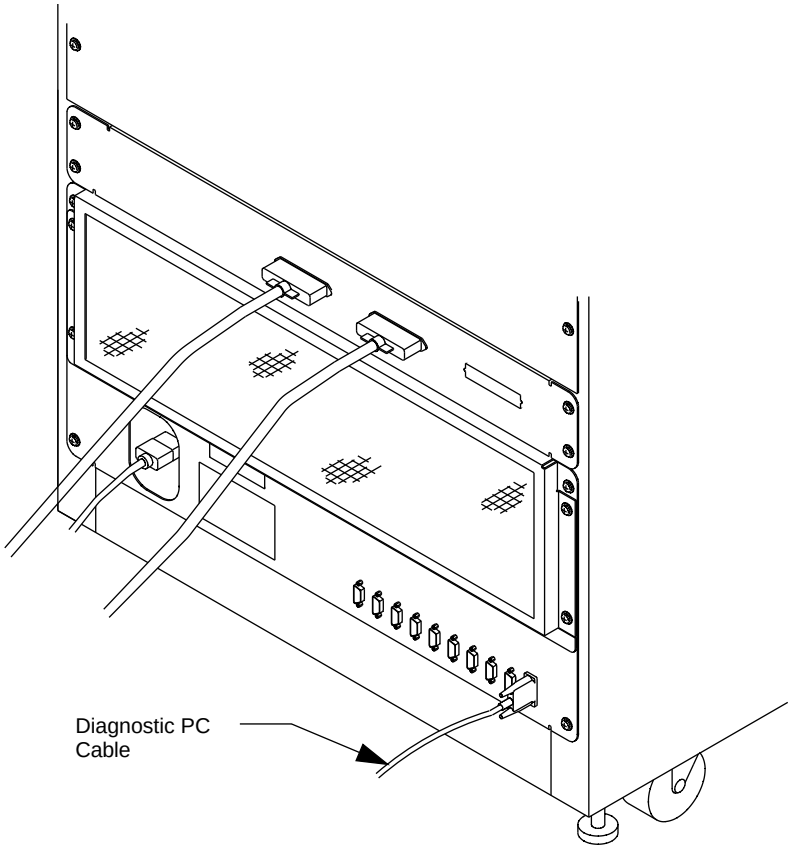
8. Use the diagnostic software to pick a cartridge and then place it in the bin slot of a different face. (Repeat this step for every face of the carousel.)
9. Use the diagnostic software to place a cartridge into each tape drive.
10. On the control panel, press and release the STOP switch.
11. Open the front door of the library.

12. Press and release the tape DRIVE UNLOAD switches, manually remove the test cartridges from each tape drive and then return them to empty bin slots.
13. Close and latch the door.
14. On the control panel, press and release the STOP switch.
15. Use the diagnostic software to verify the operation of the PTM by placing and picking a cartridge to it. (Repeat this step several times.)
16. If applicable, use the diagnostic software to verify the operation of the IOD by importing and exporting a cartridge from / to it. (Repeat this step several times.)
17. After successfully completing these tests:
    - Press and release the control panel STOP switch.
    - Open the library door and remove all test cartridges, then close and latch the door.
    - Press and release the control panel STOP switch.

Note ***If this is a stand-alone library, proceed to "Loading the Library."***

If this library is part of a multi-unit configuration, proceed to "Cabinet-to-Cabinet Mounting."

Figure 21: Diagnostic PC Cable Connection



(Note: TL820 Library shown)

Cabinet-to-Cabinet Mounting

If you have multiple units attached to one another, you must cable each of them to the MUC. The required cabling is in the Cabinet-to-Cabinet Attachment Kit (P/N 6205016) and is purchased separately.

To prepare the library for mounting, disconnect the diagnostic PC and power down the library as follows:

1. Press the STOP button on the control panel. The FAULT light will illuminate and "2A" will be displayed.
2. 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.
3. Disconnect the diagnostic PC serial cable from the rear of the library.

Note ***Robotic power also must be shut down for all units to be attached. Contact your System Administrator prior to removing power. Shut down robot power only as described in the previous steps.***

4. Remove the cover plates on the side of each unit for each side that is to be mated with another cabinet.

   Multiple units may be attached in any order. The units will be addressed left to right (when viewed from in front of the units) with logical unit 0 being on the left. Cabling from the distribution panel must reflect this order, see "External Library Cabling" for cabling instructions.

   Refer to Document 6207127, *TL82X Cabinet to Cabinet Mounting Instructions*, for instructions on how to mount the cabinets for a multi-unit configuration.

Aligning PTMs from Library to Library

The PTM is mounted to the cabinet retma rails with mounting brackets that provide adjustment in three directions (up / down, forward / back, and left / right). When configuring two or more units side by side in a multi-unit configuration, it is important that the PTM for each unit b e properly aligned with the PTM for the adjacent unit(s) so that cartridges can move between units.

After each unit has been leveled and the cabinet-to-cabinet mounting brackets (front and rear) have been installed, use the up / down and front / back adjustments in the PTM mounting brackets by loosening the respective two screws for each adjustment and moving the PTM so that it aligns with the PTM in the adjacent cabinet.

Note ***The left/right adjustment (which is critical to proper gripper-to-PTM operation) is made at the time of installation of the PTM and should not be disturbed.***

The cabinet-to-cabinet PTM alignment can be observed and adjusted by inserting a cartridge on the conveyor and gently pushing it from one PTM across to a PTM in an adjacent cabinet. Adjust each adjacent PTM up / down and forward / back so that cartridges will move freely from one PTM to the next.

Refer to Document 6207127, *TL82X Cabinet to Cabinet Mounting Instructions,* for instructions on how to mount the cabinets for a multi-unit configuration.

Loading the 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.***

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

Figure 22 on page 4-31 shows how to insert a bin pack into the carousel.

To load a cartridge into a bin pack that is already mounted on the carousel, do the following.

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 right and left arrow buttons until the desired carousel face is at the front.
3. Open the front door.
4. Insert tape cartridges into the bin pack with the bar code label slot facing out and the cartridge spindle facing down.

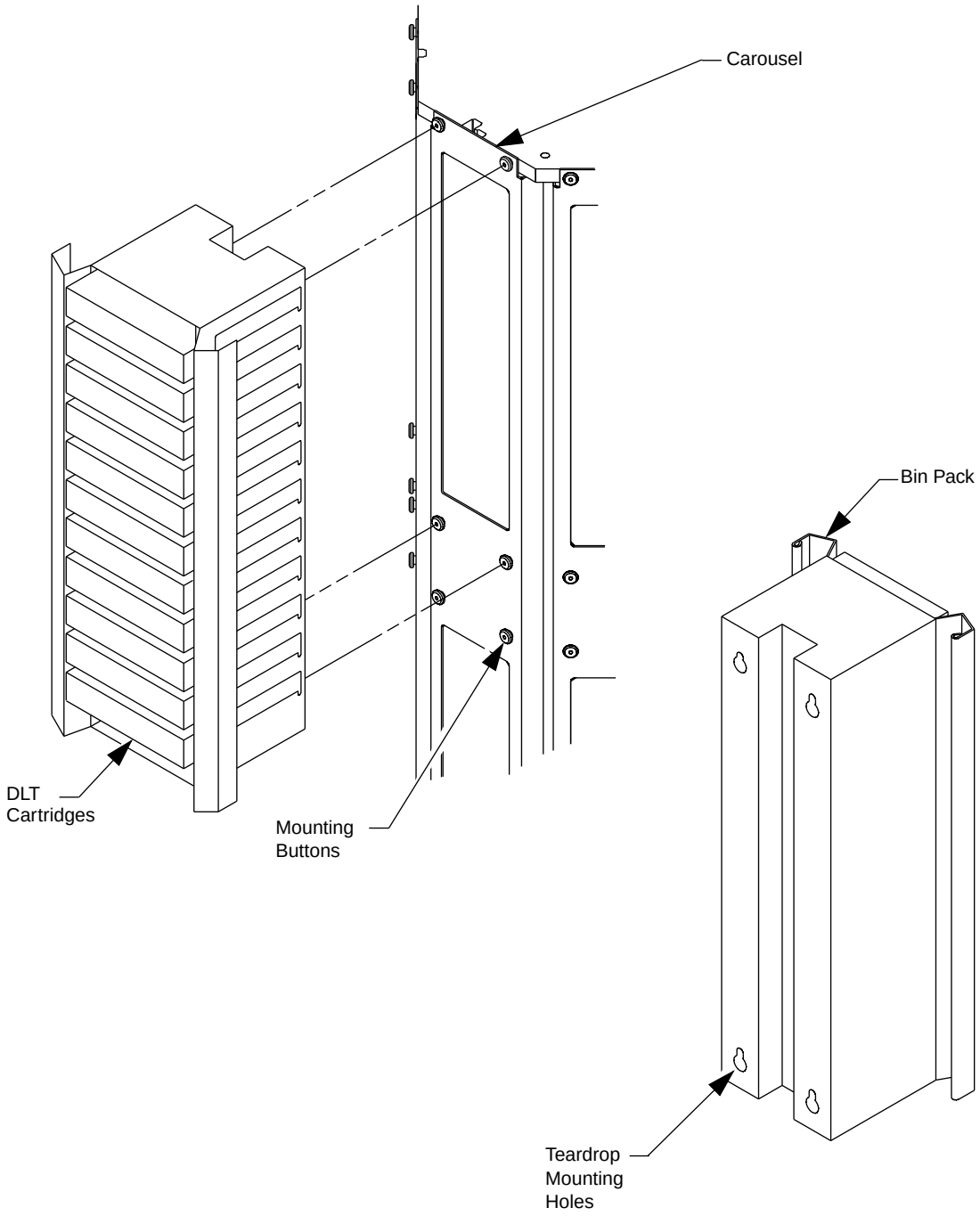
Note ***Since a cartridge can not be fully inserted into a bin pack incorrectly, you will notice if the cartridge does not fit into the cartridge slot completely.***

5. Run your hand down the front face of the cartridges on the exposed carousel face to make sure they are seated properly. (Do not run your hand up the front face of the cartridges since this can cause them to become seated incorrectly.)
6. Close the front door.
7. Verify that the STOP button is released.
8. Place the library on-line, by releasing the STANDBY button.

   Once the front door is closed and the library is on-line, it will re-inventory 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; e.g., when loading and unloading individual cartridges via the IOD.

Figure 22: Loading the TL82X Library



Tape Drive Cabling

Internal Power Cabling

The single power distribution box within the TL82X library has two sets of outlets (see Figure 13 on page 4-9). One set is dedicated to the unit's internal robotics, while the other is available for the tape drives and MUC.

For tape drive power cables, use only the outlets in the section of the power distribution box for tape drives and system integrator electronics. The receptacles accept IEC-320 style plugs and are rated at 10A each.

A circuit breaker on the outside of the power distribution box is provided for safety. The TL82X library electronics bank uses a 10A breaker.

CAUTION ***Make sure the switch on the power supply connected to the tape drives is OFF while you hook up the tape drive cabling.***

Internal Library SCSI Cabling

The DLT™ tape drives and MUC in the TL82X are internally connected to the rear library bulkhead using double-shielded SCSI-2 cables. All SCSI bulkhead connections are 50 pin female Centronics receptacles. The lower tape drives are cabled and terminated individually. The top tape drive is connected to the rear bulkhead, and daisy-chained to / terminated at the MUC.

The cabling diagrams in Figures 20 through 22 show the standard SCSI cabling for the TL820, TL822, and TL826, respectively. Additional cables are included in the accessories kit shipped with the library. Use these cables to reconfigure the library as desired. Note that in accordance with the SCSI specification, all devices on a single bus must have unique SCSI IDs, and both ends of every bus must be terminated.

Figure 23: SCSI 2-Wire Configuration (as Shipped for the TL820)

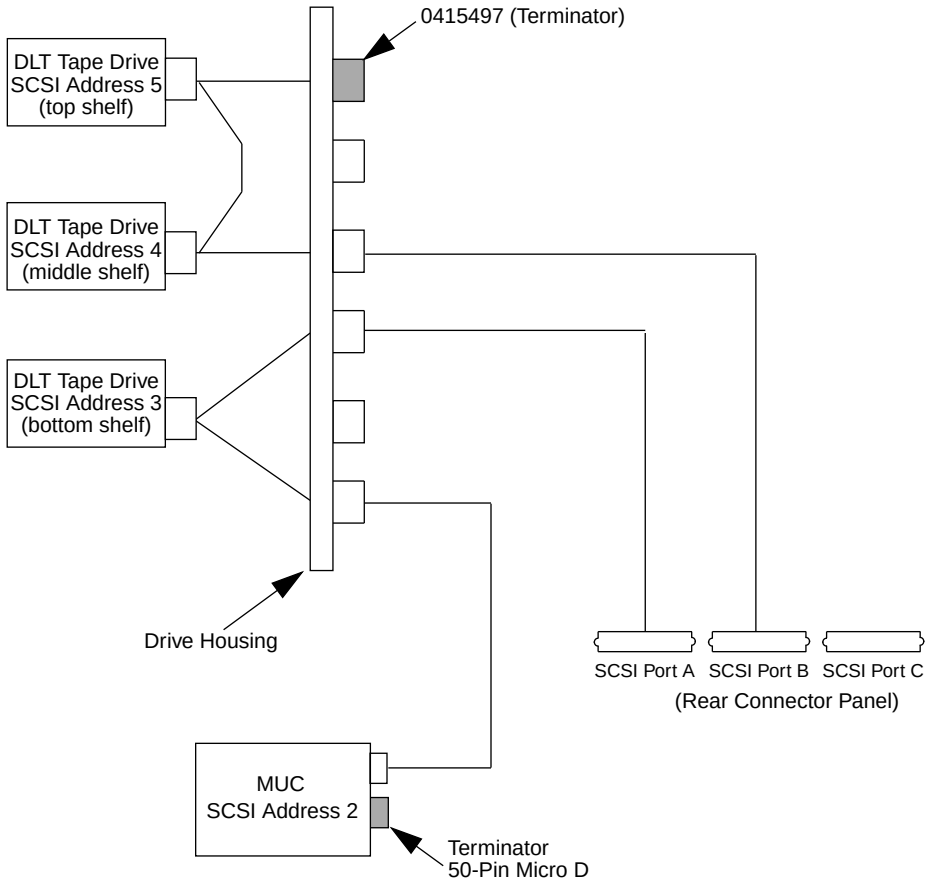


Figure 24: 3-Wire Configuration (as Shipped for the TL822)

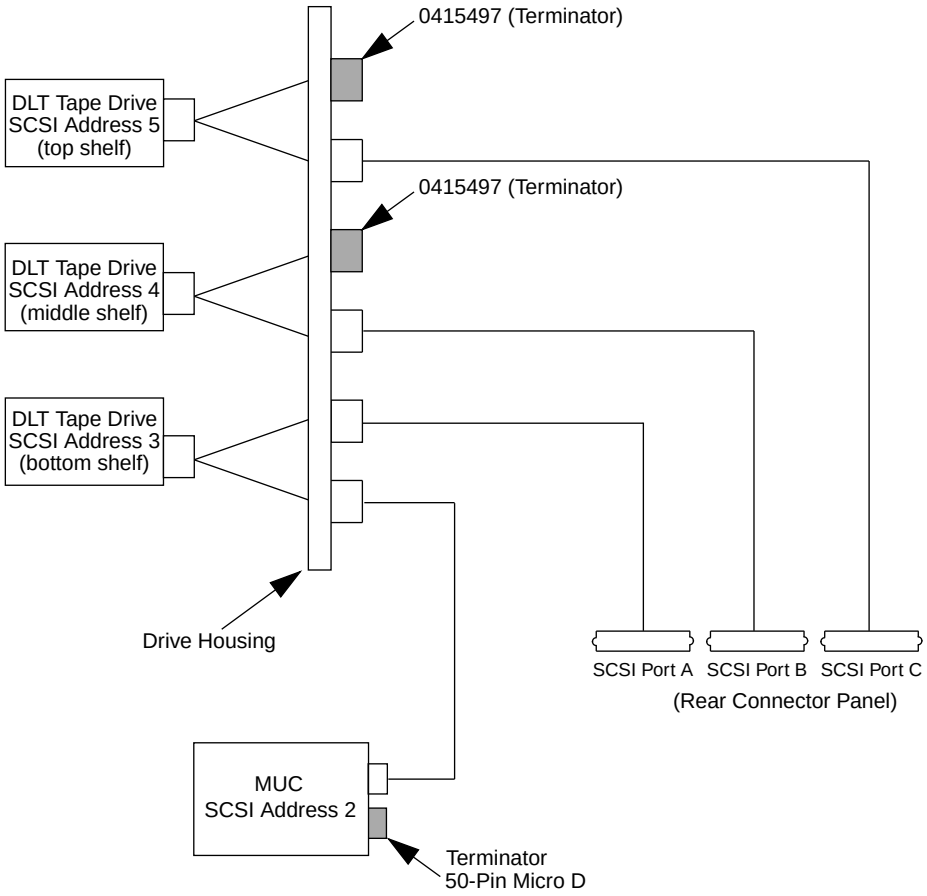
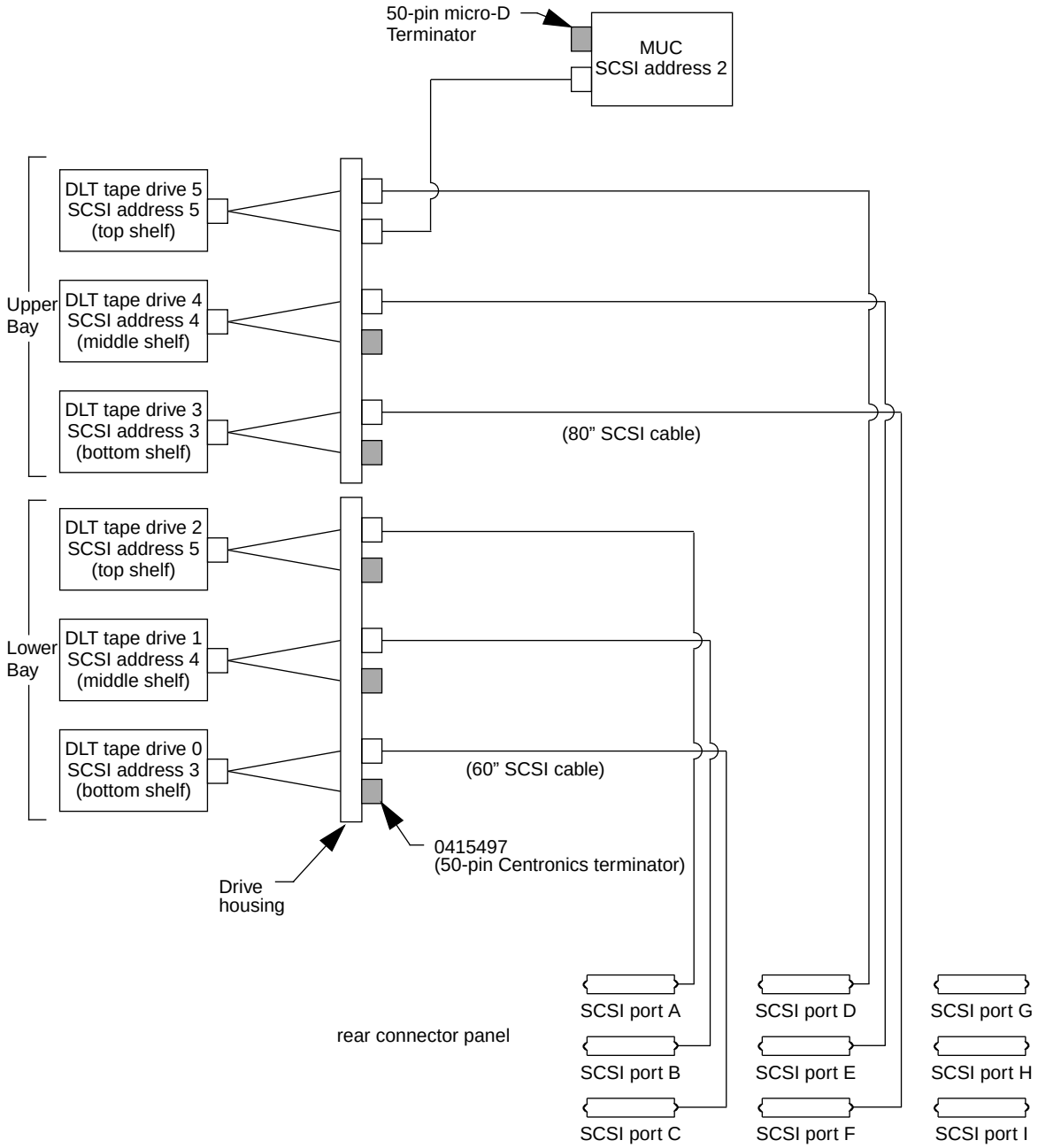


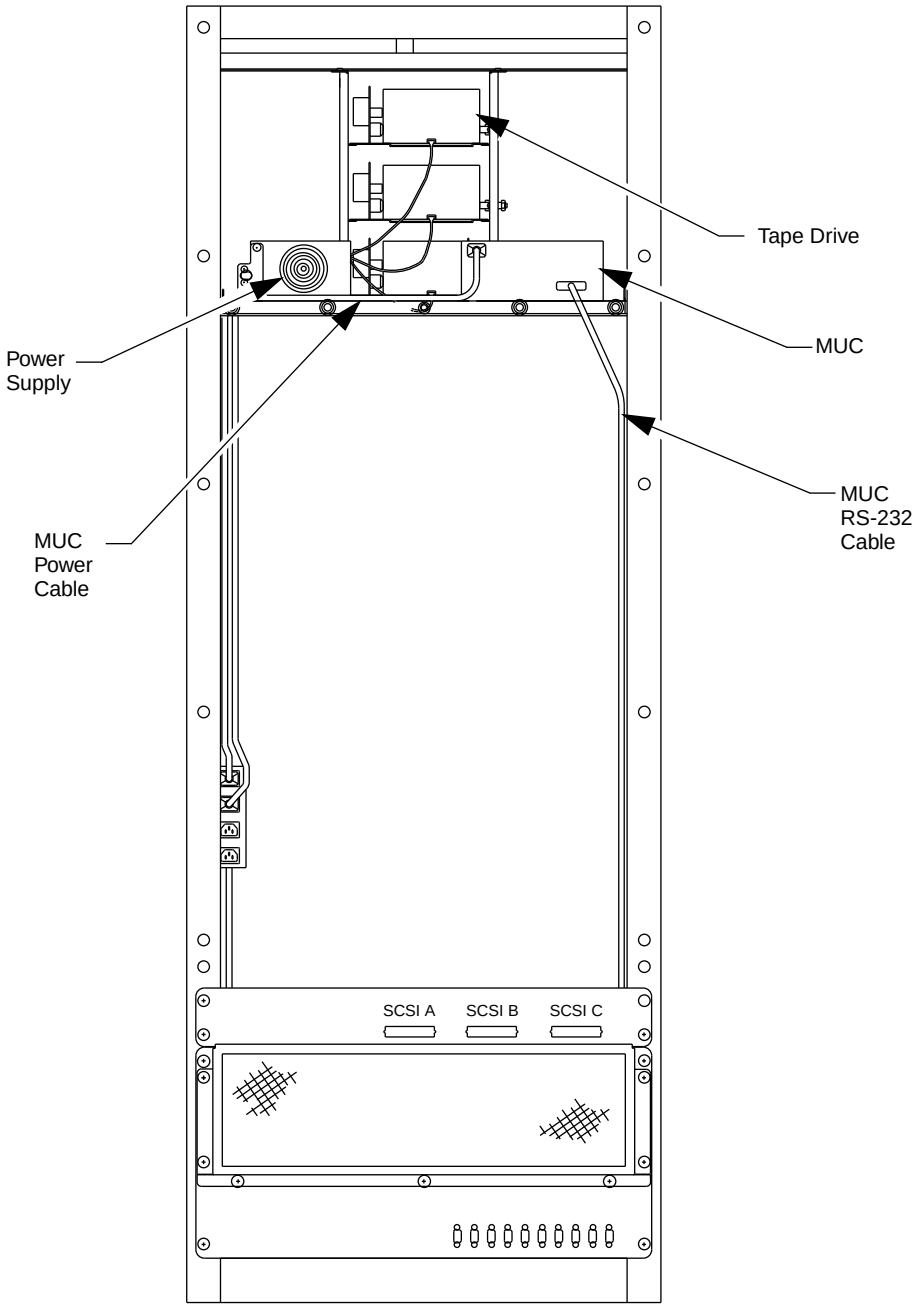
Figure 25: 6-Wire Configuration (as Shipped for the TL826)



MUC cable connections

Figure 26 shows internal MUC cable connections for a single unit configuration. The MUC is daisy-chained to the bottom tape drive.

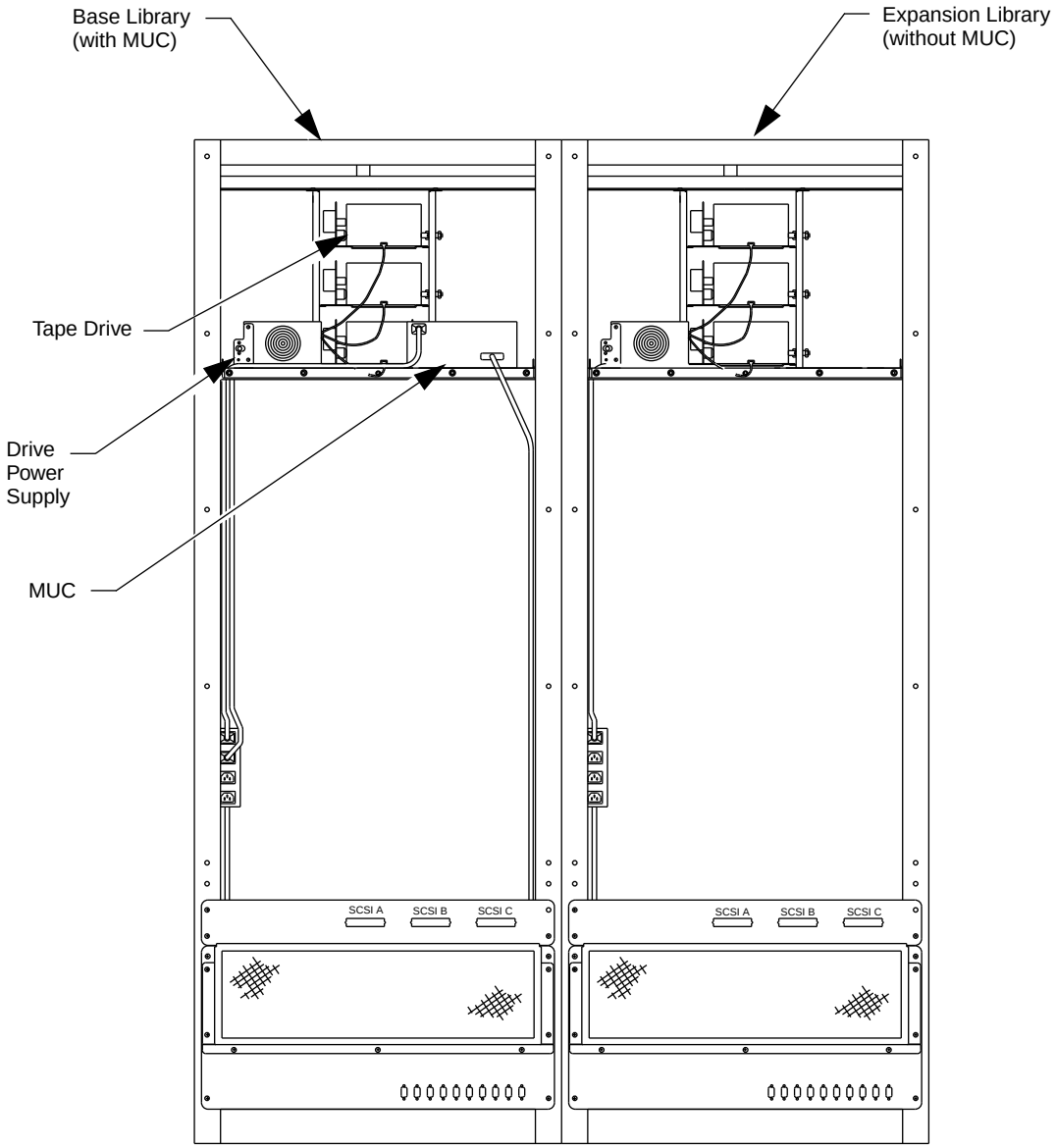
Figure 26: Internal MUC Cable Connections



Internal multi-unit cable connections

The SCSI bus coming from the host computer is attached to the unit with the MUC through the SCSI A port on the rear connector panel.

Figure 27: Internal Multi-Unit Cable Connections



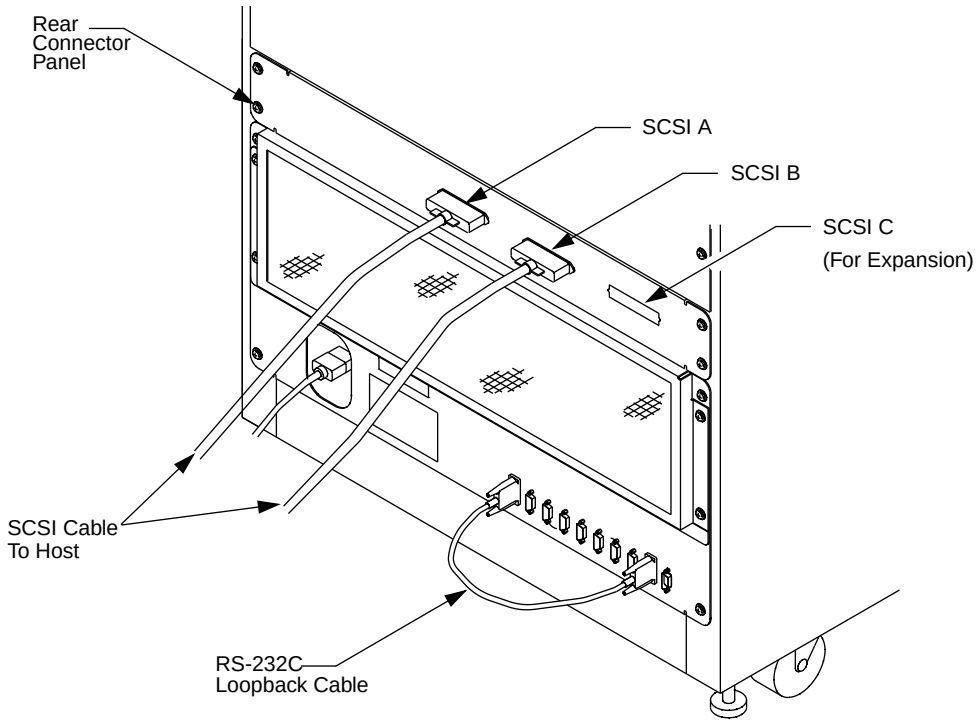
(Note: TL822 Library Shown)

External Library Cabling

MUC Cable Connections

Figure 28 shows the external cable connections for the TL822 library. The external cable connections for the TL820 and TL826 are basically the same. Note that the SCSI bulkhead receptacles are located just above the fan panel. Below the fan panel are the AC power receptacle and RS-232C receptacles for the library robotics and diagnostics.

Figure 28: External MUC Cable Connections



(Note: TL820 Library Shown)

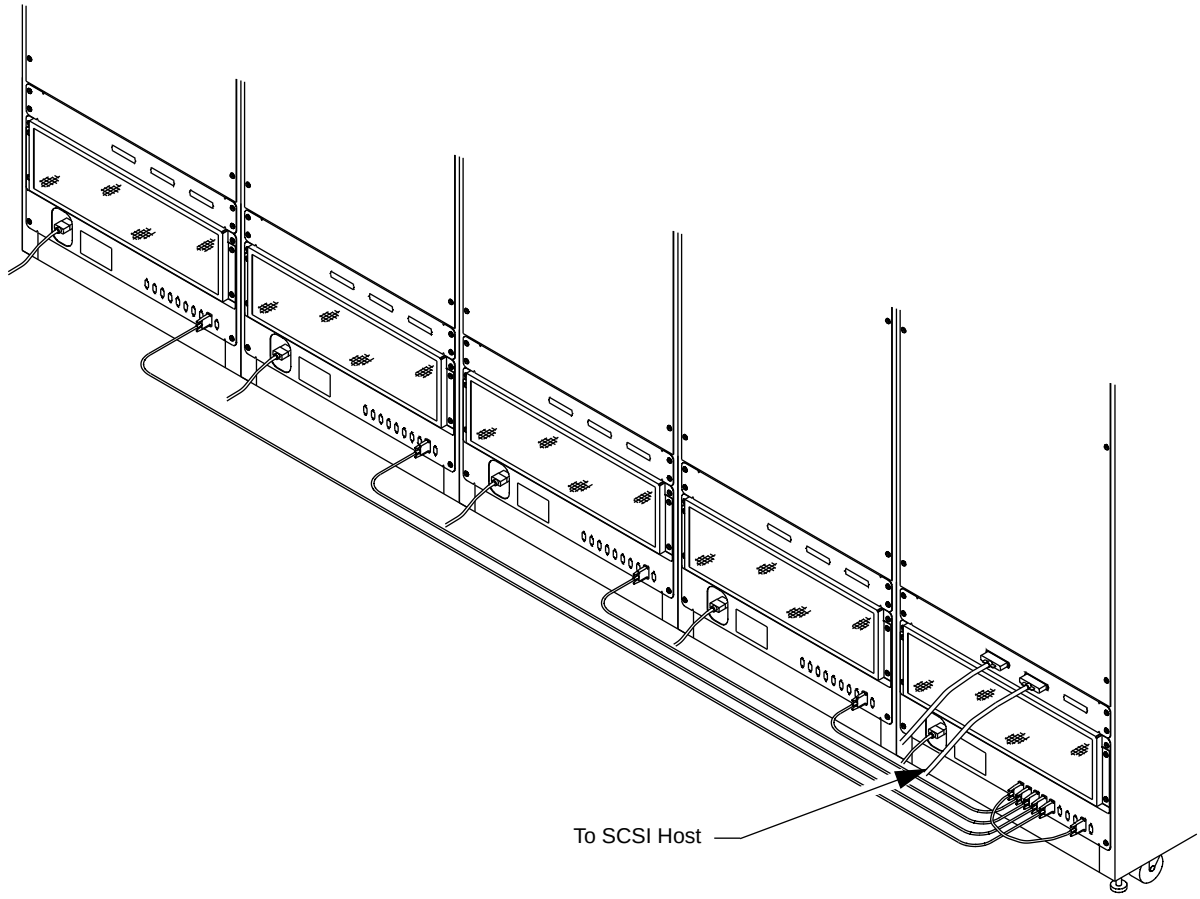
For single library installations, a shielded RS-232C serial cable (which is supplied in the accessories kit) must be connected between the Robotic Controller Port labelled “INPUT” and the Multi-Unit Controller Port labelled “UNIT 0”. This creates a link between the MUC and the library control electronics.

Connect the SCSI cable to the SCSI A port on the rear connector panel (see Figure 28). Until the library controller connections have been tested, cables between the host and the TL82X library should be connected only on the TL82X library side and not on the host side.

Multi-Unit Library Cable Connections

For multi-unit configurations, the single-unit configuration communications connection procedure is simply extended. Figure 29 shows communications connections between units in a multi-unit library system.

Figure 29: External Multi-Unit Cable Connections



Note ***The cabinet-to-cabinet connector cables are optional and are not supplied with the basic library, but they are supplied with an expansion library.***

The multi-unit library system connection functions as follows:

- Provides paths for all necessary control and coordination signals.
- Identifies a unique connection pattern to the MUC software to identify both the number of units in the multi-unit configuration and where each of them are in relation to the others.

Note ***The location of the unit housing the MUC is not critical and can be based on proximity to the host computer. For libraries with a MUC that use serial host control, connect the EIA/TIA cable to the Multi Unit Controller host port.***

CAUTION ***For the multi-unit library system to function properly, it is important for the units to be in order as unit 0, unit 1, unit 2, and so on, as described below.***

To connect units in multi-unit library system, do the following:

1. Connect a cable between the robotic controller port marked “INPUT” on the left-most (as viewed from the front of the library system) cabinet’s rear connector panel and the multi-unit controller port marked “UNIT 0” on the rear connector panel of the library with the MUC.
2. Connect a cable between the robotic controller port marked “INPUT” on the second left-most cabinet and the multi-unit controller port marked “UNIT 1” on the library with the MUC.
3. Continue this process for the third left-most cabinet, the fourth left-most cabinet, and the right-most cabinet.

Completing the Installation

Once the units have been configured and the TL82X library controller connections have been tested, the communications cable between the TL82X library and the host computer can be connected on the host side.

CAUTION ***Consult your host computer service administrator or host computer manuals for information before completing the communications connection.***

1. Connect the host interface cable(s) to the host.
2. Release the STANDBY button on the control panel so the library is communicating with the host computer.
3. Release the STOP button on the control panel so that the library is fully enabled. (This will start an automatic power up and inventory sequence. When complete, the host will be able to send commands to the library system.)

Note ***At this point the library should be operational. For information on operating the TL82X library, refer to Document, TL82X Operator's Guide. For information on interfacing the TL82X library to host computer software, refer to Document EK-TL82X-IG, TL82X Software Interface Guide.***

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 TZ88N DLT™ tape drives and a maximum of 264 cartridges.
TL826 library	An automated library system developed for storing and handling DLT™ cartridges. Contains six TZ88N 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 the TL82X 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 on library units with a Model Number of TL820-XX, TL822-XX, and TL826-XX: 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.” A “used up” cleaning cartridge is exported from the library under control of 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.***
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 stores up to eleven DLT cartridges inside a TL82X library. It attaches to the carousel inside a TL82X library.
calibration	In the context of this manual, calibration refers to the software measurements and configuration required for successful operation of the TL82X 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 TL82X 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 library.
IOD	The Inport / Outport Device, located at the cutout on the left side of the TL82X library, allows insertion and removal of single cartridges into and out of the library.
LED	Light Emitting Diode.
library	A single TL82X cabinet and the robotics therein.
mounting kit	Kits supplied with TL82X libraries for installing tape drive systems in the unit.
MTBF	Mean Time Between Failures.
MTTR	Mean Time To Repair.
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 TL82X 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 TL82X 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 Conveyor Mechanism is the motor-driven, high-speed conveyor that transports cartridges between adjacent libraries in a multi-unit TL82X tape library. 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 fans and 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

I

L

M

P

R

S

T

U

V