



DLT™ MiniLibrary (TL890) Expansion Unit

User's Guide

EK-TL890-UG. A01

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About This Guide

This guide describes how to install and operate the DLT MiniLibrary Expansion Module (TL890) to increase the storage capacity and performance of a basic DLT MiniLibrary.

Audience

This guide supports the user familiar with installing and configuring storage hardware. You should understand basic SCSI concepts such as configuring device IDs, interconnecting devices and SCSI cable termination, and be able to perform basic, menu-driven diagnostics and error recovery procedures.

Related Documentation

DLT Mini-Library User's Guide

EK-TL891-UG

Document Structure

This guide contains the following:

Chapter 1: *Introduction* - Describes the DLT MiniLibrary models available; their SCSI interface and physical configurations, as well as system expansion capacity and features.

Chapter 2: *Operation* - Describes how to utilize the front panel, control panel, display and menu features of the DLT MiniLibrary and provides tape cartridge handling procedures.

Chapter 3: *Installation* - Describes the complete DLT MiniLibrary System Expansion installation process from planning and parts identification to mechanical installation, cabling and configuration.

Appendix A: *Specifications* - Provides technical specifications and regulatory information regarding the DLT MiniLibrary modules.

Appendix B: *Accessories* - Provides ordering information for the accessories available for the DLT MiniLibrary.

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1

Introduction

This chapter describes the features of the expansion and base modules of the DLT MiniLibrary System, including Storage Architecture, SCSI Interface, Bus Performance, and Physical Configuration/Expansion Options.

The DLT MiniLibrary System is an expandable, modular tape library system combining DLT drive technology with advanced robotics. The MiniLibrary System is designed for high duty-cycle on-line and near-on-line applications, such as hierarchical storage management (HSM). It is a superior performer in high-volume backup and archival service as well.

1.1 Modules

Two types of modules comprise the DLT MiniLibrary System:

- Expansion Unit
- DLT MiniLibrary (Base Module)

The DLT MiniLibrary System consists of one Expansion Unit and up to three MiniLibrary base modules stacked in a rack. The Expansion Unit can move media freely between itself and base modules via the system's robotically-controlled pass-through mechanism.

In a DLT MiniLibrary System, you can combine modules to provide the right combination of capacity and performance to meet your present storage requirements. Digital's MiniLibrary storage architecture lets you add modules to optimize throughput and capacity as your needs change.

1.2 DLT MiniLibrary Storage Architecture

When connected as a system, the robotics in the DLT MiniLibrary Expansion Unit act as commanded by the host computer(s). The host(s) need no knowledge of the internal geometry of the system, or of the actions or capabilities of the base modules.

The Expansion Unit presents to the host(s) a single SCSI medium changer device with a single SCSI Medium Transport element, a number of SCSI Storage elements equal to the total number of cartridge magazine slots, a number of SCSI Import/Export elements as specified by the user during configuration of the Expansion Unit, and a number of SCSI Data Transfer elements equal to the total number of drives in the system.

1.2.1 Flexibility

Digital's DLT MiniLibrary storage architecture is uniquely suited to growing storage needs. Its flexible library robotics system enables you to start with a system configured to your present requirements, confident that as your storage needs evolve, you can easily modify the MiniLibrary by adding modules and extending the pass-through mechanism. Add drives for faster performance or magazine space for greater capacity, as needed. Then just turn on the power, and immediately the system updates the system map so the host is informed of the expanded capability.

1.2.2 Multi-Server Data Sharing

A host computer with a SCSI controller connected to a bus is a SCSI Initiator. The Expansion Unit is a SCSI Target. SCSI rules permit multiple Initiators on a single bus. Therefore, with the proper host software, it is possible to connect multiple hosts to a single Expansion Unit over a single SCSI bus. This allows multiple hosts to operate the library robotics, loading and unloading cartridges as each host requires.

In a system with many drives, it is desirable to use multiple SCSI busses for the drives, so the data transfer rate of the drives is not limited by bus bandwidth. In a large, high-performance system, drives may be connected to separate hosts. Using special software, one of the hosts can act as a master server, processing all robotics commands. In this way several hosts may share a common data base.

1.3 The Expansion Unit

1.3.1 Description

The Expansion Unit integrates the robotics in the individual modules into a single coordinated library robotics system. The Expansion Unit performs and maintains an inventory of all media present in the system, including bar code data. All necessary system control operations may be performed from the control panel of the Expansion Unit, as well as from the host via software. The SCSI interface for the library robotics is designed for high-speed communication with the host, and Fast/Wide SCSI configurations.

In addition to its system control functions, the Expansion Unit has a 16-cartridge magazine with a rugged random access robotic mechanism. The module robotics moves cartridges between the pass-through mechanism and any of the 16 cartridge storage locations.

The user may designate a magazine in one of the base modules as a mail slot for inserting or removing one or more single cartridges, which implements the SCSI Import/Export commands.

NOTE: A magazine which has been reserved for Import/Export service may not be used for data storage.

1.4 The Base Module

1.4.1 Description

The base module has one or two TZ89 tape drives and a 10-cartridge magazine with a rugged random access robotic mechanism.

1.4.2 Models

The DLT MiniLibrary base module is currently available as a TL891 or a TL892 with the addition of TZ89 upgrade drive. The first two digits of the model number refers to the DLT drive model series. The third digit of the model number denotes the number of drives.

The TL891 and TL892, using TZ89 series drives, also use the DLTtape IV cartridges, which provide a native capacity of 35 GB per cartridge. All models can also read and write DLTtape IIIxt cartridges. Both read and write densities are selectable from the front panel, and under SCSI control from the host.

1.5 SCSI Interface Configurations

Systems are equipped with TZ89 drives use a Fast/Wide SCSI interface using high-density 68-pin D-series connectors. The section on SCSI Interfaces in **Chapter 3 - 'Operation'**, describes the available interface options.

1.6 SCSI Bus Performance Considerations

1.6.1 Data Transfer Rate

The data transfer rate of the DLT MiniLibrary is dependent on the type of drives and on the SCSI bus configuration. The bandwidth of the SCSI bus is limited. As a result, the transfer rate of exceptionally fast drives such as the TZ89 can be limited by sharing a SCSI bus with another disc drive on tape.

1.6.2 Drives

With a standard SCSI interface, modules equipped with TZ89 drives have a native data transfer rate of 5.0 MB/second, 10 MB/sec for two drives. The rates for compressed data are dependent on compression ratio, record size and other system parameters, but averages approximately 2:1.

1.6.3 Internal Cabling Configuration

The MiniLibrary System is wired in an independent-bus SCSI configuration. That is, the robotics and each of the drives has its own SCSI bus. SCSI jumpers are available for those applications requiring that some combination of drives and robotics be daisy-chained to a single SCSI bus. These configurations are described in more detail in the section on SCSI Interfaces in *Chapter 3, 'Installation'*.

1.7 Physical Configuration

The Expansion Unit must be mounted at the top of the stack, which places its control panel at a convenient height. The control panels of the base modules are of secondary importance, as they serve mainly to help localize system failures. When installed, the motor drive assembly of the pass-through mechanism is directly behind the Expansion Unit.

Base modules may be installed anywhere below the Expansion Unit, in any order. There may be a slight performance advantage in making the base modules contiguous, but gaps are permitted. The size of a gap is limited by the fact that each gap must be bridged by some number of 7" pass-through mechanism track sections. For safety, available cover plates should be installed on all pass-through mechanism sections which are not connected to MiniLibrary modules.

The Expansion Unit senses the position of each module during initialization at power-up. Even if there are gaps between modules, the system will operate correctly. If you plan to leave gaps between modules, be sure to order additional pass-through mechanism track segments and cover plates equal to the length of the gap.

1.8 System Expansion

A DLT MiniLibrary System may be expanded in capacity and performance by adding or removing modules. Associated with the Expansion Unit and each of the base module(s) is a section of the pass-through mechanism. System firmware integrates all of the robotics of these system modules with that of the pass-through mechanism into a single high-performance library robotics system.

1.9 Features

Figures 1-1 through 1-5 identify some of the external features of the Expansion Unit and the MiniLibrary.

Figure 1-1 Expansion Unit Front View

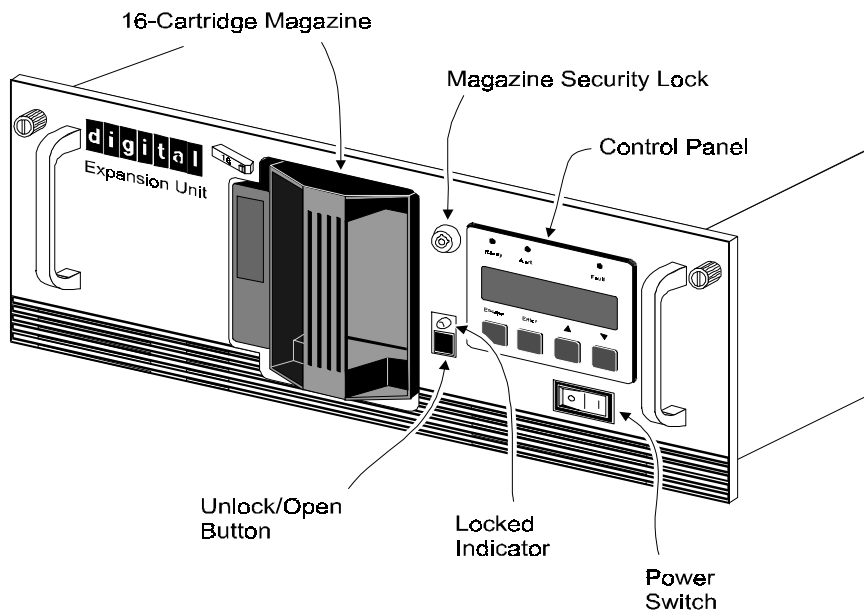
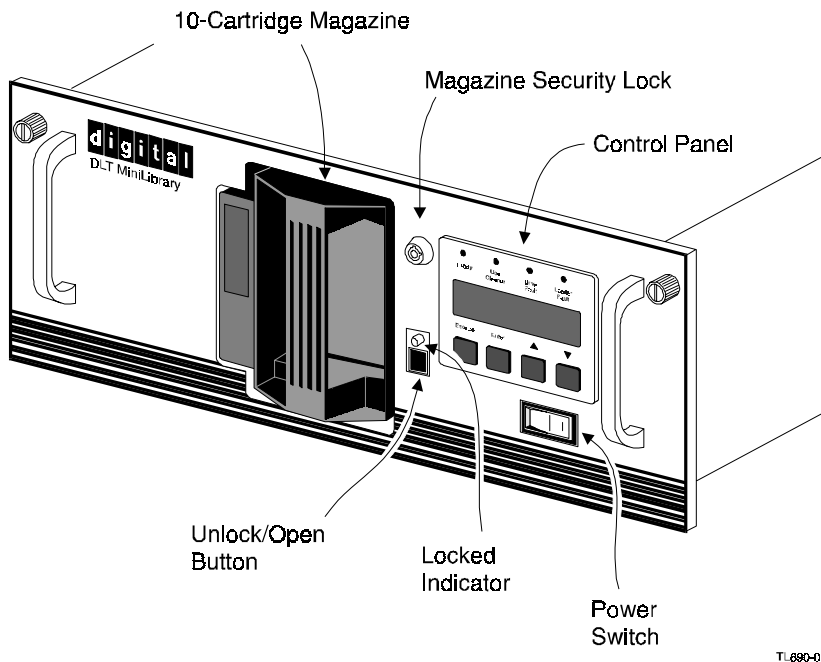


Figure 1–2 Base Module Front View



1.9.1 Control Panel

The control panels for all modules are the same, except for the number of LED indicators. The control panel features a 4-line by 20-character backlit LCD display, three or four LED indicators, and four buttons. The buttons enable the operator to navigate through the menu structure to select and display operating modes, device status, diagnostic and maintenance functions, device history and error statistics, and system configuration. The functions of the control panel are described in detail in **Chapter 2 - Operation**.

Display

The backlit 4-line by 20-character control panel display provides a highly intelligible presentation of drive and loader status, menu choices and error messages. The scrolling feature greatly expands the amount of information available to the operator. In the Expansion Unit, status information is available for the entire system. The base modules display other information as needed for localizing malfunctions.

Magazine Security Lock

The Magazine Security Lock is a key-operated switch on the front panel of each module. It can be used to prevent inadvertent removal of the cartridge magazine.

1.9.2 Power Supply

The AC Power switch is located on the front panel of the module. The autoranging power supply will adjust automatically to either of two operating voltage ranges. The ranges are 100-120 VAC and 200-240 VAC. The power supply is capable of operating at 50 or 60 Hz without any adjustment or modification. AC power is supplied to the power supply by a single IEC-compatible socket which can be connected to any properly grounded outlet.

1.9.3 Tape Cartridge Magazines

The ten-cartridge and sixteen-cartridge magazines are removable from the front panel, but may be protected from tampering by any of three means: 1) a key-operated Magazine Security Lock which must be unlocked before the magazine can be removed, 2) an electronic combination lock operated by using buttons on the Expansion Unit control panel, and 3) issuance by the host of a SCSI 'Prevent Medium Removal' command. The rugged carbon-fiber-reinforced polymer magazine fits into an extruded track, which assures precise positioning with respect to the library robotics. A ten-cartridge tape magazine is shown in Figure 1-3. Insertion and removal of the magazine is described in **Chapter 2 - Operation**.

Figure 1-3 Base Module 10-Cartridge Magazine

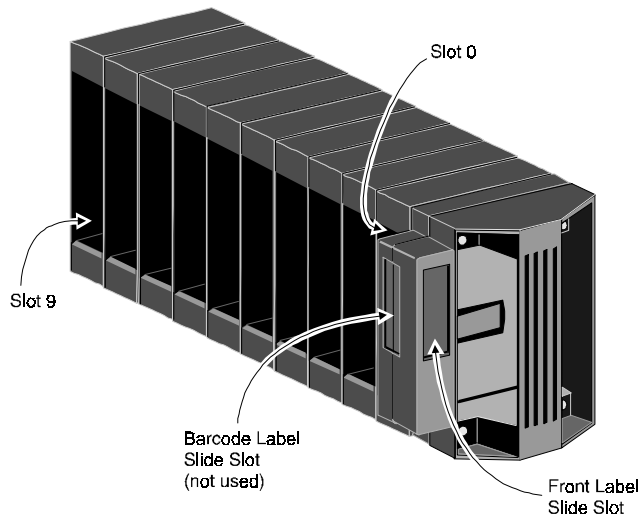


Figure 1-4 Expansion Unit Rear View

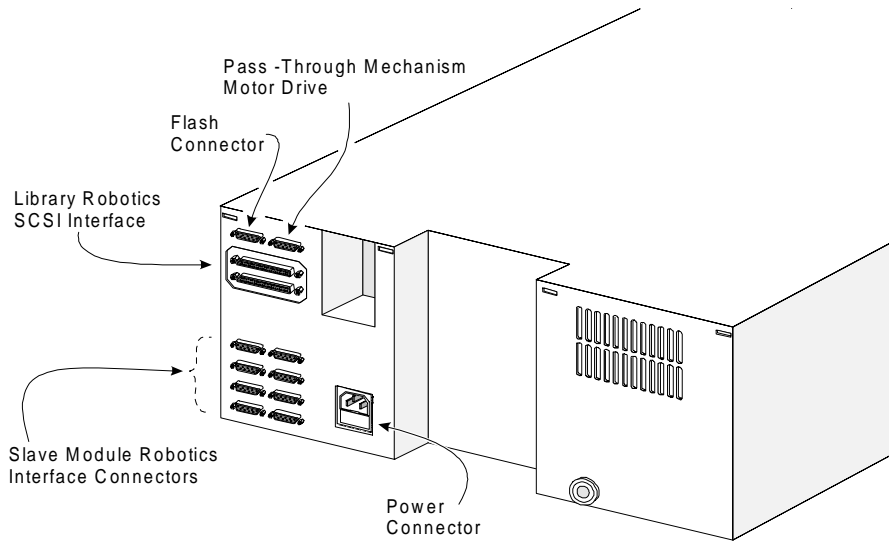
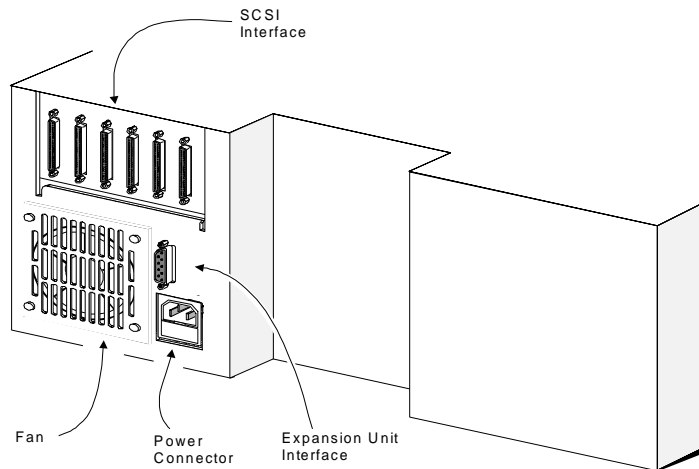


Figure 1-5 Base Module Rear View



1.9.4 Integral Fan Cooling

A single forced-air fan is mounted inside each module to provide optimum cooling for critical parts, and to prevent the drive and robotics electronics, motors and power supply from overheating.

1.9.5 Library Robotics

The DLT MiniLibrary System features library robotics that can load any of the cartridges stored in any magazine in the system into any of the DLT tape drives, moving cartridges among as many as three modules within the DLT MiniLibrary System.

1.9.6 Bar Code Reader

The bar code reader is mounted on the cartridge shuttle in each module. It reads bar code labels attached to each cartridge, and maintains the bar code data in memory as part of the library System Map.

1.10 Advanced Design Features

The DLT MiniLibrary System incorporates many significant improvements in tape drive and library design. One of the most important is the use of highly reliable DLT technology, with media rated by the media manufacturer at better than 1,000,000 head passes.

1.10.1 Embedded Diagnostics

The DLT MiniLibrary System and each of its modules provide three levels of embedded diagnostics. The Power-On Self Test (POST) performs various verification tests on the system's configuration and host interface and device control functions, as well as memory tests, at power-up. The second level of diagnostics is the User Diagnostics, which provide for displaying and changing configuration options. The third level, CE Diagnostics, include advanced diagnostics to be used by Customer Engineers for servicing the MiniLibrary System. Both the User Diagnostics and the CE Diagnostics may be selected from the front panel.

User Diagnostics are described in greater detail in **Chapter 3 - Installation**.

1.10.2 Error Checking

Drives used in the DLT MiniLibrary System apply a 16-bit parity check to each record, a 64-bit CRC to each 4 kB of data, and Reed-Solomon error correction code overall. In addition, there is an internal parity check on the data buffer.

1.10.3 Compression

DLT MiniLibrary System drives use the standard Digital Lempel-Ziv (DLZ) data compression algorithm.

1.10.4 Capacity

A single Expansion Unit with its 16-cartridge magazine offers the formatted capacity shown in Table 1-1.

Table 1–1 DLT MiniLibrary System Tape Capacity

MODEL	CARTRIDGE	MAGAZINE CAPACITY	FULL MAGAZINE UNCOMPRESSED	FULL MAGAZINE COMPRESSED
TL890	DLTtape IV	16	560 GB	1120 GB

1.10.6 Media Life

The media used in the DLT MiniLibrary is rated by the media manufacturer at over 1,000,000 head passes, and a shelf life of at least 30 years.

1.11 Related Publications

For additional information about the DLT MiniLibrary System product line, refer to the following publications.

- DLT MiniLibrary User’s Guide, P/N EK-TL891-UG. A01
- DLT TZ89 User’s Guide, P/N EK-TZ89N-UG. A01

2

Operation

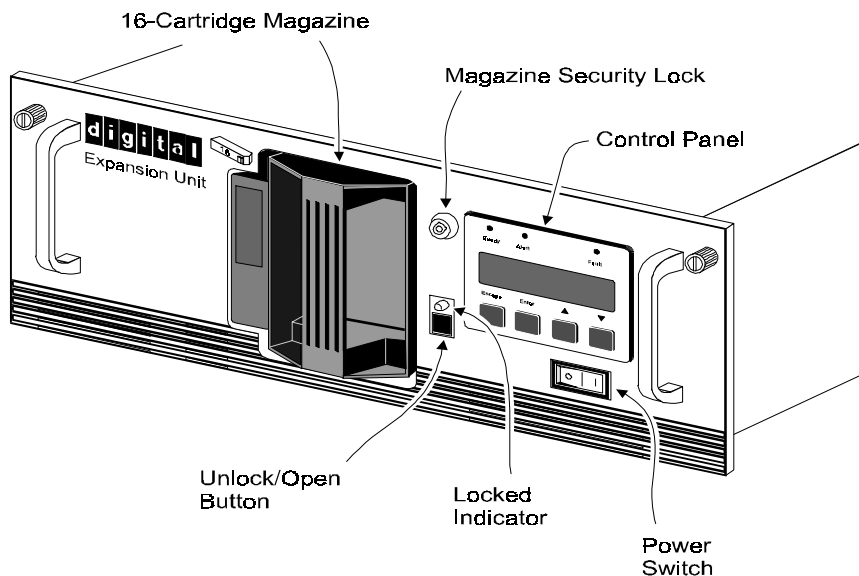
This chapter describes manual operation of the DLT MiniLibrary System through the Expansion Unit control panel, (the normal manner of manual operation), and the online and offline operations which may be performed through the MiniLibrary (base) control panel.

2.1 Expansion Unit

2.1.1 Front Panel

The front panel of the Expansion Unit (reference Figure 2-1) includes a power switch for the unit, and the control panel which has buttons, a display and indicators.

Figure 2-1 Expansion Unit Front Panel



2.1.1.1 Power Switch

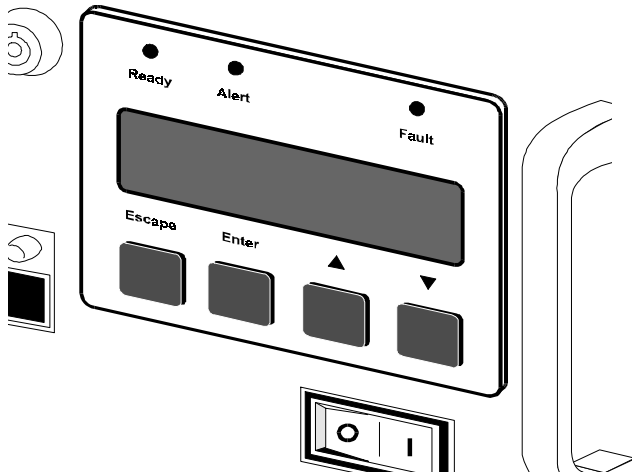
The power switch controls the supply of AC power to the module. It is set into a recess in the front panel to prevent accidental operation. Press **1** to turn the module ON and **0** to turn the module OFF.

Note: The Expansion Unit must be turned on after or simultaneously with the base module(s). If this is not done, the Expansion Unit may not be notified of the presence of one or more of the base modules.

2.1.1.2 Control Panels

The Expansion Unit control panel (as shown in Figure 2-2) consists of three LED indicators, a four-line by 20-character backlit LCD display, and four buttons. The base module control panel has four LED indicators, as shown in Figure 2-3.

Figure 2-2 Expansion Unit Control Panel



Expansion Indicators

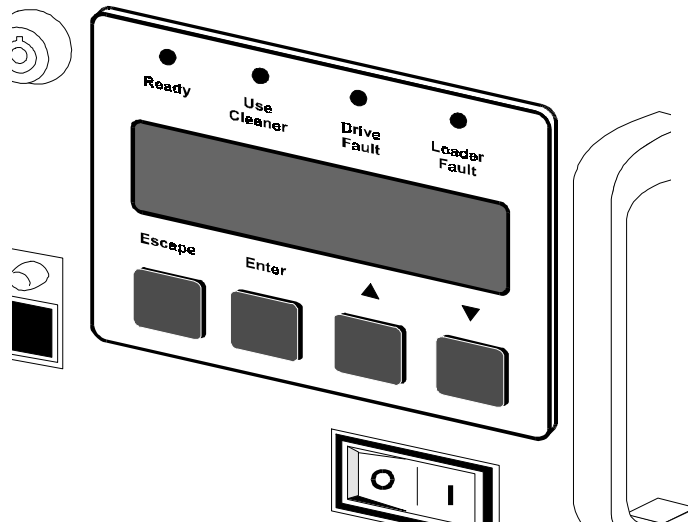
There are three LED indicators on the Expansion Unit control panel, labeled **Ready** (green), **Alert** (yellow), and **Fault** (red), which serve as follows:

- **Ready** (green) - illuminates when the system is ready to accept commands, either from the control panel or from the host computer. The **Ready** indicator goes out when you enter the Menu Mode .

Expansion Indicators - (continued)

- **Alert** (yellow) - indicates that a fault or some other matter that requires attention has occurred in one of the modules in the system. Line 2 of the display blinks the number of the module where the fault has occurred. The control panels of the indicated module may give a further indication of the cause of the alert. Often, when the **Alert** LED is lit, a **Fault** LED is illuminated on one or more of the base modules as well.
- **Fault** (red) - indicates that a fault has occurred in the Expansion Unit, or that the magazine door is unable to close. When the red LED is illuminated, a Fault Screen appears on the LCD display. The Fault Screen is described later in this chapter. A list of fault symptom codes (FSC) and error recovery procedures (ERP) appears in *The TL891 User's Guide, - Chapter 5.*

Figure 2-3 MiniLibrary Base Module Control Panel



Base Module Indicators

There are four LED indicators on the base module control panel, labeled **Ready** (green), **Use Cleaner** (yellow), **Drive Fault** (red), and **Loader Fault** (red), which serve as follows:.

Base Module Indicators - continued

- **Ready** (green) - illuminates when the base module is ready to accept commands, either from the control panel or from the host computer via the Expansion Unit. The **Ready** indicator goes out when you enter the Menu Mode .
- **Use Cleaner** (yellow) - indicates that either or both drives require cleaning. A cleaning operation should be performed as described in *The TL891 User’s Guide, - Chapter 3*. When the **Use Cleaner** LED comes on, you can find out which drive needs cleaning by selecting Cleaning Needed on the Drive Status submenu.
- **Drive or Loader Fault** (red) - illuminates when a Fault Screen appears on the LCD display. The Fault Screen is described later in this chapter. A list of fault symptom codes (FSC) and error recovery procedures (ERP) appears in *The TL891 User’s Guide, - Chapter 5*.

Buttons - All Modules

There are four buttons on the control panel, labeled **Escape**, **Enter**, ▲ and ▼. The buttons do not directly control specific functions or options. Instead, you use the buttons to navigate from the Default Screen through a multi-level menu structure, then select the desired option from the appropriate menu using the **Enter** button. Table 2-1 describes the effect of each of the four buttons under various conditions.

The three most important things you need to know about the buttons are:

1. To enter the Menu Mode and display the Main Menu from the Default Screen, press the **Enter** button.
2. To return to the Main Menu from a submenu, press the **Escape** button repeatedly until the Main Menu appears. Pressing the **Escape** button while the Main Menu is displayed exits the Menu Mode and returns you to the Default Screen. The Default Screen is shown in Figure 2-6; the Main Menu is shown in Figure 2-10.
3. To display the Show Status Menu *only* without entering the Menu Mode, press the **Escape** button at the Default Screen. The system remains online.

Note: When you enter the Menu Mode at the Expansion Unit, the **Ready** light on that module goes out. This means that the DLT MiniLibrary system is *off-line*, and the system responds to all commands from the host with a SCSI 'Not Ready' until you exit the Menu Mode and the **Ready** light goes on. When you enter the Menu Mode at any of the base modules, the Ready light on that module goes out. This means that the *individual module* is off-line, and the system responds to all commands from the host pertaining to that module with a SCSI 'Not Ready' until you exit the Menu Mode and the **Ready** light goes on.

Table 2-1 Control Panel Button Functions

	Escape	Enter	▲	▼
At POST Screen	N/A	N/A	N/A	N/A
At Default Screen	Displays Status Menu	Enters menu mode	N/A	N/A
At Status Submenu	Returns to Default Screen	Same as in Menu Mode	Same as in Menu Mode	Same as in Menu Mode
In Menu Mode	Rejects currently displayed choice, or Aborts control panel operation In progress, or Exits to next higher menu level, or Exits menu mode to default screen	Accepts currently displayed choice	Moves ► 1 line upward through list of options, or Scrolls part of display 1 line toward top of list of options	Moves ► 1 line downward through list of options, or scrolls part of display 1 line toward bottom of list of options
At Fault Screen	N/A	Clears soft errors	N/A	N/A

Note: There is an auto-repeat feature for the ▲ and ▼ buttons. When the user presses either button for more than one-half second, the control panel behaves as if the user were pressing and releasing the button about four times per second. This effect stops when the user releases the button.

2.1.2 Front Panel and Media Locks

To avoid accidental interruption of system operation by entering the Menu Mode or removing cartridges while the host is accessing the system, the front panel and the media for each module may be electronically locked. When the front panel of the Expansion Unit is locked, you can only enter the Menu Mode after entering a 4-digit code. That is, when the Default Screen is displayed, pressing the **Enter** button does not invoke the Menu Mode until you enter the code. The front panel of a base module cannot be unlocked without using the Security submenu on the Expansion Unit to unlock it.

All base module front panels are locked by default when connected to a Expansion Unit.

Media located in any or all modules may be locked and unlocked using the Security submenu on the Expansion Unit. When the media are locked, you can only remove media after unlocking the module from the Expansion Unit using the Security submenu.

Procedures for locking and unlocking front panels and media are described later in this chapter.

2.2 Starting the System

Note: When turning on power to the DLT MiniLibrary, power *must* be applied to the Expansion Unit either simultaneously with or after the other modules. If the Expansion Unit is powered on first, its inventory of modules may be incorrect, and the contents of some or all of the modules will be inaccessible to the system and to the host.

2.2.1 Display Messages

The display on the control panel is capable of displaying four lines of 20 characters each, to allow the use of easy-to-understand messages. Many of these messages and their functions are described in this chapter. Those displays that are described in other chapters are cross-referenced here as well.

Power-On Self Test Screen

When power is first applied to the module, a series of power-on self test (POST) diagnostics are performed. During POST execution, the model number of the module, the firmware revision, the status or result of the test in progress and the current date and time are displayed on the control panel as shown in figure 2-4.

Figure 2-4 POST Screen

```
DIGITAL TL89x
Firmware Level 0X.xx
Checking Hardware
26-Feb-19xx 15:35:59
```

Initialization Screens

After the POST is completed, the library robotics system is initialized. A series of screens similar to Figure 2-5 is displayed during this process.

Figure 2-5 Initialization Screen

```
DIGITAL TL89x
Firmware Level 0X.xx
Initializing Loader
26-Feb-19xx 15:35:59
```

Default Screen

After the POST diagnostics have concluded successfully and initialization is complete, the system Default Screen appears, as shown in Figure 2-6.

Figure 2-6 Default Screen

```
READY
Modules:0_ _ _ _ _
0 ▶ _ _ _ _ _ ◀ 9
10 ▶ _ _ _ _ _ ◀ 15
```

The numbers on the second line correspond to the base modules that are connected to the system. Up to three base modules may be connected. The third and fourth lines represent the cartridge magazine in the Expansion Unit. A rectangle will appear in each position which contains a cartridge. An underline represents an empty slot.

Fault Screen

When a fault is detected within the Expansion Unit or the pass-through mechanism, a screen similar to Figure 2-7 appears.

When a fault is detected in one of the base modules, the Alert LED on the Expansion Unit control panel is illuminated. The Fault Screen appears on the malfunctioning base module. At the same time, either the Drive Fault or the Loader Fault LED is illuminated on that module.

Figure 2-7 Fault Screen

```
Fault Code: XXXX
Error Description
ERP line 1
ERP line 2
```

The first line in Figure 2-7 shows a numerical fault symptom code (FSC). The second line shows a brief description of the error, in place of the words ‘Error Description.’ The third and fourth lines will contain a one- or two-line message describing the initial error recovery procedure (ERP) in place of the words shown in the figure.

A list of the fault symptom codes (FSC) and error recovery procedures (ERP) appears in *The TL891 User’s Guide, - Chapter 5.*

Base Module Default Screen

The base modules display a different Default Screen, as shown in Figure 2-8 .

Figure 2-8 Base Module Default Screen

```
DLT0 Seeking
DLT1 Idle
Loader Idle
16▶ _ _ _ _ _ ◀25
```

The example shown is a base module in the module 1 position. The first and second lines of the Default Screen show the status of the two drives within the base module. On line 4, a rectangle appears in each position which contains a cartridge. An underline would appear at each empty slot. The numbers at the beginning and end of line 4 represent the numbers the system has assigned to the first and last slots of that module.

The possible status conditions of the drives are:

- No Tape
- Idle
- Rewinding
- Seeking
- Reading
- Writing
- Erasing
- Cleaning
- Unloaded
- Loading
- Unloading
- Hard Error
- In Flux
- Fault

The third line in a base module tells the status of the library robotics (Loader) within the base module. The possible conditions of the library robotics are:

- Idle
- Fetch/Stow
- Taking Inventory
- Checking Drives
- Scanning Labels
- Orphaned Cartridge
- Trapped Cartridge
- Elevator Home

The fourth line in a base module is the magazine map. Numbers 16-25 in Figure 2-8 represent the map numbers of the cartridge slots. In this case, we have a 10-slot magazine in the first position below the 16-slot Expansion Unit. These numbers vary with the position of the module within the system and magazine size. If no magazine is installed, line 4 says 'No Magazine.' The boxes present on this line indicate that a cartridge is present in the corresponding slot of the magazine. An underline means that there is no cartridge present in that slot.

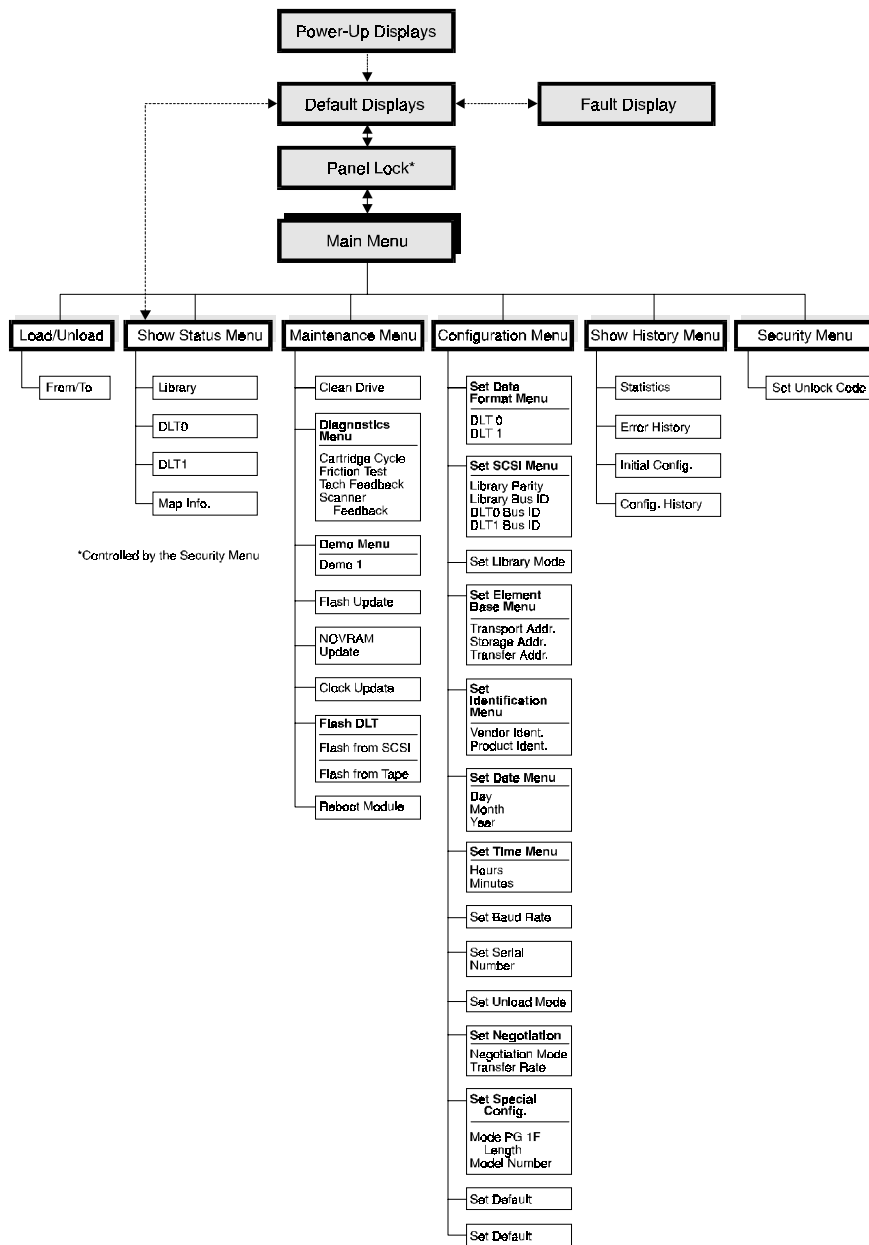
2.3 Selecting Control Panel Display Modes

As previously described, the POST, Initialization and Default Screens appear without operator or host intervention. The Fault Screens appear whenever a fault occurs. The screens which follow appear in response to operator actions.

2.3.1 The MiniLibrary Menu Structure

Figure 2-9 shows the structure of the MiniLibrary menus.

Figure 2–9 MiniLibrary Menu Structure



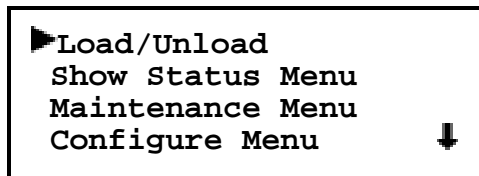
2.3.2 Entering the Menu Mode

Important Note: When the Expansion Unit enters the Menu Mode, the **Ready** light goes out. This means that the module is *offline*, and responds to all commands from the host with a SCSI ‘Not Ready’ until you exit the Menu Mode and the **Ready** light goes on.

To prevent inadvertent interruption of host operations, you may lock out the Menu Mode using the Security Menu. See the section titled ‘Security Menu’ later in this chapter. When all control panels are locked, you must enter your unlock code in order to display the Main Menu. Note that the Show Status Menu of each module remains accessible. It may be displayed from the module’s Default Screen at any time by pressing the **Escape** button.

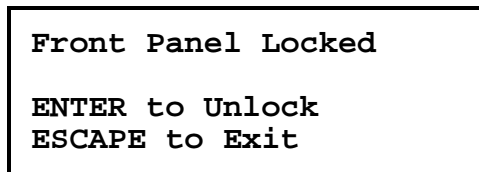
When the Default Screen appears on the screen, you can enter the Menu Mode by pressing the **Enter** button. The Main Menu shown in Figure 2-10 appears.

Figure 2-10 Main Menu



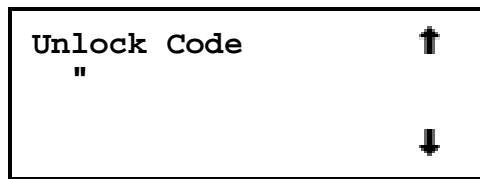
Note: If the control panel has been locked, the screen shown in Figure 2-11 appears instead of Figure 2-10. You must know the unlock code for the system before you can proceed.

Figure 2-11 Panel Locked Screen



When you press the **Enter** button, the screen in Figure 2-12 appears.

Figure 2–12 Code Entry Submenu



Using the ▲ button and ▼ buttons, set the first digit of the unlock code. When you have set it, press the **Enter** button to move the cursor to the second digit and repeat the process. When you have finished, press the **Escape** button, then the **Enter** button to confirm your entry. If the code is correct, the Main Menu is displayed. If the code is incorrect, an error screen appears.

2.3.3 Exiting the Menu Mode

To leave the menu mode and return to the Default Screen , press the **Escape** button repeatedly. Each time you press the **Escape** button, the display moves to a higher menu level. When the Main Menu is visible, pressing the **Escape** button once returns to the Default Screen. At this point, the Ready LED lights.

2.3.4 Navigating Through the Menu Structure

To select a submenu, move the ► on the display to the desired line using the ▲ and ▼ buttons. Then press the **Enter** button to confirm your choice and display the submenu. The ↓ at the end of the fourth line of the Main Menu means that there are one or more additional items that can be reached by scrolling, using the ▼ button. The items available on the Main Menu are:

- Load/Unload
- Show Status Menu
- Maintenance Menu
- Configuration Menu
- Show History Menu
- Security Menu

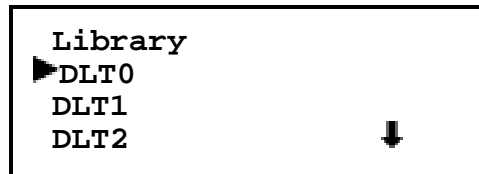
The following paragraphs describe the submenus that correspond to each of the Main Menu selections.

Load/Unload Menu

The Load/Unload Menu is described later in this chapter, under the heading ‘Loading and Unloading Tapes.’




Show Status Menu

When you select Show Status, the menu shown in Figure 2-13 appears.

Figure 2-13 Show Status Menu

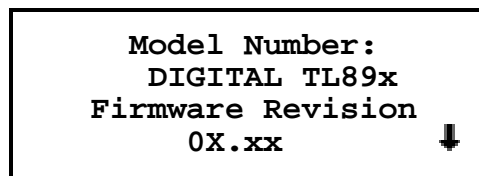
The items available on the Show Status menu are:

- Library
- DLT0
- DLT1
- ...
- DLT n
- Map Info

Move the  up or down with the  and  buttons, then press the **Enter** button to select the item.

Library Status Submenu

When you select Library, the menu in Figure 2-14 appears.

Figure 2-14 Library Status Submenu

This screen is scrollable. The list of Library Status categories available is as follows:

- Model Number
- Firmware Revision
- Date
- Time
- Loader Status

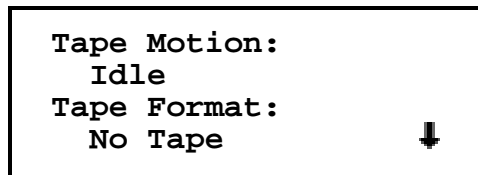
(Continued next page)

- Library Configuration
- Vendor Identification
- Product Identification
- Transport Address
- Storage Address
- Transfer Address
- Imp/Exp Address
- Serial Number
- SCSI Bus ID
- SCSI Bus Parity
- Negotiation Mode
- Transfer Rate
- Unload Mode
- Mail Slot Emulation
- Mail Slot Count
- Mode Page 1F Length
- Initialize Element Status
- Boot Version
- Flash Type

Drive Status Menu

When you select either of the drives, the menu in Figure 2-15 appears.

Figure 2–15 Drive Status Menu

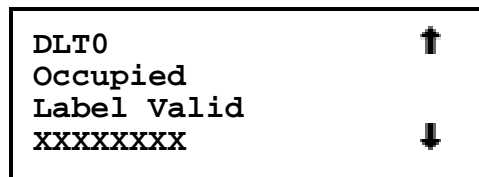


This screen is scrollable. The list of Drive Status categories available is as follows.

Map Information Screen

When you select Map Info, the screen in Figure 2-16 appears. The location being reported appears on Line 1. The content of the bar code on the label, up to 8 characters, appears on Line 4.

Figure 2–16 Map Info Submenu



The list of locations available for display on line 1 is as follows. If you do not designate any mail slots, those lines are omitted from the list.

Depending on the report for each location, Line 2 may display either 'Empty,' or 'Occupied,' or, if a magazine is absent, 'Not Installed.'

Depending on the report for each location, Line 3 may display either 'Label Valid,' or 'Label Not Present.'

For each location reported, Line 4 will display the actual bar code on the label, up to 8 characters.

Maintenance Menu

The Maintenance Menu and the options under it that are intended for operator use are described in *The TL891 User's Guide, - Chapter 3*.

Configure Menu

The Configure Menu, how to use it and the options available under it are described in **Chapter 3 - Installation**.

Show History Menu

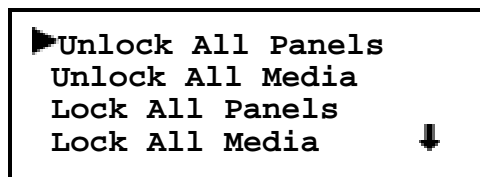
The Show History Menu enables the operator to review the history of the system. An example of the use of the Show History Menu, appears later in this chapter under the heading 'Displaying Error Logs.' You can retrieve the configuration history, the original configuration, as well as statistics on the number of operations the library robotics and the drives have performed.

Security Menu

The Security Menu permits the operator to lock the control panel, preventing inadvertent or unauthorized access to the Menu Mode, which takes the system offline. You can display the Show Status Menu without unlocking the panel (and without taking the system offline) by pressing the **Escape** button at the Default Screen.

When you select the Security Menu, the screen shown in Figure 2-17 appears.

Figure 2–17 Security Menu

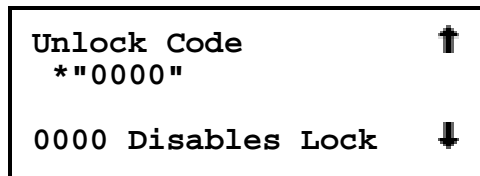


This screen is scrollable. The list of Security functions available is as follows.

- Unlock All Panels
- Unlock All Media
- Lock All Panels
- Lock All Media
- Master Locking
- Module 1 Locking
- ...
- Module *n* Locking
- Set Unlock Code

To change the unlock code, or to enable or disable the panel locking function, scroll downward by pressing the ▼ button until the ▶ is next to ‘Set Unlock Code.’ Press the **Enter** button. The screen shown in Figure 2-18 appears.

Figure 2–18 Code Select Submenu



An underline cursor appears underneath the first digit. To set the first digit, press the ▲ button or the ▼ button until the desired number is displayed. To move the cursor to the second digit, press the **Enter** button. Repeat the process for each of the four digits. Be sure to remember the 4-digit number, as you will need it in order to enter the Menu Mode. An unlock code of 0000 disables panel locking.

When you have finished entering four digits, press the **Escape** button. The screen shown in Figure 2-19 appears. Your code is shown in place of XXXX.

Figure 2-19 Code Accept Submenu

```
Unlock Code
*"XXXX"
ENTER to Accept
ESCAPE to Exit
```

Press the **Enter** button if you want to adopt the unlock code that is displayed. Press the **Escape** button if you do not want to accept it. Press the **Escape** button again to return to the Main Menu, and again to return to the Default Screen.

The next time you attempt to enter Menu Mode, the screen shown in Figure 2-20 appears. You can still display the Status Menu without using the security code by pressing the **Escape** button at the Default Screen

Figure 2-20 Panel Locked Screen

```
Front Panel Locked

ENTER to Unlock
ESCAPE to Exit
```

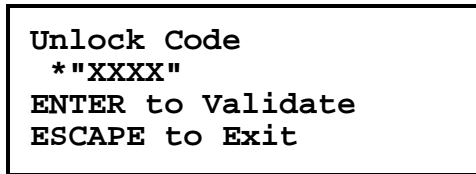
When you press the **Enter** button, the screen in Figure 2-21 appears.

Figure 2-21 Code Entry Submenu

```
Unlock Code      ↑
"      "
                ↓
```

Using the ▲ and ▼ buttons, set the first digit of the unlock code. Press the **Enter** button to move the cursor to the second digit and repeat the process. When you have finished, press the **Escape** button. The screen in Figure 2-22 appears.

Figure 2–22 Code Validate Submenu



Press the **Enter** button to validate your choice. If the code is correct, the Main Menu is displayed. If the code is incorrect, an error screen appears. If you have forgotten your unlock code, contact your technical support representative for assistance.

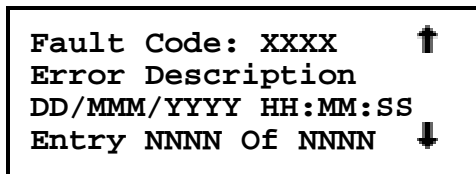
2.3.5 Displaying Firmware Revision

You may display the library robotics firmware revision at any time by pressing the **Escape** button at the Default Screen to display the Show Status Menu. It appears as one of the items on the Library Status submenu of the Show Status Menu. It is also displayed on line 2 of the POST Screen and the Initialization Screens.

2.3.6 Displaying Error Logs

To display the error history of the module, you need to use the Show History Menu. Access it as follows.

Figure 2–23 Error History Screen



2.3.7 Loading and Unloading Tapes

The Load/Unload menus enable you to specify a source and a destination for a cartridge movement. As a result, you use exactly the same procedure to load and unload. To load or unload a tape from the front panel of the module, use the Load/Unload menus as follows.

Figure 2–24 Default Screen

```

READY
Modules 012345_
0 ▶ ----- ◀9
10 ▶ ----- ◀16

```

A default screen is shown in Figure 2-24. From the Default Screen, enter the Menu Mode by pressing the **Enter** button. The Main Menu shown in Figure 2-25 appears.

Figure 2–25 Main Menu

```

▶Load/Unload
Show Status Menu
Maintenance Menu
Configure Menu   ↓

```

The ▶ is next to the line that reads 'Load/Unload.' Press the **Enter** button to display the first Load/Unload submenu, which is shown in Figure 2-26.

Figure 2–26 Load/Unload Initial Screen

```

From:
▶ DLT1
To:
*Slot3   ↓

```

In Figure 2-26, the ▶ is next to line 2 of the display. Line 2 shows the top item in a scrollable list of sources. Note that a ↓ has appeared on the right of the bottom line. This indicates that the ▼ button may now be used to scroll through the list, and that the top item on the list is displayed. As soon as you press the ▼ button, three things happen:

1. the list scrolls down one item (only line 2 scrolls)
2. a ↑ appears on the right of line 1 of the display. This indicates that there is one or more items above the item displayed on line 2.
3. The * at the left of line 2 disappears. This is because the * indicates the current selection or the default selection, and you have scrolled the default selection offscreen, and haven't yet selected an item from the list.

Note: The contents of the lists on line 2 and line 4 will vary as follows.

Initial Screen - ‘From’ Line

The list on line 2 in Figure 2-26 (the ‘From’ line) will include every drive and every magazine slot (including mail slots) that has a cartridge in it (you can’t get a cartridge from a slot or drive that is empty).

Initial Screen - ‘To’ Line

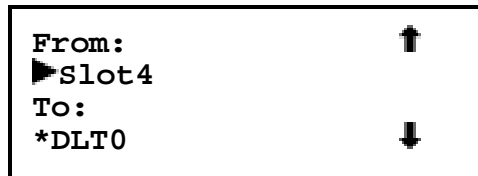
The list on line 4 of Figure 2-26 (the ‘To’ line) will include all of the valid destination choices, that is, drives and slots that are empty (you can’t put a cartridge into a slot or drive which already has one in it.)

Scroll List - ‘To’ Line

There is another limitation on the ‘To’ list. If you have selected a drive on the ‘From’ screen, the ‘To’ list can include only slots. If you have selected a slot on the ‘From’ screen, the ‘To’ list can contain only drives.

Let us assume that you want to load the cartridge that is in Slot 4 into any available drive. Use the ▼ button to scroll line two to Slot 4. The display appears as shown in Figure 2-27.

Figure 2–27 Load/Unload ‘From’ Entry Screen



When you have scrolled to your desired source, press the **Enter** button to select it. Notice that in Figure 2-28, two changes occur in the display.

The * reappears at the beginning of line 2, indicating that you have made a selection.

The ▶ now moves to line 4, indicating that you may now select a destination.

Figure 2–28 Load/Unload ‘To’ Entry Screen

```
From:
 *Slot4
To:
▶*DLT0
```

You can now simply press the **Enter** button to select DLT0 as the destination. Note that there is no **↓** at the end of line 4, nor **↑** at the end of line 1. There are no additional choices because 1) you have selected a slot as the source, so the destination must be a drive, and 2) DLT1 already has a cartridge in it, so it cannot be a valid destination. Press the **Enter** button to select DLT0. In response, the confirmation screen in Figure 2-29 appears.

Figure 2–29 Confirmation Screen

```
From: Slot4 To:DLT0

ENTER To Execute
ESCAPE To Cancel
```

As the confirmation screen indicates, to execute the load or unload, press the **Enter** button. If the confirmation screen does not show your intended source and destination, press the **Escape** button to return to the ‘From’ entry screen.

When you press the **Enter** button, the screen shown in Figure 2-30 appears. If the source is a drive, the word ‘Unload’ appears in place of the word ‘Load’ on line 4.

Figure 2–30 Load/Unload ‘In Progress’ Screen

```
From: Slot4 To:DLT0

Load In Progress
```

When the load or unload operation is finished, the Default Screen reappears.

2.4 Inserting and Removing Cartridges

When inserting cartridges, be sure that the slot you intend to use is not already reserved in the system map for a cartridge in a drive. The best way to avoid conflicts is to unload all drives, either through your host computer software or by using the Load/Unload command on the Main Menu, described in the previous section.

The tape magazine must be removed from the module in order to insert or remove cartridges. To insert or remove the magazine, the following conditions must be met.

The Magazine Security Lock must be unlocked, using the key supplied with the module. Refer to Figure 2-31. When the Magazine Security Lock is locked, the **Unlock/Open** button has no effect. If the module is installed in a reasonably secure environment, you may elect to leave the Magazine Security Lock in the unlocked position.

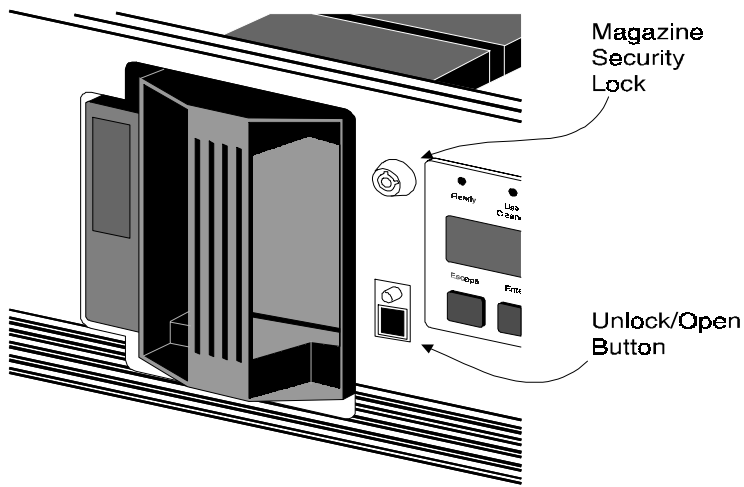
Media locking on the Security Menu must be disabled. Refer to Figure 2-17.

The host computer must allow medium removal. The host computer can enable or disable the **Unlock/Open** button using the SCSI Prevent Allow Medium Removal command. When you press the **Unlock/Open** button, the message ‘Magazine Locked’ will be displayed.

The Expansion Unit must be ready, and not actually executing a command.

Important Note: When you enter the Menu Mode, the **Ready** light goes out. The magazine cannot be inserted or removed unless the **Ready** light is on. To remove the magazine when a failure prevents the Ready light from illuminating, refer to Section 2.4.2, ‘Emergency Magazine Removal’.

Figure 2-31 Magazine In Place



TL890-02

2.4.1 Removing a Magazine

Figure 2-32 Main Menu

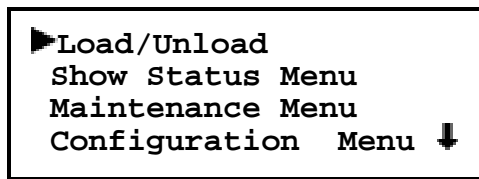


Figure 2-33 Main Menu, Scrolled

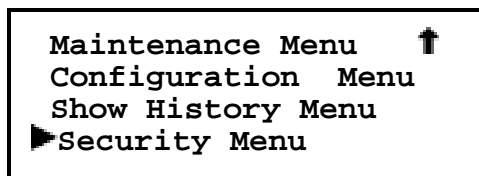


Figure 2–34 Security Menu

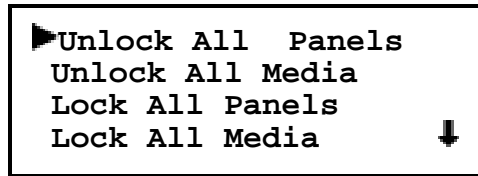
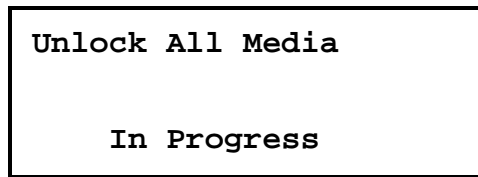


Figure 2–35 Unlock All Media Screen



2.4.2 Emergency Magazine Removal

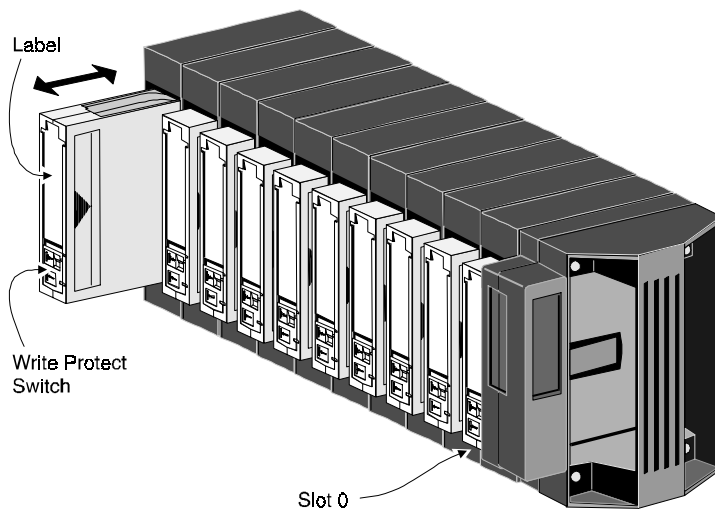
If a fault occurs that prevents removal of the magazine, turn the power off for thirty seconds. Power up while continuously pressing the ▲ button. Continue to hold the button until all of the indicators on the control panel light, then go out. Release the button. The magazine may now be removed.

If you are unsuccessful in removing the magazine using this procedure, contract your technical support representative for further advice.

2.4.3 Inserting Cartridges Into the Magazine

A full magazine is shown in Figure 2-36. Insert cartridges so that the label end with the write protect switch is outward, with the write protect switch toward the bottom of the magazine. The lowest numbered cartridge slot in the magazine is closest to the handle

Figure 2-36 10-Slot Tape Magazine With Cartridges Installed



2.4.4 Inserting a Magazine

Figure 2-37 Main Menu

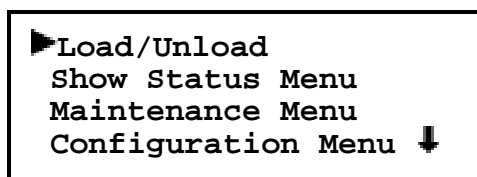


Figure 2-38 Main Menu, Scrolled

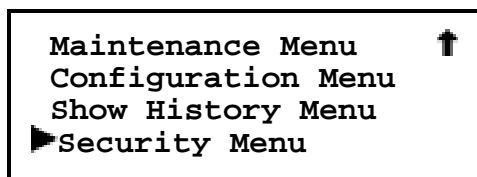


Figure 2–39 Security Menu

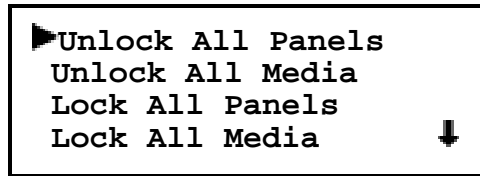
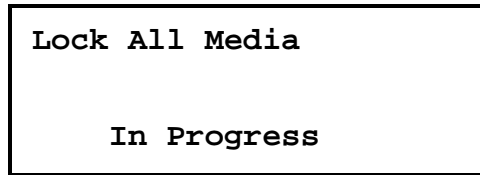


Figure 2–40 Unlock All Media Screen



Figure 2–41 Lock All Media Screen



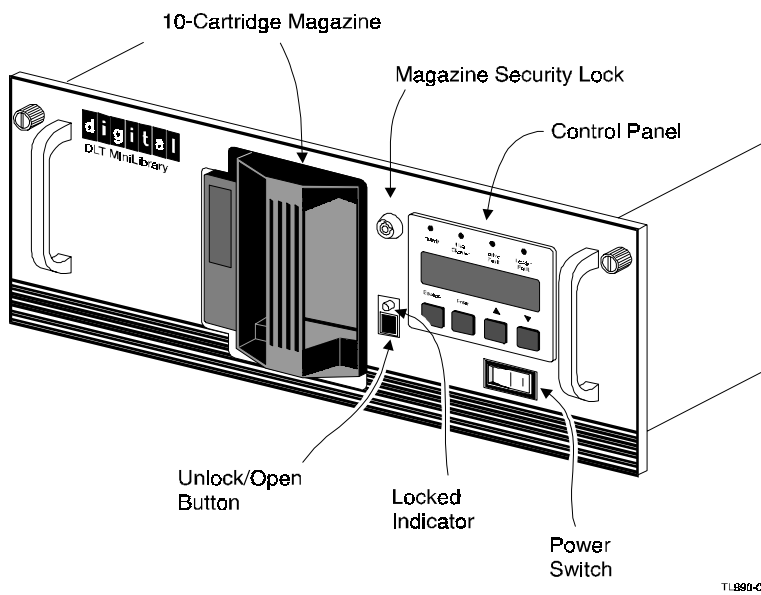
2.5 Base Module

The front panel of the base module is nearly identical to the Expansion Unit. It includes a power switch for the module, the magazine door, the Magazine Security Lock, the Unlock/Open button with its Locked indicator. The control panel, shown in Figure 2-3, has one more LED indicator than the Expansion Unit. Figure 2-42 shows the base module front panel.

2.5.1 The Magazine Security Lock, the Unlock/Open Button and the Locked Indicator LED

These features are described earlier in this chapter in *Section 2.4, 'Inserting and Removing Cartridges.'*

Figure 2-42 Base Module Front Panel



2.6 Tape Requirements

The DLT MiniLibrary System uses ECMA-approved and ANSI proposed-standards DLTtape cartridges. The DLTtape cartridge is a four inch square plastic cartridge. According to the media manufacturer, the cartridge and the medium are designed to withstand 1,000,000 passes, and to have a shelf life of 30 years when properly stored.

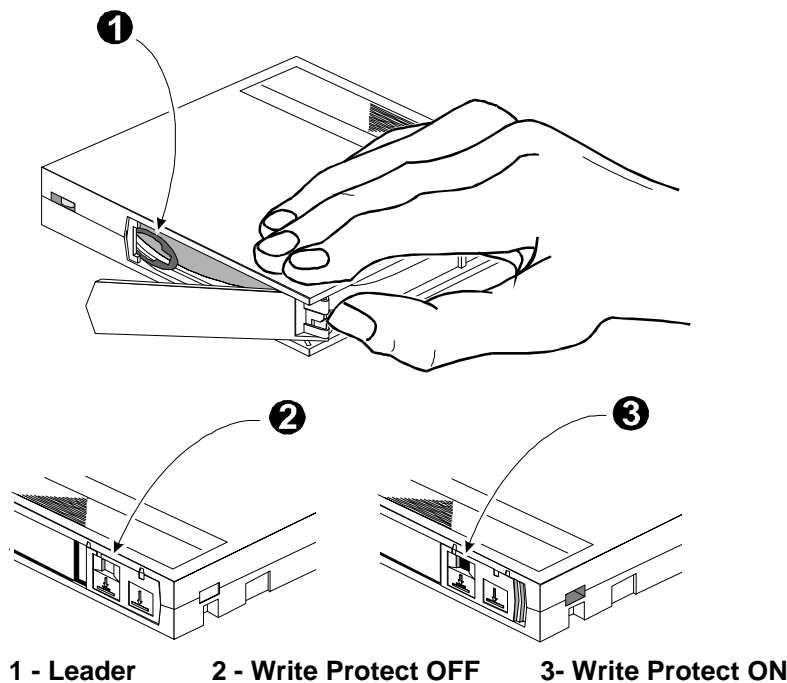
2.6.1 Cartridge Handling and Storage

A DLTtape cartridge should be stored vertically until you select it for use. Do not expose a cartridge to moisture or direct sunlight. Maintain a clean, dust-free working and storage environment.

If a DLTtape cartridge is dropped:

- Inspect the cartridge carefully before you insert it into a MiniLibrary magazine or any drive.
- Shake the cartridge while listening for the sound of a broken part. Any rattling sound makes a cartridge unfit for use.
- Inspect the case for distortion or cracks.
- Inspect the leader by opening the cartridge door as shown in Figure 3-43. The leader should be positioned as shown in view (1), and should protrude at about a five degree angle from the case. If the leader is out of position, do not use the cartridge; damage to the drive could result.

Figure 2-43 DLT Tape Cartridge



2.6.2 Write Protection

The write protection switch of a DLT tape cartridge is also shown in Figure 2-43. To enable data recording, slide the write protect switch to the right so that no orange color is visible through the window in the write protect switch (2). To write protect the DLT tape cartridge, slide the write protect switch to the left until the orange indicator shows through the window on the write protect switch (3).

2.7 Barcode Labels

Barcode labels are included with the Expansion Unit. Additional labels can be ordered (refer to Appendix B).. The label slips into the slot adjacent to the write-protect switch on each tape cartridge. The code used may be Code 39, Codabar, 2-of-9, standard 2-of-5, or interleaved 2-of-5, with a length of 8 digits. Minimum element width is 7.5 mm.

3

Installation

This chapter describes the complete DLT MiniLibrary System installation process from planning and parts identification to mechanical installation, cabling and configuration.

3.1 Introduction

There are three major steps to the installation of a DLT MiniLibrary System: mechanical installation, cabling and configuration.

Mechanical installation consists of:

- Assembling the pass-through mechanism (the two-module version is factory assembled)
- Mechanical Installation of the expansion and base module(s), (instructions are provided for both rack types: EIA/RETMA Standard 19" cabinet and StorageWorks SW500 or SW800 Metric cabinet)
- Installing the pass-through mechanism in the rack

Cabling consists of:

- Interconnecting the base modules with the Expansion Unit
- Connecting the Expansion Unit to the pass-through mechanism motor
- Connecting the base module drive SCSI busses to host SCSI interfaces
- Connecting the Expansion Unit to a host SCSI interface
- Terminating the busses properly

Configuration consists of:

- Using the Configure Menu to customize the configuration options to your particular application.

The remainder of this chapter describes each of these steps.

3.2 Planning Your Installation

The DLT MiniLibrary System is intended to be mounted in a SW500, SW800 or a standard 19-inch EIA/RETMA equipment rack with a depth of 24 to 30 inches. Each of the modules is shipped with two rack slides installed.

Every Digital DLT MiniLibrary System includes:

- (1) Expansion Unit (TL890)
- (1) Expandable Pass-Through Mechanism
- (1 to 3) Base Modules, each with 1 or 2 TZ89 drives

The Expansion Unit has 16 slots and no drives, and serves as controller of the DLT MiniLibrary System. The base modules each have 10 slots plus one or two drives. The Expansion Unit and the base module(s) each occupy 7 inches of rack space.

The pass-through mechanism is composed of a motor drive assembly plus sections of track whose combined length is equal to the combined heights of the Expansion Unit plus the base modules. One extension section of track is needed for the installation of each additional MiniLibrary module.

3.2.1 Positioning the Modules

The Expansion Unit must be mounted at the top of the stack, which places its control panel at a convenient height. The control panels of the base modules are of secondary importance, as they serve mainly to help localize system failures. When installed, the motor drive assembly of the pass-through mechanism is directly behind the Expansion Unit.

Base modules may be installed anywhere below the Expansion Unit, in any order. There may be a slight performance advantage in making the base modules contiguous, but gaps are permitted. The size of a gap is limited by the fact that each gap must be bridged by some number of 7" pass-through mechanism track sections. For safety, available cover plates should be installed on all pass-through mechanism sections which are not connected to MiniLibrary System modules.

The Expansion Unit senses the position of each module during initialization at power-up. Even if there are gaps between modules, the system will operate correctly. If you plan to leave gaps between modules, be sure to order additional pass-through mechanism track segments and cover plates equal to the length of the gap.

3.3 Mechanical Installation

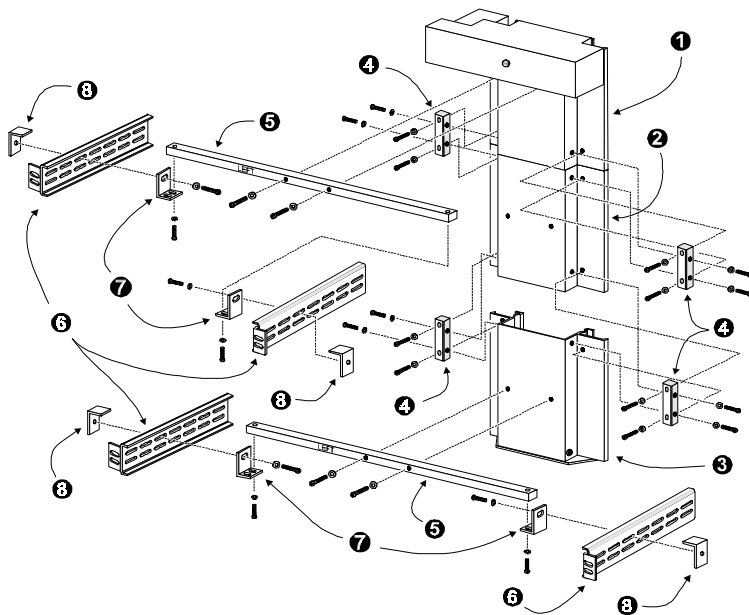
Assembly of the pass-through mechanism requires experience working with moderately complex mechanisms, and the ability to follow directions carefully.

3.3.1 Identifying the Parts of the Pass-Through Mechanism

Locate and identify the pass-through mechanism internal and external parts. The pass-through mechanism is made up of the following external parts, shown in Figure 3-1:

- Motor drive section (1)
- Extension sections (2)
- Pass-Through base with idler pulley (3)
- Tie bars (4)
- Support brace (5)
- Left and right rack slide extensions (6)
- Angle brackets (7)
- L-Shaped Nut Plates (8)

Figure 3-1 Pass-Through Mechanism External Parts



Note: The slide extensions, (6) in Figure 3-1, are not enclosed with the pass-through mechanism parts. They are supplied as part of the installation hardware for the slides that come with each of the modules.

Follow the instructions in Section 3.3.7, ‘*Mechanical Installation of the Expansion and Base Modules*’. After the rack slides and the base modules are in place, and after the pass-through mechanism is assembled, you will install the pass-through mechanism in the rack by attaching the support braces (5) to the slide extensions (6) using the angle brackets (7) and L-shaped nut plates (8).

The internal parts you will need to recognize during assembly are shown in Figures 3-2 and 3-3.

- Car
- Belt Block

Figure 3–2 Pass-Through Mechanism Car (Front View)

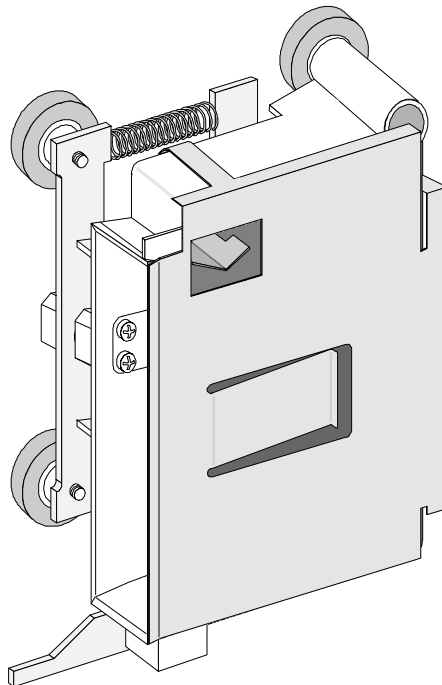
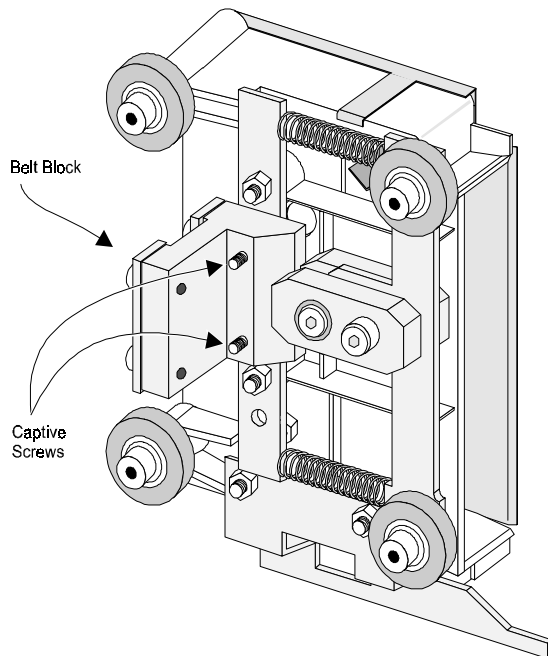


Figure 3-3 Car Rear View Showing Belt Block



The belt block comes fastened to the back of the car with two captive screws. Carefully note the orientation of the block with respect to the car, as shown in Figure 3-3.

3.3.3 Orientation of Parts During Assembly

To determine the orientation of an extension section, examine the flanges on the edges of the section, and note that they are dissimilar. Position the section so that its orientation matches that of the elevator base.

Figure 3-4 shows a typical pass-through mechanism assembly. The motor drive section always goes on top, and the base section with the idler pulley always goes on the bottom. Extension sections are mounted between the motor drive section and the base section. All sections are joined together with tie bars. For systems up to four modules, two support braces are needed, one attached to the motor drive and one to the base section. For larger systems, a third support brace should be mounted near the center of the pass-through mechanism.

3.3.3 Preparing to Assemble the Pass-Through Mechanism

You will need a clean, flat work area such as a table or work bench. The surface should be long enough to support the full height of the pass-through mechanism. The height is equal to the height of the stack of modules in your system plus any gaps you intend to include in the stack. Use the following procedure to assemble your pass-through mechanism.

3.3.4 Assembling the Pass-Through Mechanism

In most cases, you have received a pre-assembled pass-through mechanism. If its length is correct for your system, turn to Section 3.3.7, ‘*Mechanical Installation of the Expansion and Base Modules*’ and continue on to the end of the chapter. If you need to add sections, please take a few minutes to read this section and Section 3.3.5, ‘*Installing the Belt*’, before proceeding to Section 3.3.6, ‘*Adding to an Existing pass-through Mechanism*.’

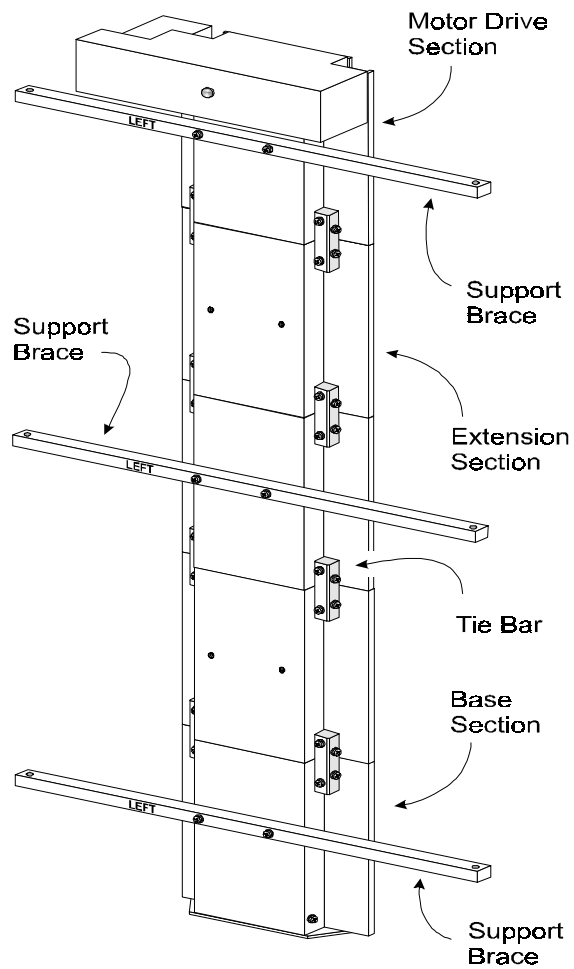
Note: References to left and right refer to the position of the part when the pass-through mechanism is assembled and mounted in the rack, as viewed from the front of the rack.

Refer to Figures 3-1 and 3-4.

1. Place the base section, with the inside facing down, overhanging the right end of the work area, with the bottom plate of the section toward the right.
2. Place each of the extension sections, with the inside facing down, in a row aligned edge-to-edge beginning with the base section. The bottoms of the sections should be toward the right. Omit the motor drive at this time.

3. Center one of the support braces across the rear of the base section over the holes on the rear surface of that section. Be sure that the word 'LEFT' that is stamped on the brace is upright.
4. Insert two M4 x 20 Phillips sems screws through the holes in the support brace into the holes in the base section, and tighten.

Figure 3-4 Pass-Through Mechanism Assembled



5. Place pairs of tie bars so that they straddle all of the joints where sections come together. Be sure that the beveled edge is toward the inside corner of the sections.
6. Install two M3 x 20 mm Phillips screws through each tie bar into the threaded holes in the flanges of the extrusion sections. Tighten finger tight only. Insert two M3 x 20 mm screws through each tie bar into the side of the extrusion sections and finger tighten.
7. Firmly press the neighboring sections together while tightening the two M3 x 20 mm screws through each tie bar into the flanges of the sections. Alternately tighten the screws into the flanges and those into the sides of the extrusions to ensure that each tie bar is drawn into the corner of the extrusion. ***Important Note:*** These screws should be tightened to no more than 4 inch-lbs.
8. Inspect the joint to see that the sections are well aligned, with minimal irregularities and gaps.
9. Repeat steps 6, 7 and 8 for each pair of sections. It may be necessary to use suitable blocks to support the row of sections so that neither the motor housing nor the bottom flange of the base section touches the work surface while you are connecting the motor drive section.
10. Center one of the support bars across the rear of the motor drive section over the holes on the rear surface of that section. Be sure that the word ‘LEFT’ that is stamped on the brace is upright.
11. Insert two M4 x 20 Phillips screws through the holes in the support brace into the holes in the motor drive section, and tighten.
12. Go on to the section entitled ‘Installing the Belt.’

3.3.5 Installing the Belt

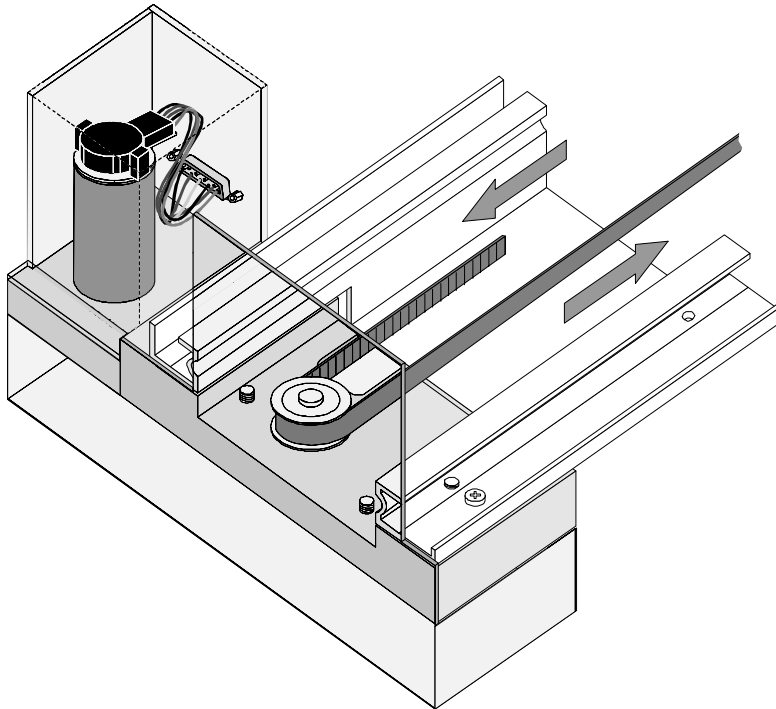
Refer to Figures 3-5 through 3-9.

1. Turn the assembled pass-through mechanism over so that the motor points upward.
2. Referring to Figure 3-6, locate the tensioner ramp in the base section. Compress the spring until the hole in the tensioner ramp is aligned with a hole in the base section. Insert an 0.050” Allen wrench or a paper clip through the holes. This sets the idler pulley for zero belt tension.
3. Locate the length of toothed belt that was enclosed with the extension section.

Table 3-1 Belt Length for Various System Sizes

Number of Modules	Length of Belt
2	27 inches
3	41 inches
4	55 inches

Figure 3-5 Threading the Belt Through the Drive Section



4. Refer to Table 3-1 for the required belt length for your system. After double-checking the length specified, cut the belt between teeth.
5. With the toothed side of the belt toward you, position the right end of the belt about halfway along the pass-through mechanism.
6. Referring to Figure 3-5, thread the left end of the belt counter-clockwise around the motor drive pulley.
7. Referring to Figure 3-6, thread the belt from the motor drive counter-clockwise around the idler pulley and back to the right end.
8. Holding the ends of the belt as shown in Figure 3-7, the two ends should be touching or very slightly overlapping.

Figure 3–6 Threading the Belt Through the Base Section

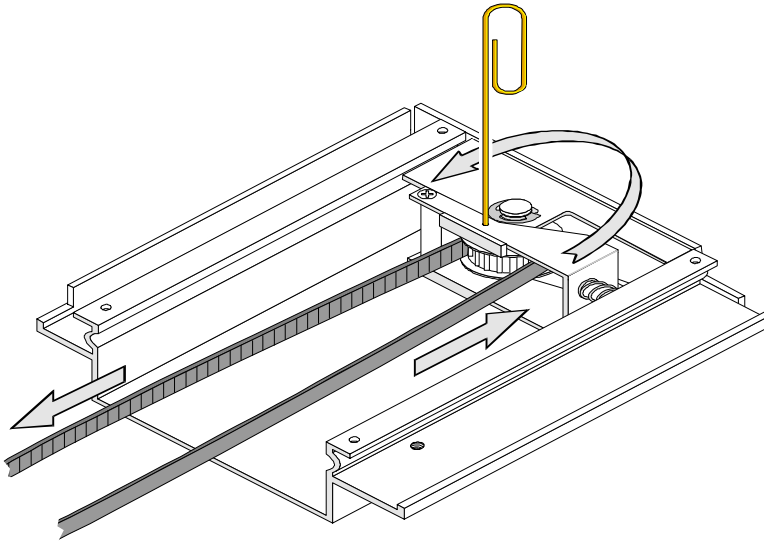


Figure 3-7 Checking Belt Length

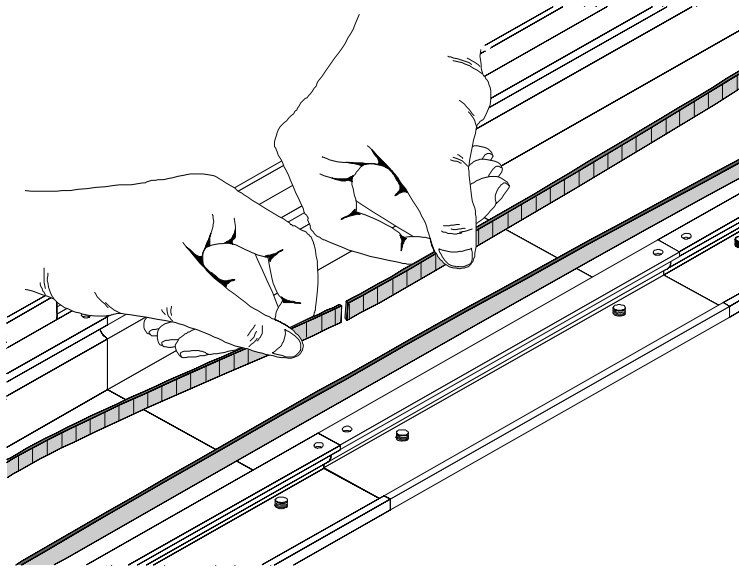


Figure 3-8 Belt Block With Belt In Place

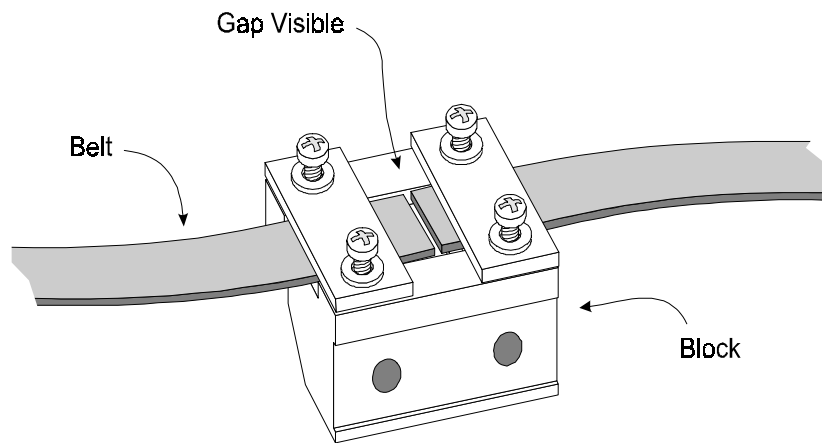
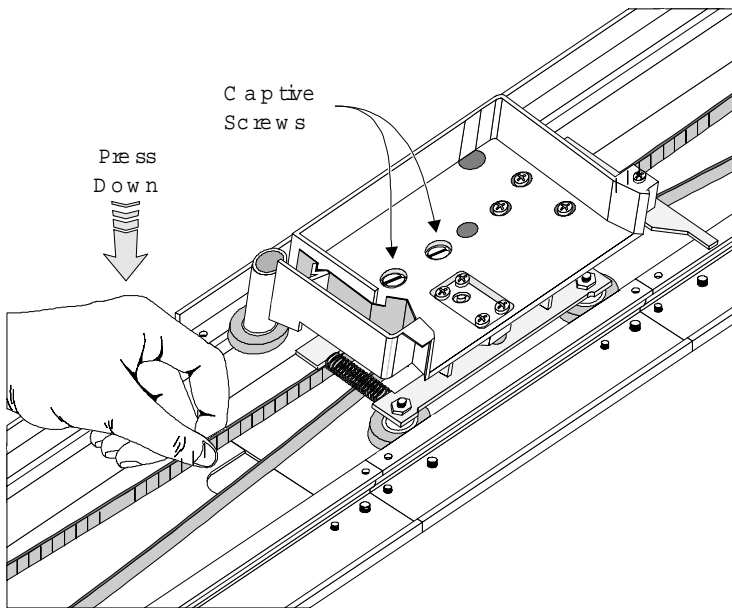


Figure 3–9 Aligning the Captive Screws With the Block



9. Loosen the four screws that hold the belt retaining plates to the block. Slide the ends of the belt under the plate until they engage the teeth on the block. Both ends of the belt should be visible through the gap between the plates as shown in Figure 3-8. Set the belt so there is only a small space between the ends of the belt (approximately 1/32”).
10. Tighten the four screws that hold the belt retaining plates.
11. Pull out the paper clip previously installed in the base section. This applies the proper tension to the belt.
12. Locate the two captive screws in the car. Screw them backward approximately one thread into the bracket in the car so they are held in an upright position.
13. Position the belt block at least six inches from the motor drive pulley.
14. Locate the spring-loaded wheels of the car. Referring to Figure 3-9, engage the spring-loaded wheels in the track, while positioning the car so the captive screws are directly over the holes in the belt block. **Note:** Figure 3-9 omits the door on the car for clarity. **Do not remove the door.**

15. To steady the belt block, grasp the belt several inches from the block and push toward the back of the track until the block is pressed firmly against the back of the track. While holding the belt with one hand, compress the springs and swing the car downward until the remaining wheels are aligned with their groove in the track.
16. While continuing to press the belt block against the back of the track, release the car so that the stationary wheels engage their groove in the track.
17. While continuing to press the belt block against the back of the track, begin to tighten the captive screws. When both screws are partially threaded into the belt block, release the belt and finish tightening the screws. Be sure that the block is fully seated against the bracket on the car. Close and secure the door on the car.
18. Using nylon button rivets, install covers over any exposed pass-through mechanism sections that are not covered by modules.
19. Proceed to Section 3.3.7, '*Mechanical Installation of the Expansion and Base Modules.*'

3.3.6 Adding to an Existing Pass-Through Mechanism

Before reading this section, it may be helpful to familiarize yourself with the parts and procedures by reading the two preceding sections. To add to an existing pass-through mechanism, you must first partly disassemble it, then make the necessary changes as described in the preceding sections. Use the following procedure for disassembly.

1. Locate the covers over the drive motor section and the base assembly. Note that the covers are held in place by nylon button rivet fasteners. Using a suitable thin-bladed tool, pry up the cover until the fasteners can be removed. Set the covers aside, and save the fasteners for re-use.
2. Place the pass-through mechanism on a suitable work surface with the motor at the left and pointed upward.
3. Referring to Figure 3-9, open the door of the car to gain access to the captive screws. ***Do not remove the door.*** Loosen the captive screws until they are disengaged from the belt block.
4. Grasp the closed side of the car and pull it toward you so as to compress the springs underneath the car. When the wheels on the closed side are clear of the track, lift the car from the track and set it aside.

5. Referring to Figure 3-6, locate the tensioner ramp in the base section. Compress the spring until the hole in the tensioner ramp is aligned with a hole in the base section. Insert an 0.050” Allen wrench or a paper clip through the holes. This sets the idler pulley for zero belt tension.
6. Referring to Figure 3-8, loosen the four screws on the belt block far enough to pull the ends of the belt free of the block. Pull the belt free of the motor drive assembly and the base section and set the belt aside.
7. Turn the pass-through mechanism over and support it so that neither the motor nor the flange at the bottom of the base assembly is touching the work surface.
8. Referring to Figure 3-1 and 3-4, remove the eight screws holding a pair of tie bars in place. Separate the pass-through mechanism at that joint.
9. You may now add sections as needed and install a new belt as described in Sections 3.3.4 and 3.3.5.

3.3.7 Mechanical Installation of the Expansion and Base Modules

The Expansion Unit and base module(s) must be rackmounted in either a standard 19” EIA/RETMA rack (with a depth of 24-30”) or a StorageWorks (SW500 or SW800) metric rack using metric conversion brackets. Both rack types require two initial steps:

1. Separating the rack-slides
2. Attaching the mounting-brackets.

This section describes these *common* rackmount instructions, followed by *rack-specific* rackmount instructions. (The cabling and configuration procedures for all rackmounted DLT MiniLibraries are described in Section 3.4, ‘*Interfaces and Cabling*’.

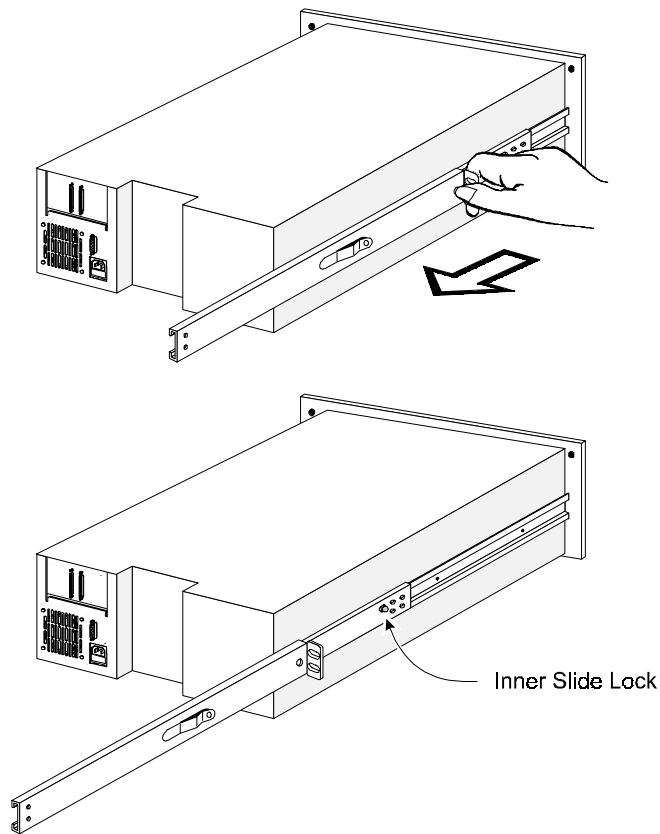
Follow the directions in the shipping container to unpack the module(s). Save the packing materials for re-use in case you need to return the module(s) for repairs.

The Expansion Unit and the MiniLibrary base module comes with a slide rack set installed on either side. The slide is attached to the base module enclosure by means of three screws through the inner slide. Remove the packing tape from the slides, and separate each set of slides as follows:

Rack Slide Separation:

1. Refer to Figure 3-10. Pull the outer slide toward the rear, along with the intermediate slide until the inner slide lock engages the intermediate slide.
2. Continue to pull the outer slide towards the rear until the outer slide lock engages the intermediate slide. Press down on the inner slide lock to permit the intermediate slide to continue to move toward the rear. Continue to move the outer and intermediate slides toward the rear until they are separated from the inner slide.

Figure 3-10 Separating a Rack Slide



3. Identify and orient the parts of the slides and hardware needed for your specific rack type. Figure 3-11 shows the parts required for Standard EIA/RETMA rackmounting and Figure 3-12 shows the parts for rackmounting into a StorageWorks metric rack.

NOTES:

All of the screws, washers, nutplates and/or metric conversion brackets required for rackmounting in either cabinet type are supplied with the Base Module. You will need a #2 Phillips screwdriver and a flathead screwdriver.

The left and right slides are alike, so there is no risk of confusing the parts on reassembly.

The *front of the cabinet*, and *front rails* in this text refers to where the *module face* will be exposed (typically opposite from the main power source location). The main power source location thus becomes the *rear of the cabinet*, and where the *rear rails* exist.

4. Loosely assemble a mounting bracket to each outer slide, using two 10-32 screws with washers and a nutplate for each. Select slots in the mounting brackets so the length of the assembly equals the distance between the front and rear rails of the rack.
5. Locate the screw holes in the front and rear rails of the cabinet or equipment rack where the drive is to be installed.

CAUTION!

The cooling fan at the rear of the drive must not be obstructed when the drive is installed in the rack. It is advisable to allow two inches of clearance behind the rear panel of the module.

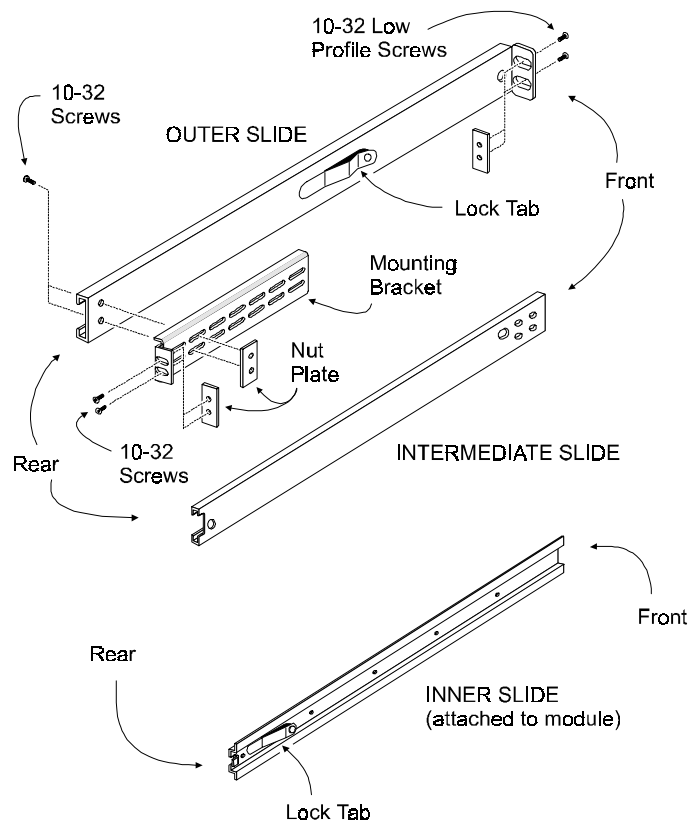
6. From this point, the instructions vary depending on cabinet type, and you should proceed as follows:
 - **EIA/RETMA Cabinet Rackmounting - Refer to Section 3.3.8**
 - **StorageWorks Metric Rackmounting - Refer to Section 3.3.9**

3.3.8 Rackmounting in a Standard (19") EIA/RETMA Cabinet:

These procedures assume that you have already separated the slide racks and attached the mounting brackets to the slides as described in the beginning of this chapter. Next:

1. Fasten each outer slide behind the front rail of the rack using two 10-32 **low-profile** screws with washers and one nut plate. Two 10-32 clip nuts are provided to engage the captive screws on the front panel.
2. Fasten each of the mounting brackets to the front of the rear rail of the rack using two 10-32 screws and one nut plate.
3. Tighten the screws installed in step 4.
4. If they are not already locked, pull the intermediate slides toward the front (out of the rack) so that they lock in the extended position.

Figure 3–11 Rack Slide Parts for Standard 19" EIA/RETMA Rackmounting



NOTE:

Step 9 should be performed by two people.

CAUTION!

Make certain that when the module is fully extended that a force of 20% of the rack weight, but not more than 57 lb. Applied in any direction but upwards does not cause the rack to overbalance.

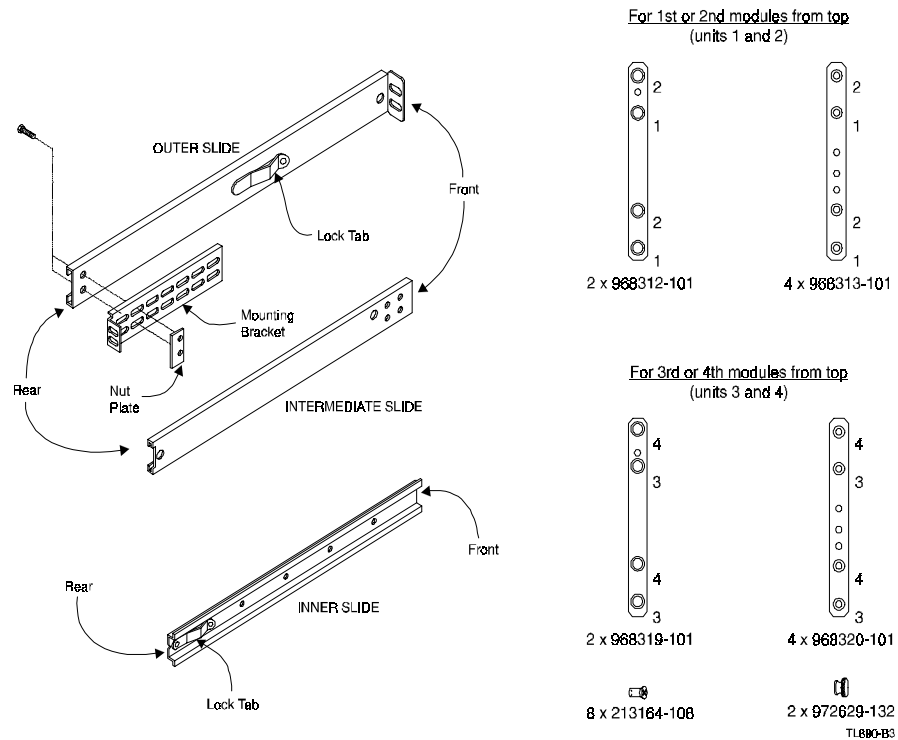
9. In front of the rack, lift the module to its installed height. Engage the inner slides mounted on the module with the intermediate slides protruding from the rack, and slide the module toward the rack until the inner slide lock engages the intermediate slide. This leaves the entire module protruding from the rack, locked in position, supported by slides.
10. Press inward (toward the module) on each of the inner slide locks to permit the intermediate slides to move toward the rack.
11. Slide the module in and out several times, ensuring that the inner and outer slide locks engage, and that the module does not bind against the slides.
12. If binding occurs, loosen the four screws that secure the slides to the front rails and the four screws that secure the slides to the rear rails.
13. If necessary, repeat steps 11 and 12 until the module does not bind against the slides.
14. If the rails on your rack are not threaded, install a clip nut on each front rail at the height of the captive screws on the front panel of the Base Module. If the rails on your rack are threaded, skip this step.
15. Slide the base module into the rack, and tighten the captive screws.
16. Once you have securely installed the MiniLibrary into the standard rack, proceed to Section 3.4 - *'Interfaces and Cabling'*.

3.3.9 Rackmounting in a StorageWorks (SW500 or SW800) Metric Cabinet

These procedures assume that you have already separated the slide racks and have attached the mounting brackets to the slides as described in the beginning of this chapter.

You are now ready to install the metric conversion brackets supplied with the base module. These adapter brackets are designed to mount 4U high (IU=1.75") RETMA modules into a metric rack. The brackets maintain the 4U high unit-to-unit spacing on a metric rack which enables the pass-through system to work properly.

Figure 3–12 Parts List for StorageWorks Metric Rackmounting



CAUTION!

The cooling fan at the rear of the drive must not be obstructed when the drive is installed in the rack. It is advisable to allow two inches of clearance behind the rear panel of the module.

Make certain that when the Module is fully extended that a force of 20% of the rack weight, but not more than 57 lb. applied in any direction but upwards does not cause the rack to overbalance.

Metric Conversion Bracket Description and Identification:

1. Refer to Figure 3-12 to identify and take inventory of the metric conversion hardware included in your metric rackmount kit.
2. Determine where the module you are installing is going to be located relative to the top module.
 - a) If the module you are installing is going to be located on the top of the stack or the second from the top (unit 1 or 2), the parts which you will need to install this module are:

2 pieces	968312-101
4 pieces	968313-101
 - b) If the module you are installing is going to be located third or fourth from the top (unit 3 and 4), the parts which you will need to install this module are:

2 pieces	968319-101
4 pieces	968320-101
 - c) Sort out the appropriate adapters for your application. The part number is stamped in the middle of the part for identification.
3. Next to each mounting hole in the bracket, numbers are stamped which correspond to the module number. If you are installing the first module for example, mount the flat head screws (P/N 213164-108) through the holes marked #1.

Metric Rackmount Procedure:

1. (Reference Figure 3-13, Metric Rackmount Installation Layout). Mount the appropriate metric conversion bracket to both ends of the slide using the 10-32 nuts provided in the slide kit. Do this for both the left and right slide assembly. For modules 1 and 2, use P/N 968313-101. For modules 3 and 4, use P/N 968320-101. Make sure that these brackets are oriented so that the numbers are right side up in all corners.
2. Mounting the bracket/slide assembly to the StorageWorks:

I. If installing the first module, select a mounting location.

- a) Mount each slide/bracket assembly to the rack by aligning the two mounting holes marked #1 to holes on the rack. Start by mounting the slide/bracket assembly to the **rear** of the StorageWorks first. Hold the bracket/slide assembly in place with one hand, fasten a mounting screw to the holes marked #1.
- b) To mount the front bracket, place bracket (P/N 968312-101) **in front** of the rack with the holes marked #1 aligned to the holes on the rack.
- c) Extend the slide/bracket assembly forward to mate with the rack. Align the holes marked #1 on the slide/bracket assembly with the hole #1 on the front bracket and fasten two mounting screws through the two #1 holes.
- d) Be careful to mount all four brackets at the same height. You can use a ruler or count holes to achieve this.
- e) Tighten all four corners and the slide extension.

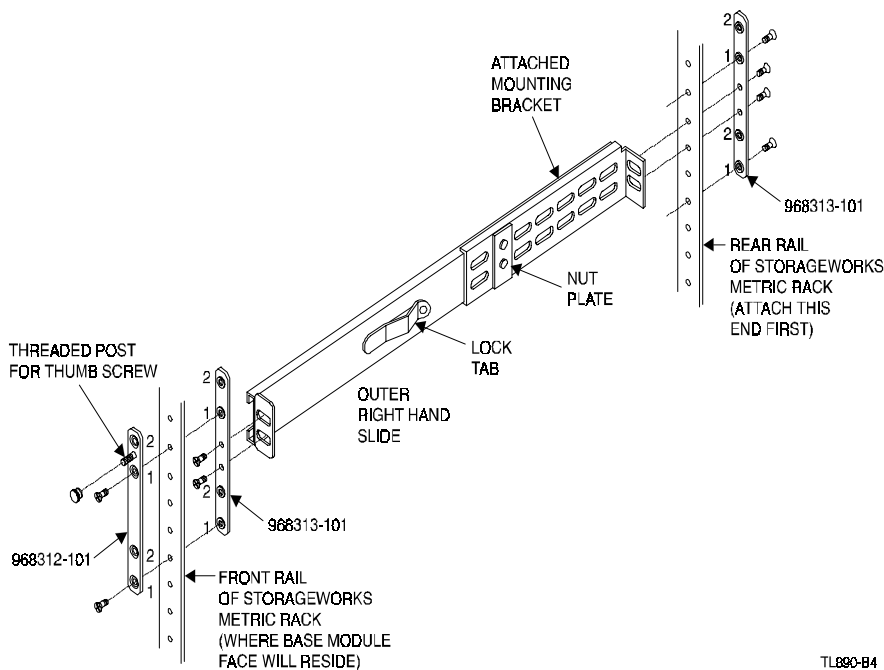
II. Procedure for installing modules 2, 3, or 4:

- a) Each unit is 7 inches high. To locate the mounting location of the next bracket/slide assembly, use a ruler to measure 7 inches vertical distance of the protruding stud from the bracket above to the stud of the bracket which is to be installed. The mounting holes marked for the number of the module being installed should automatically line up with the rack holes.

- b) Using mounting screws (P/N 213164-108), mount the slide bracket assembly using the two mounting holes marked 2, 3, or 4 to mount the second, third or fourth module respectively. Start by mounting the slide/bracket assembly to the rear of the StorageWorks cabinet. Hold the bracket/slide assembly in place with one hand, fasten the mounting screw to the bracket holes marked with a number that corresponds to the module number.
- c) Be careful to mount all four brackets at the same height. You can use a ruler or count the hole numbers to achieve this.
- d) Tighten all four corners and the slide extension.

You are now ready to install the pass-through mechanism in the rack as described in Section 3.3.10.

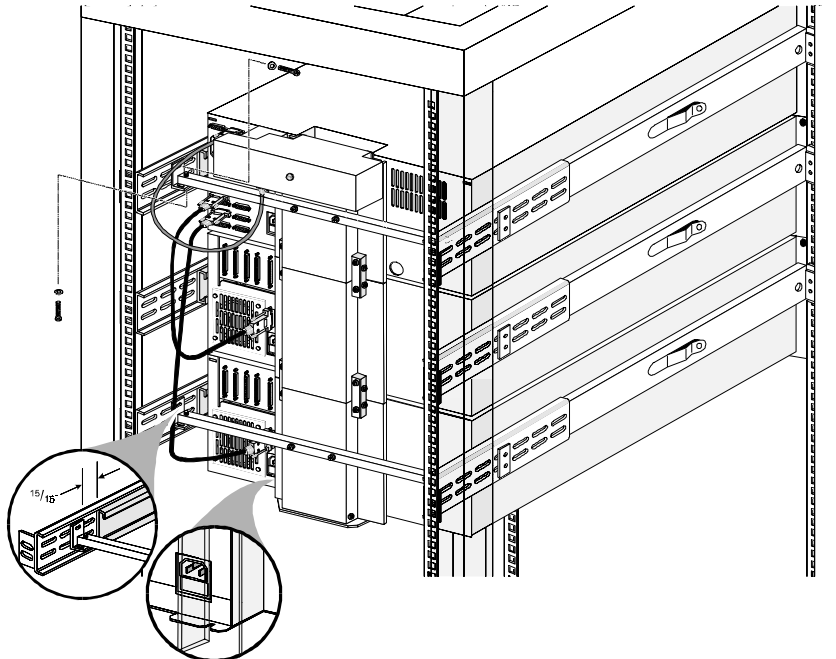
Figure 3–13 Metric Rackmount Installation Layout



3.3.10 Installing the Pass-Through Mechanism in the Rack

1. If you have not previously done so, install the angle brackets on the rack slide extensions of the top and bottom modules, using one 10-32 screw and an L-shaped nut plate for each angle bracket. The L-shaped nut plates should hang from the top of the slide extensions on the outside. Place the angle brackets so the front edge of the vertical part is $15/16$ " behind the rear edge of the slide body, as shown in the inset in Figure 3-14.
2. Referring to Figure 3-14, position the pass-through mechanism against the back of the installed modules so that the support braces rest on the previously installed angle brackets. Install an M4 x 20 mm screw and washer through the rear hole in each angle bracket into the support braces. Do not tighten.
3. Look closely at the right flange of the pass-through mechanism (left side as viewed from the rear of the rack) as shown in the inset in Figure 3-14. At the top module, position the pass-through mechanism horizontally so that the edge of the flange fits exactly into the slot on the rear of the chassis of the top and bottom modules.

Figure 3-14 Installing the Pass-Through Mechanism in the Rack



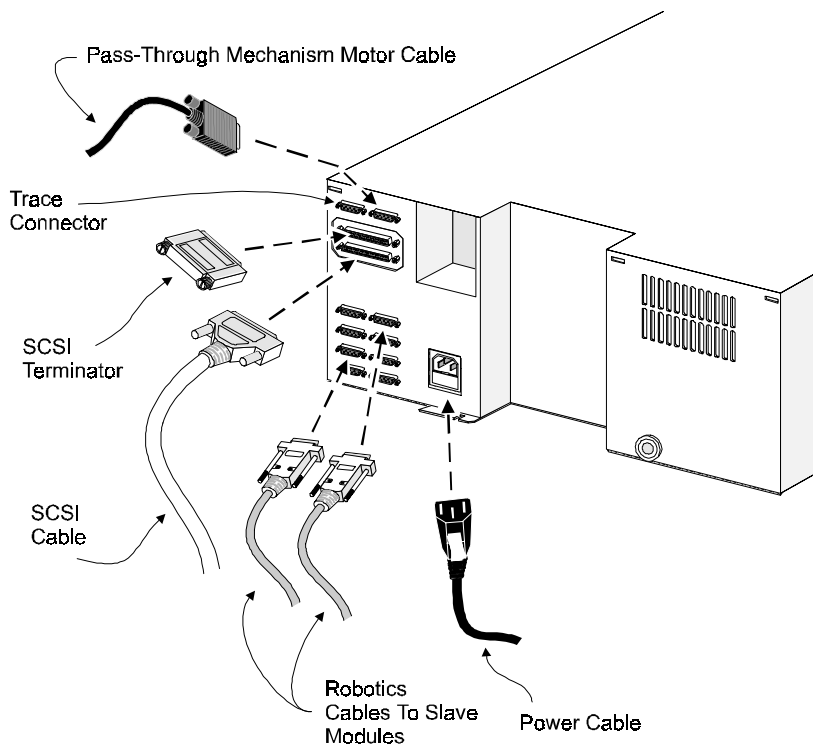
4. Ensure that the bottom edge of the pass-through mechanism motor drive section is flush with the bottom surface of the module chassis. If necessary, adjust the vertical position of the angle brackets.
5. Repeat steps 3 and 4 at the bottom module. Tighten all of the screws that hold the pass-through mechanism to the angle brackets while ensuring that:
6. The pass-through mechanism is centered horizontally, as indicated by the flange engaging the slot on the top and bottom modules, and
7. It is centered vertically, as indicated by the bottom of the bottom of the pass-through mechanism being flush with the bottom of the lowest module, and
8. The pass-through mechanism is pressed firmly against the backs of the top and bottom modules.
9. One by one, push the remaining modules into place and tighten the captive screws. In each case, ensure that the module does not bind against an adjacent module, that clearance between modules is evenly divided between top and bottom, and that the flange on the pass-through mechanism engages the slot on the back of the module.
10. If binding occurs, or if the module is not centered on the pass-through mechanism, loosen the four screws that secure the slides of the binding module to the front rails and the four screws that secure the slides to the rear rails, reposition the slides, then retighten the screws.
11. If necessary, repeat steps 6 and 7 until the module does not bind against the slides or against adjacent modules.
12. Repeat steps 6, 7, and 8 for all of the remaining modules.

3.4 Interfaces and Cabling

Refer to Figure 3-15. The connections required depend on the type of module. The Expansion Unit always has the SCSI connection to the host for the library robotics. base modules have a separate SCSI connection to the host for each drive*, but the SCSI connectors for the robotics should not be used. The portion of the library robotics that is located in the base modules is controlled by the Expansion Unit through a cable connected to the Expansion Interface connector on each module. Each module has a separate AC power connection.

- In principle it is possible to daisy-chain the SCSI connections for multiple drives, to save SCSI controllers. Digital strongly recommends against this practice because it may severely limit the data throughput performance and reliability of the library.

Figure 3–15 Expansion Unit SCSI Connectors, Terminator and Cables
(Fast/Wide SCSI Shown)



3.4.1 Pass-Through Mechanism Motor Cable

The pass-through mechanism motor cable is 36 inches long and has a male DB-15 connector on each end. Connect the cable from the connector on the motor housing to the elevator connector on the Expansion Unit.

3.4.2 Control Cables

Connect each base module to the Expansion Unit using one of the cables with a DB-9 male connector at the base end and a DB-9 female at the Expansion Unit end. A cable is required for each base module.

Note: Any of the control cables may be connected to any of the DB-9 connectors on the back panel of the Expansion Unit. The Expansion Unit determines the location of each module during power-up tests.

3.4.3 Power Cord

The detachable AC power cord is a standard grounding AC cord which attaches to an IEC-compatible connector on the rear panel. Connect a cord to the connector on each module, and connect the other end to a reliably grounded AC outlet or rack power outlet.

To maintain safety compliance, use a power cord with a suitable rating that is approved for the country in which the product is used. In the US cords must be UL listed, in Canada, CSA certified, and in Europe use a Harmonized cord marked <HAR> or a nationally certified cord.

3.4.4 SCSI Interfaces

DLT MiniLibrary Modules come with a differential Fast/Wide SCSI and one or two TZ89 drive(s). Fast/Wide SCSI is available as differential, and uses two parallel female high-density 68-pin D-Series connectors per bus. Fast/Wide SCSI cables and terminators are secured to the connectors by jackscrews.

Note: Digital strongly recommends that you use differential controllers and high-quality SCSI cables to ensure the highest performance of your MiniLibrary. Bus errors caused by excessive length or poor quality cables can significantly degrade performance and reliability.

In the base module, each drive is wired to an independent bus with a pair of SCSI connectors. Because it can be used in free-standing applications, the base module has a pair of SCSI connectors for that module’s library robotics. The *library robotics connectors should not be connected* when installed in a system with an Expansion Unit. The Expansion Unit controls the library robotics for all of the modules in the system. It has a single SCSI bus, with a pair of SCSI connectors, to enable a host to control the library robotics.

Each of the drives in the system and the library robotics is a separate SCSI device and is wired to a separate SCSI bus. Any of the separate buses may be combined using a SCSI jumper cable, available from Digital. If any two or more devices are connected to the same SCSI bus, each must be assigned a unique SCSI address. For information on assigning SCSI addresses, see the section headed ‘Configuration’ later in this chapter.

Note: For best performance, no more than one TZ89 drive should be connected to a single SCSI bus, because of the bandwidth limitations of the SCSI bus.

A terminator of the proper type (68-pin differential) must be installed on each unused connector at the end of each bus, as explained below in the Section 3.4.7, - 'Interface Cable and Terminator Installation'. Figure 3-15 shows the SCSI cable, connectors and bus terminator used on the module.

In order to connect a module to a host computer system, the host system must have at least one SCSI controller and the appropriate driver software. As noted earlier, higher-speed drives may require the use of separate SCSI controllers for each drive or each pair of drives. No more than one TZ89 drive should be connected to a single SCSI bus. Your Technical Support representative is available to answer your questions about installation procedures for specific host systems.

Before cabling the system, see the recommended SCSI cable specifications in the following section. Also, see the section on Interface Cable and Terminator Installation later in this chapter.

3.4.5 Interface Cable Specifications

The DLT MiniLibrary is a high-performance system. To avoid degradation of performance, use the highest-quality interface cables. The detailed requirements for SCSI cables are set forth in ANSI X3.131-1994. It is recommended that all SCSI cables used with the DLT MiniLibrary Module meet at least the following requirements:

- Shielded or double-shielded, as required to meet EMI specifications;
- Impedance match with cable terminators of 132 ohms, ideally;
- Characteristic impedance between 90 and 132 ohms, required;
- Each end of the twisted pair ground must be connected to chassis ground;
- The maximum cable length for a differential Fast SCSI bus is 82 ft. (25 m)*;
- Cables of different impedances should not be used together.

* When calculating the overall length of the bus, be sure to include the internal cabling of the module, which is as follows:

MiniLibrary Base Module:

Fast/Wide (TZ89 Drive)

DLT0	14 inches (36 cm)
DLT1	23 inches (57 cm)

Expansion Unit: 32 inches (81 cm)

Additional specifications to assure the highest SCSI performance can be found in ANSI X3.131-1994 or later.

Note: This equipment has been tested for electromagnetic emissions and immunity using good quality shielded cables. The use of unshielded cables, poor quality cables or other variances from good practice may result in non-compliance with national and international rules.

3.4.6 Terminators

A terminator must be installed on the device if the device is to be used at either end of a SCSI bus, such as the first or last device along a daisy-chain, or as a single SCSI peripheral. The appropriate type and quantity of terminator is shipped with your module. They are packaged in the accessory bag that arrives with the module.

Note: It is important to use only differential terminators on a differential SCSI bus.

3.4.7 Interface Cable and Terminator Installation

To properly cable a module:

1. Make sure that your host system has an appropriate SCSI interface card for each SCSI bus and software drivers installed.
2. Inspect the terminator and make sure it is a differential type. SCSI terminators should be clearly marked “single-ended” or “differential”.
3. Determine whether the module is to be connected in daisy-chain fashion with other devices.
 - If not used in a daisy-chain, install the terminator in the second SCSI connector.
 - If used in a daisy-chain, and the drive is the last device of the chain, install the terminator in the second SCSI connector. Otherwise, do not use the terminator. Connect the next cable in the chain to the second SCSI connector.
4. Make sure that the cable you use meets the specifications listed earlier in this chapter.
5. Measure the cable length to connect the module to the computer system.
6. Be sure that the length of the entire bus falls below the maximum permissible length given in the section on SCSI cable specifications

Figure 3-16 Base Module SCSI Connectors, Terminators and Cables
(Fast/Wide Interface, Independent Bus Connection Shown)

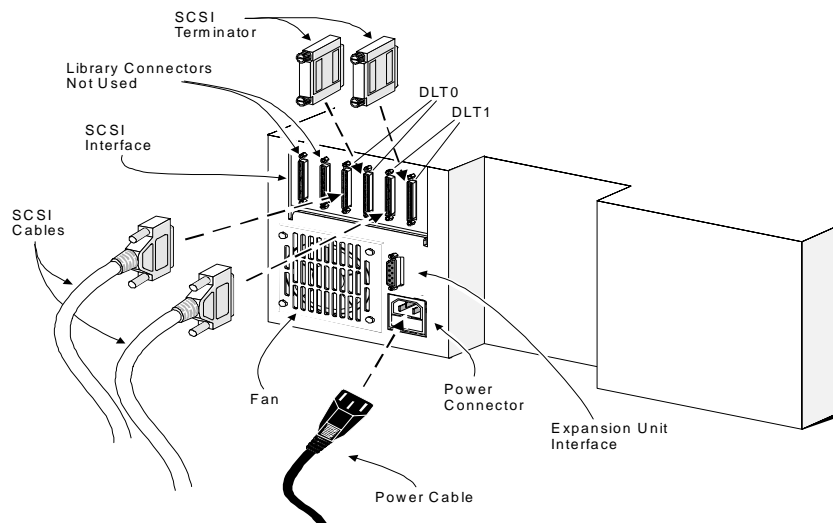
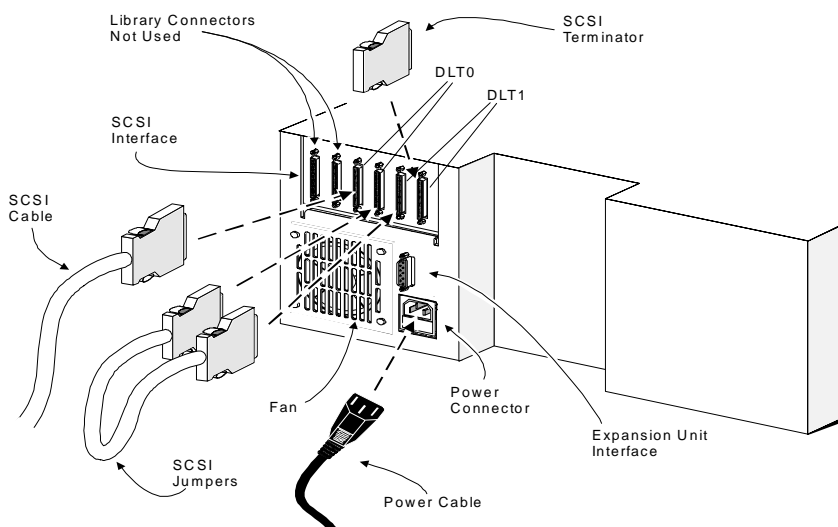


Figure 3-17 Base Module SCSI Connectors, Terminator, Jumpers and Cables
(SCSI-2 Interface, Daisy-chained Connection Shown)



3.5 Configuration

Individual MiniLibrary base modules in *all* newly assembled systems must be configured as described in the next section. In addition, the MiniLibrary System is designed with several configuration options, each offering multiple settings to support a variety of applications and platforms. The setting of each option is stored in non-volatile memory in the module. For most applications, you will not need to change the factory default settings.

To change settings, you need to use the control panel on the Expansion Unit. For an overview of how the control panel works, and a description of the functions of the buttons, indicators and display, refer to the sections titled ‘*Entering the Menu Mode*’, ‘*Exiting the Menu Mode*’ and ‘*Navigating Through the Menu Structure*’ in **Chapter 2 - Operation**.

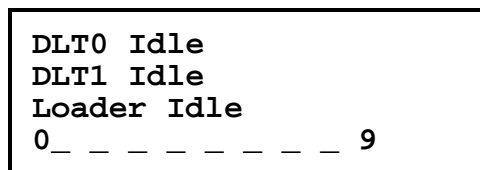
The settings can be changed using the procedure described below under “A Configuration Example - Setting the SCSI ID.” Before changing any configuration settings, consult your host system documentation to determine which settings may need to be changed.

3.5.1 Setting Base Module (slave) Configuration

Important Note: All MiniLibrary base modules are shipped configured as standalone systems. Before powering up the Expansion Unit in a MiniLibrary system for the first time, you must reconfigure each of the base modules in the system as a slave. To do so, perform the following procedure on each base module.

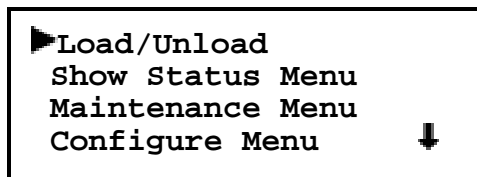
1. Turn on the power switch on the base module. After a series of self-test screens, the screen shown in Figure 3-18 appears.

Figure 3–18 Base Module Default Screen



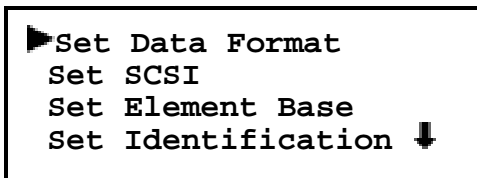
2. Press the **Enter** button to display the Main Menu, shown in Figure 3-19.

Figure 3–19 MiniLibrary Base Module Main Menu



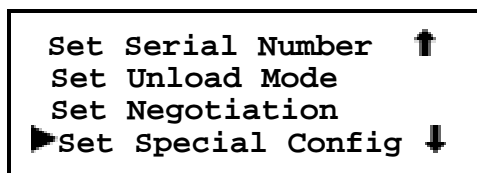
3. Press the ▼ button three times to select the Configure Menu, then press the **Enter** button. The screen shown in Figure 3-20 appears.

Figure 3–20 Configure Submenu



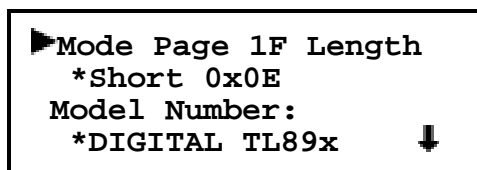
4. Press the ▼ button repeatedly to select Set Special Configuration, as shown in Figure 3-21.

Figure 3–21 Configure Submenu, Scrolled



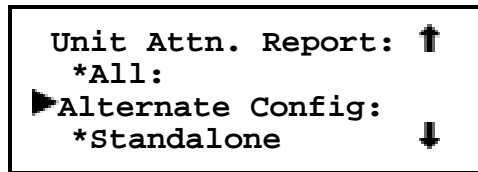
5. Press the **Enter** button. The screen shown in Figure 3-22 appears.

Figure 3–22 Special Config Submenu



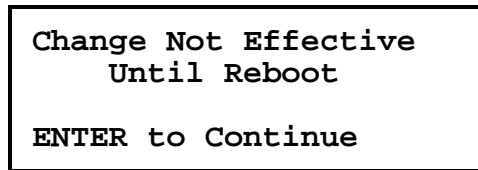
6. Press the ▼ button repeatedly to scroll down to select Alternate Config, as shown in Figure 3-23.

Figure 3–23 Special Config Submenu, Scrolled



7. Press the **Enter** and then ▼ button to change the line to ‘Slave’. Press **Enter** again and after selection stops flashing. The screen shown in Figure 3-24 appears.

Figure 3–24 Acknowledgment Screen



8. Press the **Enter** button. When the Special Configuration Submenu reappears, turn the power switch off to recycle power.

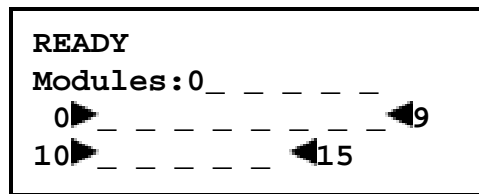
NOTE: Expansion Unit installation remaps the cartridge slot numbering system as follows: The 16-slots of the Expansion Unit become slot numbers 0-15. Slots 0-9 of the first base module become slots 16-25, etc.

3.5.2 A Configuration Example - Setting the SCSI ID

1. Turn the system on*, and wait until the Power-On Self Test terminates and the default screen appears on the display. Figure 3-25 shows a typical default screen. Yours may vary depending on the number of modules in your system, as shown in the second line.

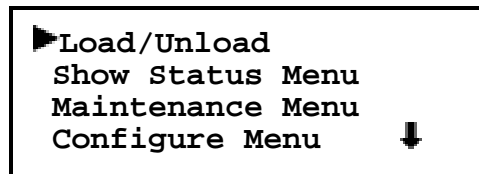
*see the Section titled ‘Starting the DLT MiniLibrary System’ in **Chapter 2 - ‘Operation’**.

Figure 3–25 Default Screen



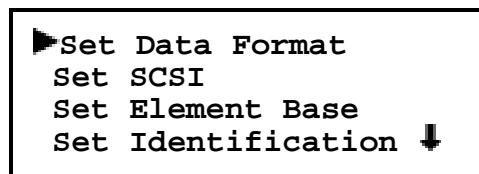
- At the Default Screen, press the **Enter** button. The display will show the Main Menu, as in Figure 3-26.

Figure 3–26 Main Menu



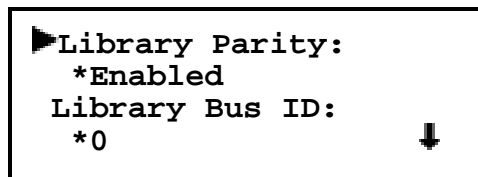
- Press the ▼ button three times to move the ▶ to Configure Menu, then press the **Enter** button. The display will show the Configure submenu, as shown in Figure 3-27. Note that the ↓ at the end of the fourth line means that there are additional configuration options that can be reached by scrolling with the ▼ button.

Figure 3–27 Configure Submenu



- To select a configuration option, press the ▲ or ▼ button on the control panel until the ▶ on the display is next to the option you want to change. In this case, let us choose Set SCSI. Press the **Enter** button to display the choices for that option. The submenu in Figure 3-28 appears.

Figure 3–28 Set SCSI Submenu



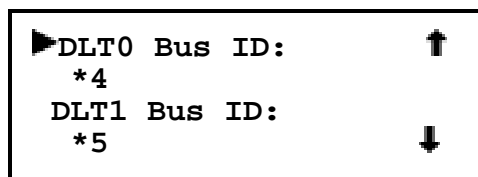
Note: Take a moment to look closely at the submenu in Figure 3-28. Note that the ▼ on the display is next to line 1, and that line 2 is indented. This tells you that Figure 3-28 is a *two-tiered menu*. The ▲ and ▼ buttons work on two levels in this kind of menu, which is typical of many submenus of the Configure Menu. The first level is as follows: If you press the ▼ button, the ▶ moves to line 3. If you press the ▲ button, the ▶ moves back to line 1.

If you press the **Enter** button while the ▶ is next to line 1 (or line 3), the ▲ and ▼ buttons operate on the second level. You can tell because the ▶ moves next to line 2 (or line 4), and a ↓ appears at the end of line 4, indicating that there is a list of settings that can be scrolled using the ▲ and ▼ buttons.

The ↓ at the end of line 4 means that there are other items that can be displayed by scrolling, using the ▼ button repeatedly.

5. Note that the Library SCSI ID is set to 0. Suppose you want to set the DLT0 bus ID to 3. With the ▶ next to line 1, press the ▼ button repeatedly until the display scrolls as shown in Figure 3-29.

Figure 3–29 Set SCSI Submenu Scrolled



6. With the ▶ next to line 1, press the **Enter** button. The ▶ moves to line 2 and the ↓ remains at the end of line 4, and a ↑ appears at the end of line 1. Now you can use the ▲ and ▼ buttons to scroll through the possible settings. Scroll downward so that 3 is displayed, then press the **Enter** button to save the new selection. An * appears to the left of the 4, to indicate that it is the current selection.

7. Press the **Escape** button repeatedly until the submenu in Figure 3-27 reappears.
8. Repeat this procedure for each configuration option you want to change.

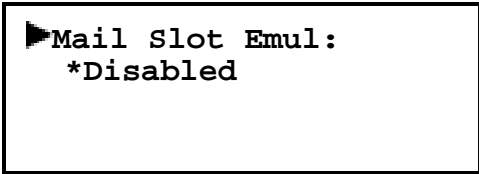
3.5.3 Setting Up a Mail Slot

Some of the available host software enables the system administrator to limit access to the library as a whole while permitting insertion into or removal from the library of one or more tape cartridges when needed. This feature is commonly called a mail slot. It is implemented using SCSI Import/Export elements.

In the DLT MiniLibrary system, you can designate the magazine of any base module as the mail slot magazine. When you do so, the entire magazine is withdrawn from the list of storage elements. You can designate any number of mail slots from one slot up to the full size of the magazine. To configure a mail slot, use the following procedure.

1. As shown in Figures 3-25 through 3-27 in the preceding procedure, navigate from the Default Screen through the Main Menu to the Configure Submenu.
2. Scroll down on the Configure Submenu until you see 'Set Mail Slot,' and select that option. The screen shown in Figure 3-30 appears.

Figure 3-30 Set Mail Slot Submenu



```

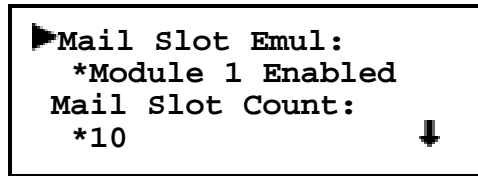
▶Mail Slot Emul:
  *Disabled
  
```

3. With the ▶ next to line 1, press the **Enter** button. The ▶ moves to line 2 and a ↓ appears at the end of line 4. Now you can use the ▲ and ▼ buttons to scroll line 2 to display the possible settings. These options enable you to specify which module should have the mail slot enabled. Scroll downward to the desired module, then press the **Enter** button to save the new selection.

Note: The Expansion Unit is not on the list. Module 1 refers to the base module just below it.

4. Scroll line 2 to display Module 1, then press the **Enter** button to select it. The screen changes as shown in Figure 3-31.

Figure 3–31 Set Mail Slot Submenu Enabled



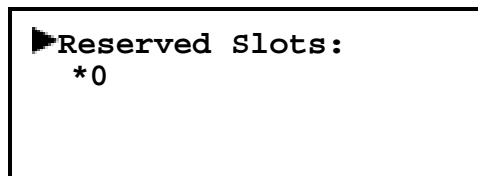
5. The ▶ returns to line 1. Press the ▼ button. The ▶ moves to line 3.
6. Press the **Enter** button The ▶ moves to line 4. Now you can use the ▲ and ▼ buttons to scroll line 4 to specify how many slots will be designated as mail slots. Scroll to the desired number, then press the **Enter** button to save the new selection
7. Press the **Escape** button repeatedly to return to the Default Screen.

3.5.4 Reserved Slots

Some host software imposes size limits on tape library magazines for licensing purposes, and will not operate with a library that exceeds the licensed size. This configuration option enables you to withdraw some of the slots in the Expansion Unit from use as storage slots in order to meet licensing requirements.

1. As shown in Figures 3-25 through 3-27, navigate from the Default Screen through the Main Menu to the Configure Submenu.
2. Scroll down on the Configure Submenu until you see ‘Set Reserved Slots,’ and select that option. The screen shown in Figure 3-32 appears.

Figure 3–32 Set Reserved Slots Submenu



3. With the ▶ next to line 1, press the **Enter** button The ▶ moves to line 2, a ↓ appears at the end of line 4, and a ↑ appears at the end of line 1. Now you can use the ▲ and ▼ buttons to scroll line 2 to specify the number of slots to be reserved. Scroll to the desired number, then press the **Enter** button to save the new selection.
4. Press the **Escape** button repeatedly to return to the Default Screen.

3.5.5 Descriptions of Configuration Options

Table 3-2 summarizes the configuration settings for the DLT MiniLibrary System. The default settings are shown in the fourth column, and other possible settings are shown in the third column.

The items available on the Configuration Menu are as follows:

Set Data Format: This option enables you to specify DLT data *density* and DLT data *compression* requirements. The default for both options is Auto Selection (this will not effect the default operation of the TZ89N tape drive).

Set SCSI: This setting enables you to 1) enable or disable the library robotics SCSI bus parity checking, and 2) set the SCSI addresses of the drives and the library robotics. The defaults are: parity enabled; Library Bus ID = 0. The designators DLT 0 through DLT n refer to the first through n th drives, counting from top to bottom. The actual designator used by the system depends on the number of drives in the system and the placement of the module in the system;

Set Element Base: This setting allows you to set the base addresses of each of the four SCSI *elements* of the module. In order to identify sources and destinations in commands to the robotics, the Library System is divided into elements, each of which is assigned a separate designator or *element address*. The *Transport Element* is the robotics mechanism itself; the *Storage Elements* are the slots in the magazines; the *Transfer Elements* are the drives, and the *Import/Export Element* is the mail slot or slots. The Module reports these settings in response to the SCSI Mode Sense command, in the Element Address Assignment Page. The defaults are Transport element base = 0000; Storage element base = 0001, Transfer element base = 00F0, and Import/Export element base = 00E0.

Set Identification: This setting enables you to specify the response of the Module's robotics to the SCSI Inquiry command in the Vendor ID and the Product ID fields. The defaults are: Vendor ID = DIGITAL; Product ID TL800.

Set Date: Enables you to set the system's calendar.

Set Time: Enables you to set the system's clock.

Set Baud Rate: Enables you to set the data transmission rate of the Expansion Unit's trace port. This function is intended for use by CEs only. The default is 38400 bits/sec.

Set Serial number: This setting enables you to alter the Expansion Unit's serial number as stored in the unit. The Module's robotics reports these settings in response to the SCSI Inquiry command, in the Unit Serial Number Page.

Set Unload Mode: This setting determines whether a SCSI Move Medium command is interpreted as implicit or explicit. If implicit, the Expansion unloads a drive before attempting to move a cartridge from that drive. If explicit, the host must issue a SCSI Unload command to the drive before each Move Medium command from a drive to a slot. The default is Implicit.

Set Negotiation: This option offers two choices: Initiate Negotiation and Set Transfer Rate. Initiate Negotiation, if set, allows the system to initiate SCSI Synchronous Negotiation with the host (the default is No). The Expansion always responds to host-initiated negotiation.

Set Transfer Rate can be set to 10 Mbytes/sec, 5 Mbytes/sec or Asynchronous. The default is 10 Mbytes/sec.

Set Mail Slot: Some of the available host software enables the system administrator to limit access to the library as a whole while permitting insertion into or removal from the library of one or more tape cartridges when needed. This feature is commonly called a mail slot. It is implemented using SCSI Import/Export elements.

Set Reserved Slots: Some host software imposes size limits on tape library magazines for licensing purposes, and will not operate with a library that exceeds the licensed size. This configuration option enables you to withdraw some of the slots in the Expansion Unit from use as storage slots in order to meet licensing requirements.

Set Special Configuration: This option contains predefined Digital operational configurations. Refer to “Special Configuration Options” section within Table 3-2 for default configuration characteristics.

Set Default: This option resets all of the preceding configuration options to their factory defaults. It does not affect the settings of the SCSI IDs of the DLT drives.

Table 3–2 MiniLibrary Configuration Options

Option	Settings	Default
Data Format	Density: THZ01, THZ02, DLT2000, DLT2000XT, DLT4000, DLT7000, Auto Selection Compression: Enabled, Disabled (Enabled at 10.0 only)	Auto Selection Auto Selection
SCSI	Lib Bus Parity: Enable, Disable Lib Bus ID: (SCSI ID) DLT0 Bus ID: (SCSI ID) DLTn Bus ID: (SCSI ID)	Enabled 0 4 n
Element Base	Transport: NNNN (hex) Storage: NNNN (hex) Transfer: NNNN (hex) Import/Export: NNNN (hex)	0000 0001 00F0 00E0
Identification	Vendor ID: DIGITAL EXABYTE, DEC, Quantum, Vendor Unique Product ID: TL800 Media Changer, Vendor Unique	DIGITAL TL800
Date	DD, MMM, YYYY	Current date
Time	HH, MM	Current Time
Baud Rate	[Digital CE Use Only]	38400
Serial Number	NXNNNNNNNN	999999999
Unload Mode	Implicit, Explicit	Implicit
Auto Clean Mode	Enabled, Disabled	Disabled
Negotiation	Negotiation Mode: Do Not Initiate, Initiate Transfer Rate: 10 MB/sec, 5 MB/sec, Asynchronous	Do Not Initiate Synchronous 10 MB/sec
Mail Slot	Mail Slot Emul: Disabled, Enable Module 1, Enable Module n Mail Slot Count: 1 through n	Disabled
Reserved Slots	Reserved Slots: 0 through n	0

Continued next page

SPECIAL CONFIGURATION OPTIONS		
Option	Settings	Default
Mode Page 1F Length	Short (0 x 0E) Long (0 x 12)	Short
Model Number	DIGITAL TL89x <Vendor Unique>	DIGITAL TL89x
TUR Reporting	Standard Custom	Standard
Init Element Status	No Inventory Force Inventory Force Label Scan	No Inventory
Unit Attn Report	All One	All
Alternate Config	Stand alone Slave	Stand alone
Element Base	Zero based One based	Zero based
Label Size	8 char...1 char	8 character
Label Alignment	Left Align Right Align	Left Align
Default	Resets all options to defaults. Data and Time remain current	

Note: The options described in this table represent the version of the firmware in use when this manual was written. If the displays on your control panel differ from those described here, you may find an up to date listing of configuration options on the Digital Website listed on page *viii* in the front of this manual.



Specifications

This appendix lists the specifications and regulatory requirements met by the DLT MiniLibrary and Expansion Unit.

Operational Performance Specifications

Host Interface.....	Fast/Wide SCSI (diff)
Number of Cartridges, Full Magazine	
MiniLibrary Base Module	10
Expansion Unit	16
Media type	
TZ89 Drives	DLTtape IV
Tape Speed	110 in/sec read/write, 150 in/sec search
Tape Tension	3.0 +/- 1 oz. when stationary
.....	4.7 +/- 1 oz. at operating speed
Load Time	10 sec (max.), including picking from slot
Unload Time.....	10 sec (max.), including returning to slot
Rewind Time	45 sec (avg.)
Sustained native data transfer rate, maximum (TL891/92)	5 MB/sec
Peak SCSI transfer rate, synchronous mode (TL891/92)	20.0 MB/sec
Native Data Capacity (Per Cartridge) TL891/92)	35 GB

Reliability Specifications (Drives)

Mean cycles between operator intervention	150,000
Data Error Rate.....	1 in 10 ¹⁵ bytes
MTBF.....	280,000 hrs (unlimited duty cycle)
MTTR.....	15 min
Head Life	30,000 tape motion hrs
Design Life	5 years @ 3,300 power-on hrs/year

Reliability Specifications (Library Robotics)

Life Expectancy, Load/Unload Operations 500,000
Design Life.....Seven years

Power Specifications

Voltage 115-240 VAC
Amperage, Each Module
 TL891 1.8-1.2 A
 TL890 1.0-0.5A
Line Frequency50-60 Hertz

Mechanical Specifications

Height.....6.97 in. (17.70 cm.)
Width..... 17.00 in. (43.18 cm.)
Depth
 overall..... 23.75 in. (60.35 cm.)
 behind panel22.75 in. (57.79 cm.)
Weight
 DLT MiniLibrary Base Module
 dual drive 62 lbs. (28 kg.)
 single drive48 lbs. (22 kg.)
 Expansion Unit.....41 lbs. (20 kg.)
 Pass-Through Mechanism (2-module height)5 lbs (2.3 kg.)
Shipping Weight
 DLT MiniLibrary Base Module
 dual drive 70 lbs. (32 kg.)
 single drive56 lbs. (25 kg.)
 Expansion Unit (packed with pass-through mechanism)75 lbs. (34 kg.)

Environmental Specifications

Operating

Dry Bulb Temp.	50°F to 104°F (10°C to 40°C)
Temperature Gradient	1.8°F/min. (1°C/min.)
Temperature Shock.....	59°F (15°C) over 2 min.
Wet Bulb Temperature	78.8°F (26°C)
Relative Humidity <small>non-condensing</small>	15% to 85%
Humidity Gradient.....	10%/hour
Altitude.....	-100ft. to +10,000 ft (-305m to 3050m)

Non-Operating (Packed or Unpacked)

Dry Bulb Temp.	-40°F to 140°F (-40°C to 60°C)
Temp. Gradient	36°F (20°C)/hour (across the range)
Temperature Shock.....	27°F (15°C) (over 2 min.)
Wet Bulb Temp.	86°F (30°C)
Relative Humidity <small>non-condensing</small>	10% to 95%
Humidity Gradient.....	10%/hour
Altitude.....	-100 to +10,000 ft. (-305 to 3050m)

Storage/Transit

Dry Bulb Temp.	-40°F to 140°F (-40°C to 60°C)
Temp. Gradient	45°F (25°C)/hour (across the range)
Temperature Shock.....	27°F (15°C) (over 2 min.)
Wet Bulb Temp.	86°F (30°C)
Relative Humidity <small>non-condensing</small>	5% to 95%
Humidity Gradient.....	10%/hour
Altitude.....	-100 to +10,000 ft. (-305 to 15,250m)

Acoustic Emissions

Drive Condition.....	Emission Level
Two drives operating	<50 dBA
(Intermittant robot motion excepted)	

Safety

The TL890, TL891 and TL892 models carry the following Regulatory Agency product safety certifications:

Certification.....	Standard
UL Listed	UL 1950
TUV/Product Service.....	EN 60 950
GS Mark	
CE Mark	EMC Directive, Low Voltage Directive
Canadian UL Listed.....	CSA 22.2 No. 950

Electromagnetic Emission

Notice

This equipment has been tested using double shielded cables for EM compliance. The use of unshielded cables or modifications requires system testing for EMI testing for compliance to the standard.

Industry Canada Industrie Canada

This Class A digital apparatus meets all requirements of the Canadian Interference-causing Equipment regulations.

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

FCC Notice

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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Table A-1 Acoustic Noise Declaration
Declared Values per ISO 9296 and ISO 7779

Product	Sound Power Level		Sound Pressure Level	
	L_{WA} , B		L_{pAm} , dBA (bystander position)	
	Idle	Operate	Idle	Operate
-TL890-	6.0	6.0	48	48

NOTE

Current values for specific configurations are available from Digital representatives.
 1 B = 10 dBA.

Table A-2 Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779 /DIN EN27779:

Gerät	Schalleistungspegel		Schalldruckpegel	
	L_{WA} , B		L_{pAm} , dBA (Bediener position)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
-TL890-	6.0	6.0	48	48

HINWEIS

Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA.

FCC and VCCI Requirements

The following FCC and VCCI notices apply to the TL890.

Statement for Equipment Meeting FCC Class A Requirements

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. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) This device must accept any interference that may cause undesirable operation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Equipment Meeting VDE Class B Requirements (VFG 1046/84 and VFG 243/91 for Germany)

Für Bundesrepublik Deutschland
For Federal Republic of Germany
Pour la République fédéral d'Allemagne

Bescheinigung des Herstellers/Importeurs

Dieses Gerät ist Übereinstimmung mit den Bestimmungen der BMPT Vfg. 243/1991 und Vfg. 46/1992 in Verbindung mit EN55022:1987 (DIN VDE 0878-3:11.89) oder Vfg. 1046/1984 mit Vfg. 483/1986, funkentstört. Es trägt als Nachweis der EMV-Konformität entweder eine Konformitätskennzeichnung oder das freiwillige VDE-Funkschutzzeichen.

Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die unten aufgeführten Hinweise.

Für Geräte die nicht mit dem VDE-Funkschutzzeichen versehen sind wurde dem Bundesamt für Zulassungen in der Telekommunikation (BZT) des Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung Zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Betreiberhinweis

Wir sind verpflichtet, Sie auf folgende Fakten hinzuweisen (BMPT-Amtsblattverfügung 243/91 bzw. 1046/84 §2, Abschnitt 5):

Dieses Gerät wurde funktechnisch sorgfältig entstört und geprüft. Wird deises Gerät innerhalb einer Anlage zusammen mit anderen Geräten betrieben, muß bei Inanspruchnahme der "Allgemeinen Betriebsgenehmigung" nach BMPT-AmtsblVfg. 243/91 bzw. 1046/84 die gesamte Anlage den unter §2, Abschnitt 1, genannten Voraussetzungen entsprechen.

Externe Datenkabel:

Sollte ein Austausch der von Digital spezifizierten Datenkabel nötig werden, muß der Betreiber für eine einwandfreie Funkentstörung sicherstellen, daß Austausch kabel im Aufbau und Abschirmqualität dem Digital Originalkabel entsprechen.

VCCI Notice for Japan Class I Equipment

Japanese Voluntary Control Council for Interference (VCCI)

この装置は、第一種情報処理装置（商工業地域において使用されるべき情報処理装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Translation: This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an area adjacent thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.



Accessories

This appendix lists the supplies available for the TL890 DLT MiniLibrary.

B.1 Data and Cleaning Cartridge Ordering Information

You can order additional CompacTape Data or Cleaning Cartridges for the TL890 by contacting your authorized Digital reseller or by calling Digital's DECdirect ordering service at 1-800-DIGITAL. Table B-1 lists cartridge ordering part numbers.

Table B-1 Data and Cleaning Cartridge Part Numbers

P/N	Description
TK85K-01	CompacTape III Data Cartridge (quantity, 1)
TK87X-01	CompacTape IIIXT Data Cartridge (quantity, 1)
TK88K-01	CompacTape IV Data Cartridge (quantity, 1)
TK85-HC	Cleaning Tape Cartridge (quantity, 1)

B.2 Bar Code Label and Magazine Ordering Information

Additional Bar Code Labels or Magazines can be ordered by calling Overland Data at **1-800-729-8725** Monday through Friday; 7:00 a.m. to 5:00 p.m. (PT) and asking for *Spares Sales*. Part numbers are provided in the following table.

Table B-2 Bar Code Label and Magazine Part Numbers

P/N	Description
106045-001	Bar Code Labels (quantity, 100)
106035-001	Magazine (quantity, 1)

Order Lead-Time: Next day if product is in stock; 10-20 working days if not stocked. General Terms of Sale: P.O. or written order faxed to: **(619) 571-3664** prior to shipping an order. Methods of Payment include COD, Credit Card, Net/30 OAC. From the U.K., accessories may be ordered via the following phone and fax numbers: Phone: +44 11891 891 891 Fax: +44 11891 891 897

Reader's Comments

Manual Order Number: EK-TL890-UG. A01
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Digital is committed to providing the best products and services. Since our manuals are important components of our products, we value your comments, corrections, and suggestions for improvements. Please take a few minutes to fill out and return this form. Attach additional sheets, if necessary. Thank you.

Manual Rating	Excellent	Good	Fair	Poor
Accuracy (correct presentation of facts)	[]	[]	[]	[]
Completeness (adequate information)	[]	[]	[]	[]
Clarity (easy to understand)	[]	[]	[]	[]
Organization (logical sequence of information)	[]	[]	[]	[]
Layout (easy to follow subject matter)	[]	[]	[]	[]
Indexing (easy to locate desired information)	[]	[]	[]	[]

Errors Noted (include page, paragraph, table or figure number) _____

Most-Liked Features: _____

Least-Liked Feature _____

Suggestions for Improvement _____

Return Address: Digital Equipment Corporation Customer Research Response Center 334 South Street, SHR3-2/W3 Shrewsbury, MA 01545	Name		Phone
	Title		
	Company		
	Street Address		
	Mail Stop		
	City	State	ZIP
	Country (if other than USA)		