Installation and Operating Guide

Scalar Series

Advanced Digital Information Corporation

Copyright Notice

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EMI/RFI Compliance

United States – FCC

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

- Re-orient 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.

You may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems.* This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00354-04.

Any changes or modifications not expressly approved by adic could void the user's authority to operate this equipment.

Canada – Department of Communications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Class B prescriptes dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le ministre des Communications.

Shielded Cables

Shielded data cable(s) are required in order to meet EMI/RFI limit specifications. The adic data cable meets this requirement. If you need a replacement cable, be sure to use an adic-approved shielded cable (to assure acceptability to EMI/RFI requirements).

DECLARATION OF CONFORMITY

according to EN 45014

Manufacturer's Name: Advanced Digital Information Corporation

Manufacturer's Address:

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declares, that the product:

Product (Produit, Erzeugnis): SCALAR 448

Model Number (Marque Commercial, Warenbezeichnung): SCALAR 448 .

conforms to the following international specifications, as required by 89/336/EEC & 92/31/EEC:

EMI: EN 50081-1, EN-55022 Class B
EMC: EN 50082-1, IEC 801-2, IEC 801-3, IEC 801-4
Safety: EN 60950

Supplementary Information:

Redmond, Washington USA	18 December 1995	Product Engineering Mgr.
Location	**Date**	**Signature/Title**

63-1095-01 rev A

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Safety Warnings

This symbol should alert the user to the presence of "dangerous voltage" inside the product that might cause harm or electric shock.

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION : TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Caution

All safety and operating instructions should be read before this product is operated, and should be retained for future reference. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards. In order not to defeat the safeguards, observe the following basic rules for its installation, use and servicing.

1. Heed Warnings - All warnings on the product and in the operating instructions should be adhered to.
2. Follow Instructions - All operating and use instructions should be followed.
3. Ventilation - The product should be situated so that its location or position does not interfere with proper ventilation.
4. Heat - The product should be situated away from heat sources such as radiators, heat registers, furnaces, or other heat producing appliances.
5. Power Sources - The product should be connected to a power source only of the type directed in the operating instructions or as marked on the product.
6. Power Cord Protection - The AC line cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the cord at the wall receptacle, and the point where the cord exits from the product.
7. Object and Liquid Entry - Care should be taken to insure that objects do not fall and liquids are not spilled into the product’s enclosure through openings.

8 Servicing - The user should not attempt to service the product beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Precautions

Do not use oil, solvents, gasoline, paint thinners or insecticides on the unit.

Do not expose the unit to moisture, to temperatures higher than 140ºF (60ºC) or to extreme low temperatures.

Keep the unit away from direct sunlight, strong magnetic fields, excessive dust, humidity and electronic/electrical equipment which generates electrical noise.

Hold the AC power plug by the head when removing it from the AC source outlet; pulling the cord can damage the internal wires.

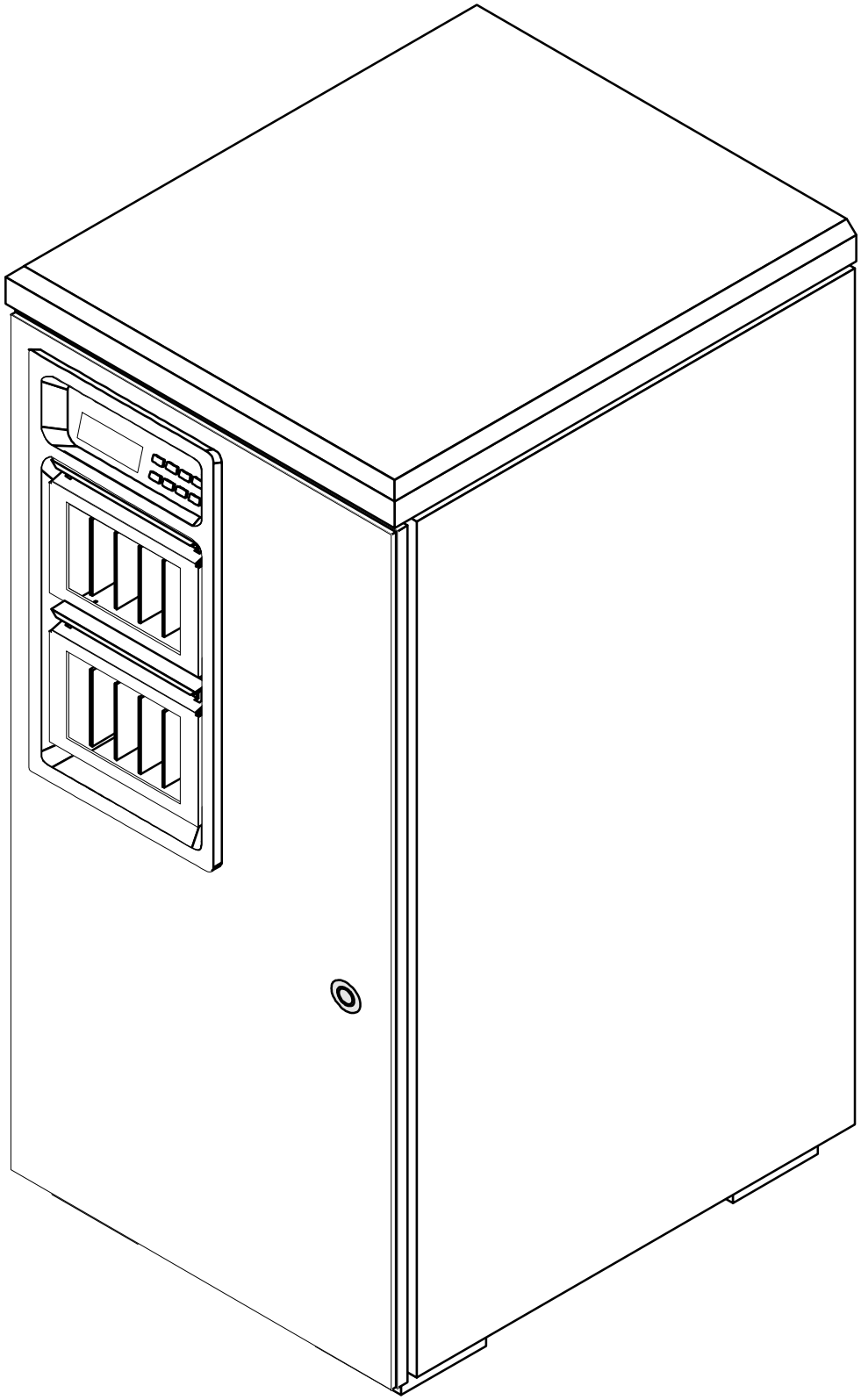
Use the unit on a firm level surface free from vibration, and do not place anything on top of unit.

Chapter 1

The Scalar Series

This Chapter …

- provides a brief overview of Scalar Library features. For detailed specifications, see Appendix C.



Welcome to your new adic Scalar Library (Scalar 458 shown above). Your new library is a fully automated, high-performance, high-capacity, mass storage system. The Scalar Series is designed to provide you with unattended, near-line and off-line data storage, archiving, backup, hierarchical storage management (HSM), and retrieval for mid-range and high-end servers and networks.

The Scalar Series models (Scalar 224, 448, 458) are SCSI-2 compliant library systems incorporating streaming tape cartridge data storage devices which feature high capacity, high throughput, and data compression. Equipped with four Digital Linear Tape (DLT) drives, your library operates as five independent SCSI devices on up to five SCSI buses. Your library can contain up to 58 data cartridges providing a maximum formatted capacity of 4.06 TeraBytes and a sustained data transfer rate as high as 2400 MB per minute. The tape media is rated at 500,000 passes and has a shelf life of 30 years, providing superior media durability and data reliability.

Scalar Series Models	# Drives	# Tape Slots	Media Interchange Shelf	Barcode Reader
Scalar 224	2	24 (std)	Optional	Standard
Scalar 448	2 - 4	48 (std)	Optional	Standard
Scalar 458	2 - 4	48 + 10	Standard	Standard

Features

- **Media Interchange Shelf**. When equipped, the Scalar Series 10-slot Media Interchange Shelf (Mailbox), mounted on the transparent front door, allows you to insert and remove cartridges from your library without opening the door. Access to each of the five-slot shelves is provided by a separate lockable door. The Mailbox doors can be locked and unlocked by the application software.

- **Multi-function Operator Panel**. The Operator Panel, located at the top-left of the front door, employs a 4-line by 20-character liquid crystal display (LCD) and an eight-key keypad to permit you to monitor and control the operations of your library.

- **Media Picker**. The uniquely designed Media Picker is the media cartridge handling mechanism and normally responds to commands from the application software to move the cartridges between the storage slots, the drives, and the Mailbox. The Media Picker employs a bi-directional, pass-through gripper which will pick a cartridge from both the front of the picker, or the back. This design eliminates the need for a separate cartridge handling mechanism to pick and place cartridges from the Mailbox.

- **Barcode Scanner**. The Scalar Series Barcode Scanner, mounted on the bottom of the Media Picker, reads cartridge information contained in a barcode label attached to each of the data cartridges. This information becomes part of the application software's library cartridge inventory.

- **Exabyte® Emulation**. To maximize application software compatibility, your adic library provides functional emulation of the Exabyte® EXB-480™ library and can appear as either a Scalar or an Exabyte® EXB-480™.

- **System Integrity**. The cartridge slots, drives, and robotics are protected by a physically lockable door. System security and media access is controlled by two lockable media interchange shelves. System security can be enabled or disabled from the application software. Additionally, the Scalar Series Libraries feature a logical lock system that can be set by the application software. The LOCKED LEDs on the Operator Panel indicates that the system cannot be interrupted. Functions that would alter the state of the machine cannot be accessed when the LOCKED LEDs are illuminated.

- **Maintainability**. The full operation of your library can be viewed through the transparent panel that covers the front door. If a problem occurs, it is both visible and readily correctable. Any condition that causes a cartridge load or unload to fail is reported via a message on the Operator Panel LCD.

- **Cleaning Cartridge**. Although the cleaning cartridge can occupy a cartridge storage slot in the Scalar Library (facilitating automated cleaning cycles), manual insertion of a cleaning cartridge is permitted through the Mailbox.

- **Manual Cartridge Use**. Individual cartridges can easily be transported to the drives through the Mailbox.
- **Cartridge Pre-Check**. Whenever you power up your Scalar Library the Media Picker will scan the cartridge storage slots and build a log of valid cartridge locations. Sensors in the Mailbox allow a similar mapping of the area.
- **Reverse Cartridge Protection**. The cartridge storage slots, and the slots in the Mailbox employ a design that prevents the cartridges from being inserted incorrectly.
- **Downloadable Firmware**. Both your Scalar Library and the DLT drives employ Flash EEPROM technology permitting easy on-site installation of firmware updates from the host computer.
- **Built-in Diagnostics**. Your Scalar Library includes diagnostic firmware that tells you when drive head cleaning is required, reports diagnostic results, and drive operating status. Embedded data logging of operational embedded and drive errors embedded aid you in failure analysis.

Options

DLT Drives

Your adic library can be equipped with second-, third-, or fourth-generation DLT drives. All drive models (DLT2000XT, DLT4000, and DLT7000) can read and write 2.6 GB, 6.0 GB, and 10.0 GB tape formats for 100% interchange compatibility with earlier DLT drives. Tape density is selectable by the application software or a button on the drive.

Drive Model	**Cartridge Max Capacity** (compressed mode)	**Library Max Capacity** (compressed mode)	**Sustained Transfer Rate** (compressed mode)
DLT2000XT	20 GB (DLTtape III) 30 GB (DLTtape IIIXT)	480 MB (Scalar 224) 960 MB (Scalar 448/458) 720 MB (Scalar 224) 1.44 TB (Scalar 448/458)	2.5 MB/sec/drive (150 MB/min/drive)
DLT4000	20 GB (DLTtape III) 30 GB (DLTtape IIIXT) 40 GB (DLTtape IV)	480 MB (Scalar 224) 960 MB (Scalar 448/458) 720 MB (Scalar 224) 1.44 TB (Scalar 448/458) 960 MB (Scalar 224) 1.92 TB (Scalar 448/458)	3.0 MB/sec/drive (180 MB/min/drive)
DLT7000	20 GB (DLTtape III) 30 GB (DLTtape IIIXT) 70 GB (DLTtape IV)	480 MB (Scalar 224) 960 MB (Scalar 448/458) 720 MB (Scalar 224) 1.44 TB (Scalar 448/458) 3.36 TB (Scalar 448/458)	10.0 MB/sec/drive (600 MB/min/drive)

Maximum Capacity and Sustained Transfer Rates

Differential SCSI

Differential SCSI is available for the robotics. The drives can be all differential, all single-ended, or a mix of both.

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Chapter 2

Getting Started

This Chapter …

- covers what you need (and what you need to know) to install your adic Scalar Library. Read this chapter before you begin installation.

For the most part, installation is simply a matter of checking all necessary SCSI connections installing the application software (backup or otherwise) on the host computer and applying power. The Scalar Library defaults set at the factory should be sufficient for most applications.

Requirements

- Space requirements: your Scalar Library has a footprint of 19.0" wide by 23.0" deep. The cabinet extends 40.5" above the floor. You must allow adequate clearance to the rear to allow air flow and enough room at the front to open the door which extends outward 18.5" when perpendicular to the cabinet. The door is hinged on the left side. The floor on which the Scalar Library will sit must be level.

- We assume that you are familiar with your computer system. The Scalar Library must be incorporated into the host computer system. The backup software, SCSI interface and any additional SCSI interface cables must be purchased separately.

- Necessary tools: No special tools are required to install the Scalar Library. If you are installing a host adapter (SCSI controller) card at this time, refer to the installation manual for your host adapter.

Unpacking and Inspecting

Caution

If the operating environment differs from the storage environment by 15° C (30° F) or more, let the unit acclimate to the surrounding environment for at least 12 hours.

Unpack all items from the carton. Save the packing materials in case you need to move or ship the system in the future.

Caution

You must ship the Scalar Library in the original or equivalent packing materials or your warranty may be invalidated.

Checking the Accessories

Check to make certain that the following items are included with your Scalar Library:

- Power cord
- One DLT data cartridge
- One DLT cleaning cartridge
- Barcode labels
- One active SCSI bus terminator
- One SCSI Bus Jumper (daisy-chain cable)
- This manual
- Two keys for the front door

Preparing the Library for Installation

Follow the instructions in *Unpacking the Scalar Library* adic document number 63-1119-01 to prepare your library for installation. This document was attached to the front of your library. If you need another copy, please call adic Customer Assistance.

Prepare and Install the Data Cartridges

Before inserting the cartridges into the library, affix the barcode labels and set the write-protect switches as described below.

Barcode Labels

To install the barcode labels, position the label with the numbers upright, as shown in figure 3, sliding the label under the ridges on the sides of the cartridge.

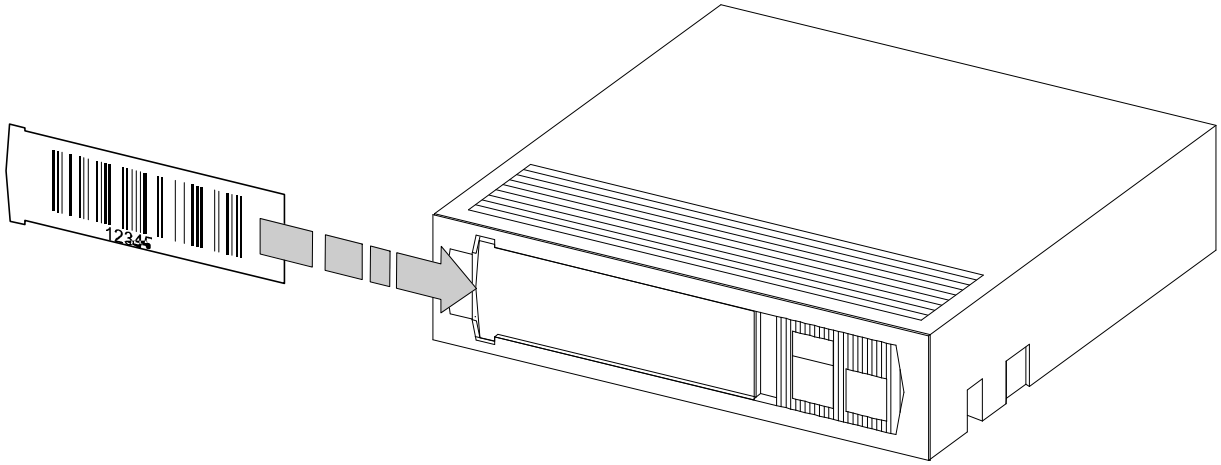


Figure 3. Barcode Labels

> ***Warning***
>
> Do not use wrap-around labels on the individual cartridges. Most labels use a removable adhesive and have a tendency to curl or tear after multiple uses. This can jam the mechanical movement of the drives and the Media Picker. Place labels only in the space provided on the cartridge.

Write-Protect Switch

Make sure that the write-protect switch (figure 4) is set appropriately on each cartridge. Use a ball-point pen or similar instrument to set the switch.

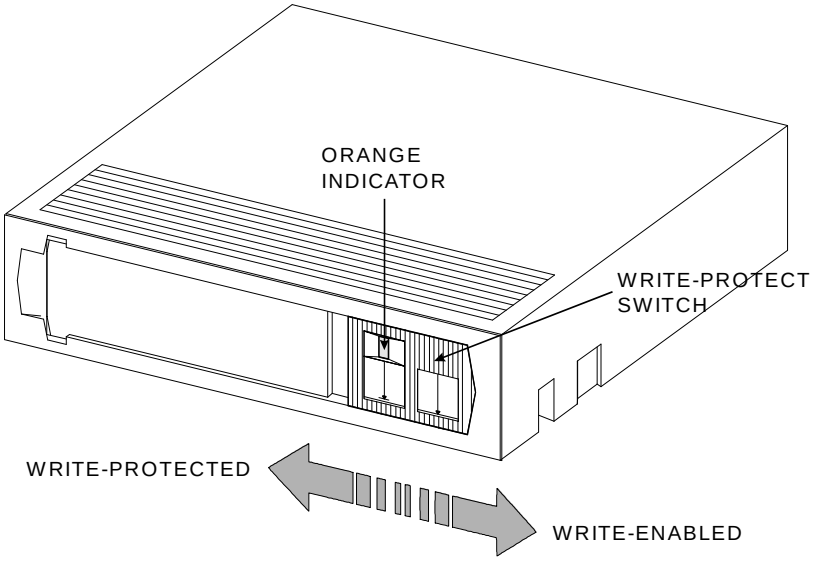


Figure 4. DLT Cartridge Write-Protect Switch

Install Data Cartridges

Install each of the cartridges into the library. The cartridge storage slots are designed so that you cannot incorrectly install the cartridges.

Install Cleaning Cartridge (Optional)

If your backup software is capable of scheduling and performing a drive cleaning cycle automatically, you may want to dedicate a cartridge storage slot to a cleaning cartridge. When all cleaning cycles on the cleaning cartridge are exhausted (see *Chapter 5: Operations and Maintenance*, section *Cleaning the Drive Head*, for explanation of how to determine if a new cleaning cartridge is needed), remove the cleaning cartridge and install a new one (if equipped, use the Mailbox to exchange the cleaning cartridge).

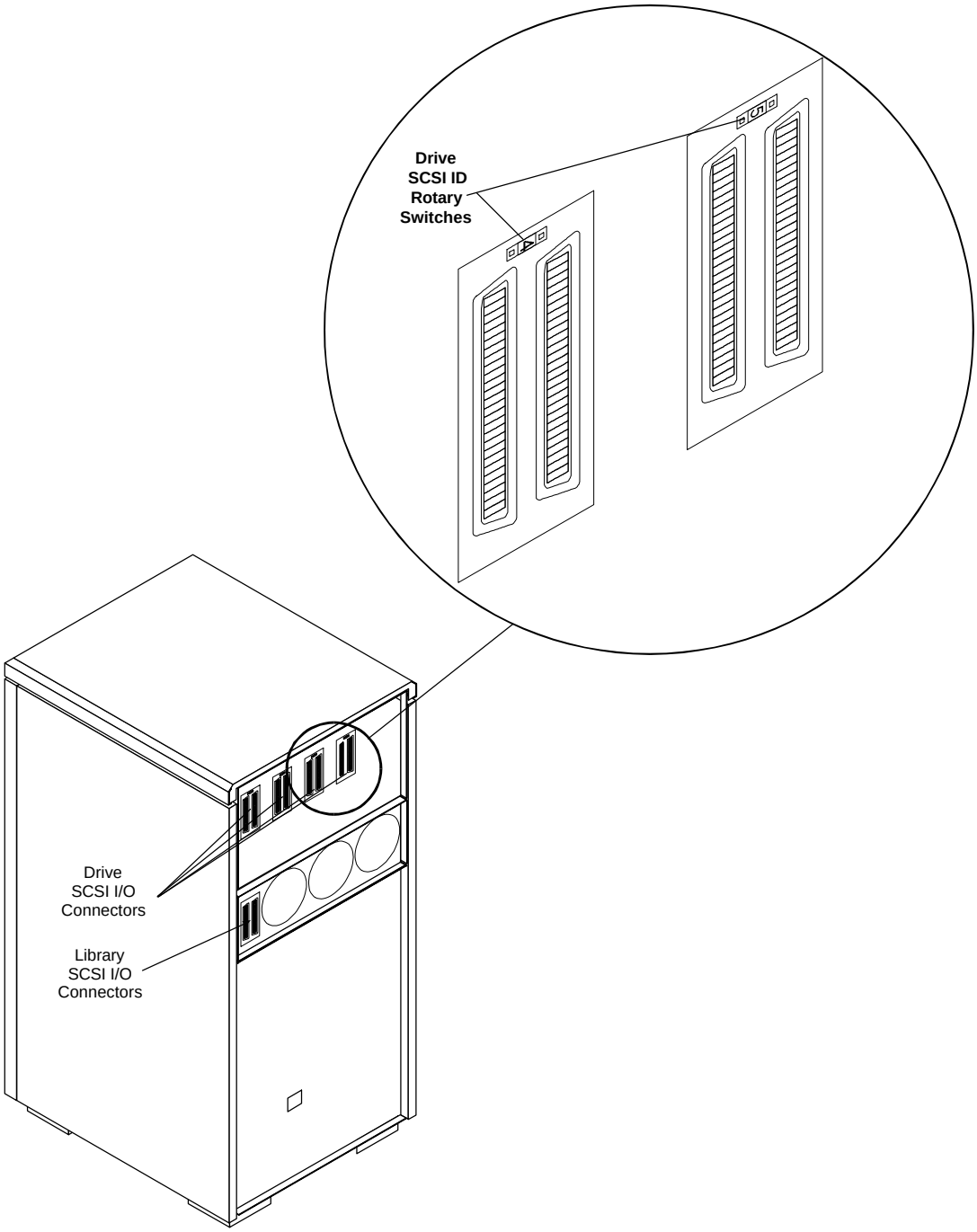
> ***Warning***
>
> Use only adic -approved DLT cleaning cartridges. Use of any other cleaning cartridge may damage the drive heads and void your warranty.

Close and Lock the Front Door

Close the library door, turn the key a quarter turn to the left and remove it from the lock.

Setting the SCSI IDs

Your Scalar Library consists of up to five SCSI devices; four drives and the library robotics. The library can be connected to from one to five separate SCSI buses. Each device in your library must be set to a unique ID for the SCSI bus it is connected to. The ID for the robotics is set by selecting it through the Operator Panel, Off-Line Mode, Configuration Menu, Set SCSI ID option (see sub-subsection *Set SCSI ID*, subsection *Configuration Menu*, section *Off-Line Mode Menus* in *Chapter 4: Equipment Description* of this manual). The IDs for the drives are set by selecting the appropriate ID on the rotary switch on the back of each drive assembly.



Drive SCSI ID Rotary Switches

Preparing the Host Computer System

Power Off the Computer

- ❒ Turn off the power switch.
- ❒ Unplug the cord from the AC outlet.

Confirm and/or Install the SCSI Host Interface

Your Scalar Library must be connected to either an integrated SCSI host or a SCSI interface (host adapter) card installed in the computer – either directly to the I/O connector on the card or as part of an existing SCSI chain. The SCSI interface must be installed before you connect the library . Refer to the instructions supplied with your selected SCSI interface.

Backup Software

A variety of backup and data storage software is available for use with your Scalar Library. Please check with adic Sales or Customer Assistance if you have a question on the compatibility of a particular software package.

Now you are ready to connect the library to your host computer. Follow the instructions provided in the next chapter.

Chapter 3

Connecting the Scalar Library

This Chapter …

- provides instructions for physically connecting your Scalar Library to your host system.
- steps you through the final phase of the installation process.

Installing SCSI Cables, Jumpers, and Terminators

Follow the steps on the following pages to connect your library to the SCSI bus. This involves installing SCSI cables, terminators (s) and jumpers (daisy chain cables) onto the SCSI connectors at the rear of the library.

> ***Note***
>
> - Make sure that the interface cable(s) you are planning on using have the appropriate connectors on each end. If the host computer's SCSI connector is different from that on the your library, you will need to obtain an adapter or a different cable. Consult your dealer or adic Customer Assistance if you need help.
>
> - The interface cable(s) must be shielded – adic can supply you with the correct type(s).

Determining Your SCSI Configuration

The Scalar Library can consist of up to five SCSI devices; four drives and the library. Listed below are the SCSI configurations supported by the library:

- Connection to up to five SCSI interface channels (buses) are allowed.
- The SCSI buses can be either single-ended or differential. They should each match the peripheral they are connected to.
- Each tape drive and the library robotics can be connected to separate SCSI buses, or up to four drives and the robotics can be connected to the same SCSI bus.
- A device (drive or robotics) can be connected to more than one SCSI bus when integrated into a multi-initiator environment.
- Termination can be active or passive. adic recommends using active termination on a single-ended bus.
- All termination must be external. Never use internal terminators to terminate the drives.

> ***Note***
>
> SCSI bus TERM POWER is supplied by the robotics interface, not by the drives. This can be modified. Please call adic Customer Assistance if you need to change this.

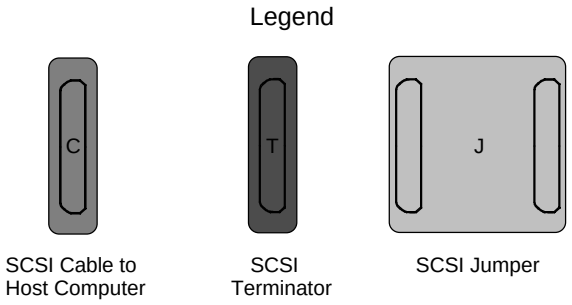
The following table provides several examples of SCSI configurations:

If you have this many SCSI buses...	Use this configuration...
1	1
2	2
3	3
4	4
5	5

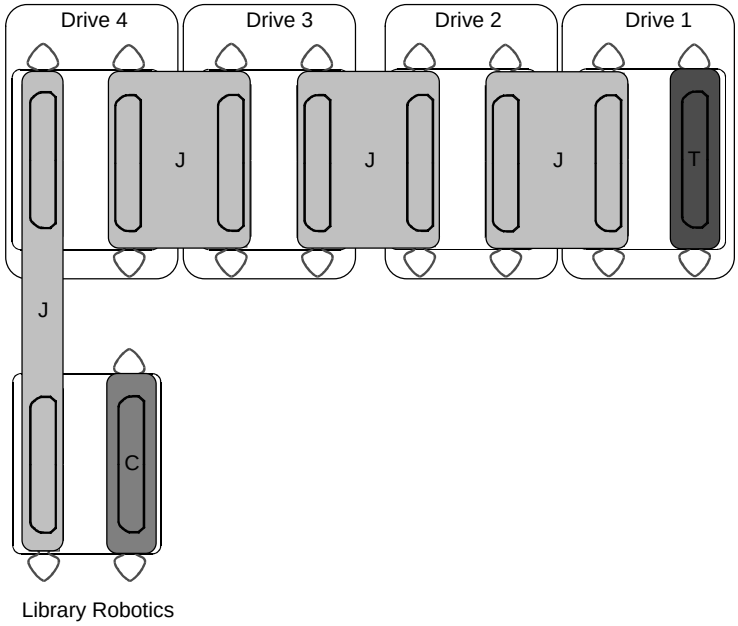
Install the SCSI cables, terminators, and jumpers as indicated by the configuration illustration.

❒ Check that the power switches on both your Scalar Library and your host computer are off.

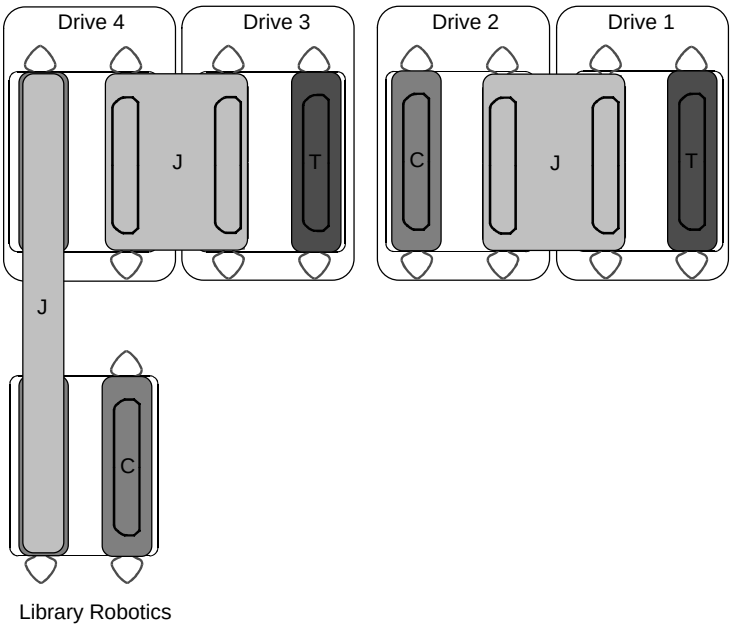
The following symbols are used in the SCSI configuration illustrations:



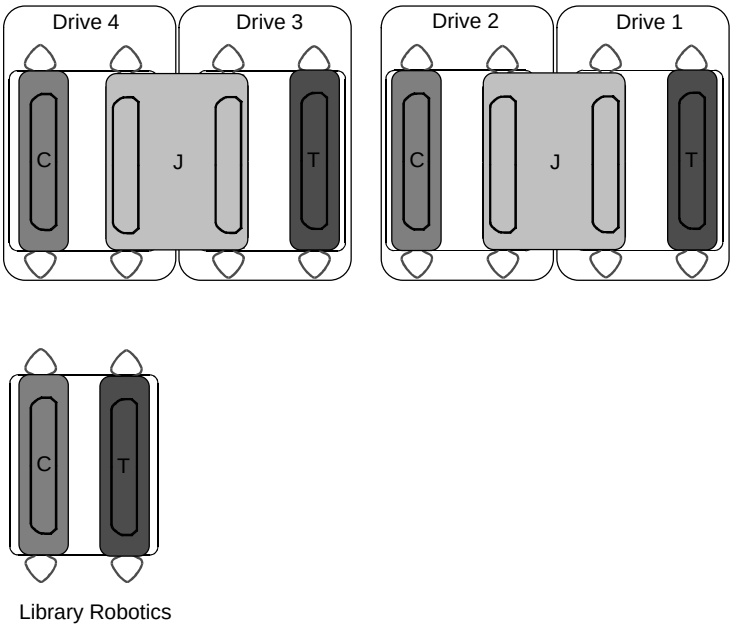
Configuration Legend



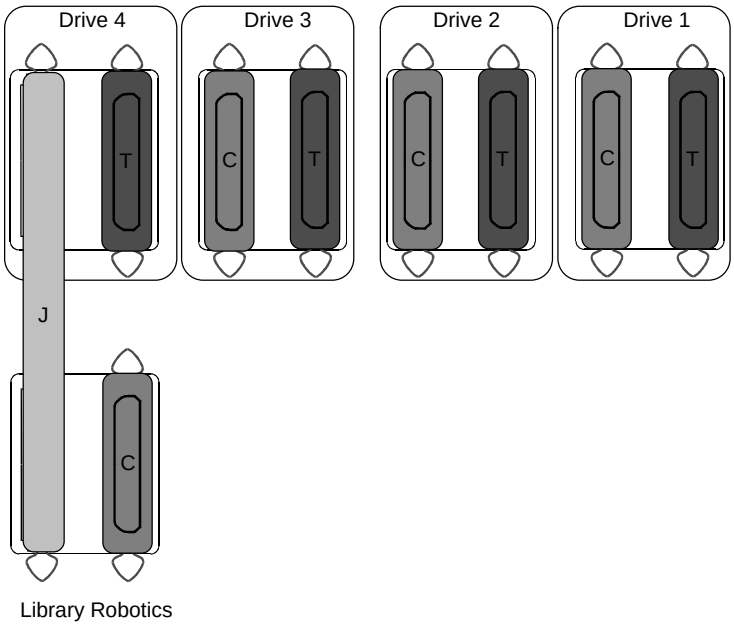
SCSI Configuration 1 — One SCSI Bus



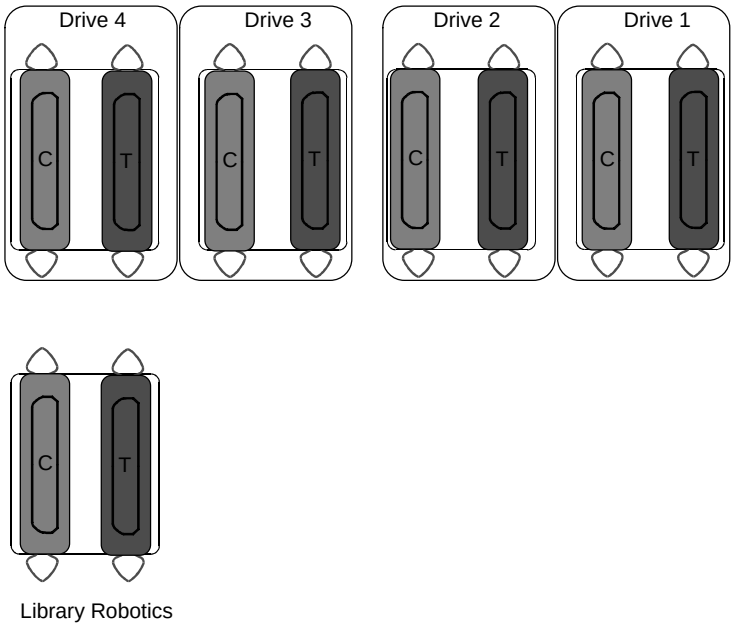
SCSI Configuration 2 — Two SCSI Buses



SCSI Configuration 3 — Three SCSI Buses



SCSI Configuration 4 — Four SCSI Buses



SCSI Configuration 5 — Five SCSI Buses

- ❒ Attach one end of the SCSI interface cable(s) to the connector(s) shown on the rear of your Scalar Library . Press firmly and secure the bail locks.

- ❒ Plug the other end of the SCSI interface cable(s) into the external connector(s) on the SCSI interface card(s). Secure the bail locks firmly.

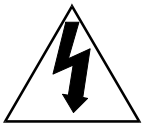
> ***Note***
>
> The bail locks at both ends of the SCSI cable must be securely fastened in order for your library to communicate properly with the computer.

❒ Install an external terminator(s) on the appropriate SCSI connector(s) on the rear of your Scalar Library .

Powering on the System

❒ Plug the power cord into the back of your Scalar Library .

❒ Plug the power cord from the Scalar Library into a grounded electrical outlet.



Use caution when plugging the power cord into an electrical outlet. Hazardous voltages are present in the sockets of the outlet.

❒ Plug the power cord from your host computer into a grounded electrical outlet.

Turn on power to the Scalar Library. Turn on the host computer power. When the library has completed it's boot and initialization process it will display a message on the Operator Panel similar to the one shown below:

You are now ready to install the backup software – if it has not already been installed.

Installing the Backup Software

At this point you need to refer to your software installation guide for instructions on installing the backup/controlling software for the Scalar Library onto the host computer.

Note

This is the software that runs your Scalar Library, not the data being transferred to the data cartridges. Two examples of backup software are Cheyenne's ARCserve and Legato's NetWorker.

After you have completed installation of the Scalar Library and of the software, to make sure that your unit is operating correctly, you should run any diagnostic test(s) supplied with the backup software.

Once your Scalar Library has been connected to your host computer system and the application software has been installed, the library is ready for use. Just turn on the power switch.

Chapter 4

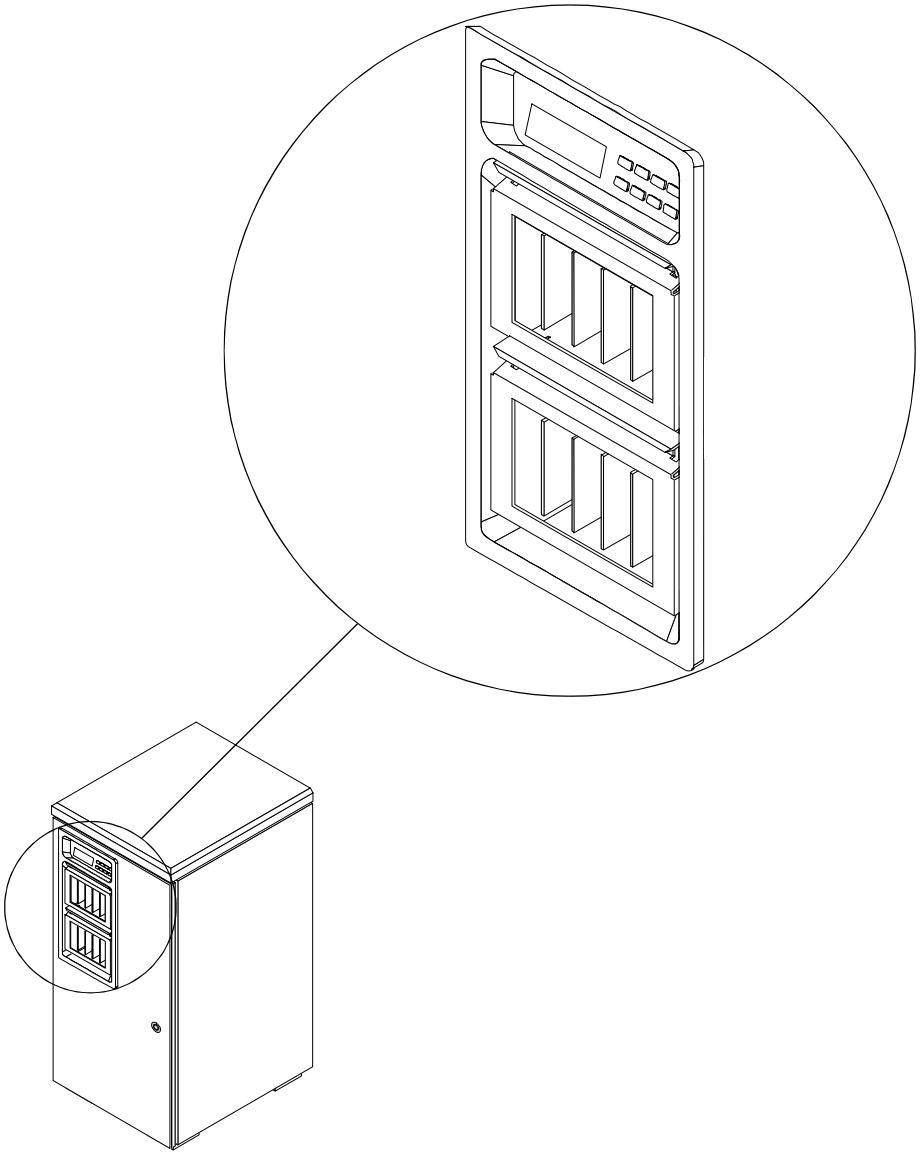
Equipment Description

This Chapter …

- describes the switches, indicators and connectors on the front and rear of your Scalar Library.
- describes the various functions available via the front panel buttons.
- describes the power-up procedure and messages on the front panel LED display.

Front Panel Switches and Indicators

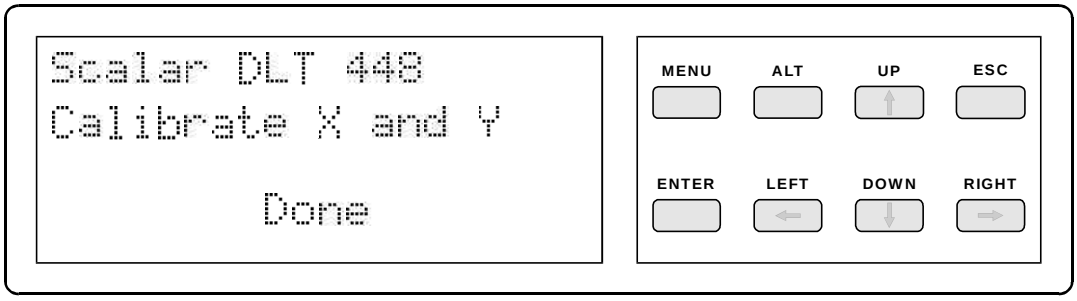
Switches and indicators on the front panel of the Scalar Library are shown below.



Front of adic Scalar Library (when equipped with Mailbox)

Displays and Indicators	
Display	The four-line 20-character LCD shows current drive status of the Scalar Library , allows access to change features or displays error messages.
Power LED (green)	Lights when the power is on.
LOCKED LED (upper - green)	Lights when upper row door of Media Interchange Shelf (Mailbox) is locked.
LOCKED LED (lower - green)	Lights when lower row door of Media Interchange Shelf (Mailbox) is locked.

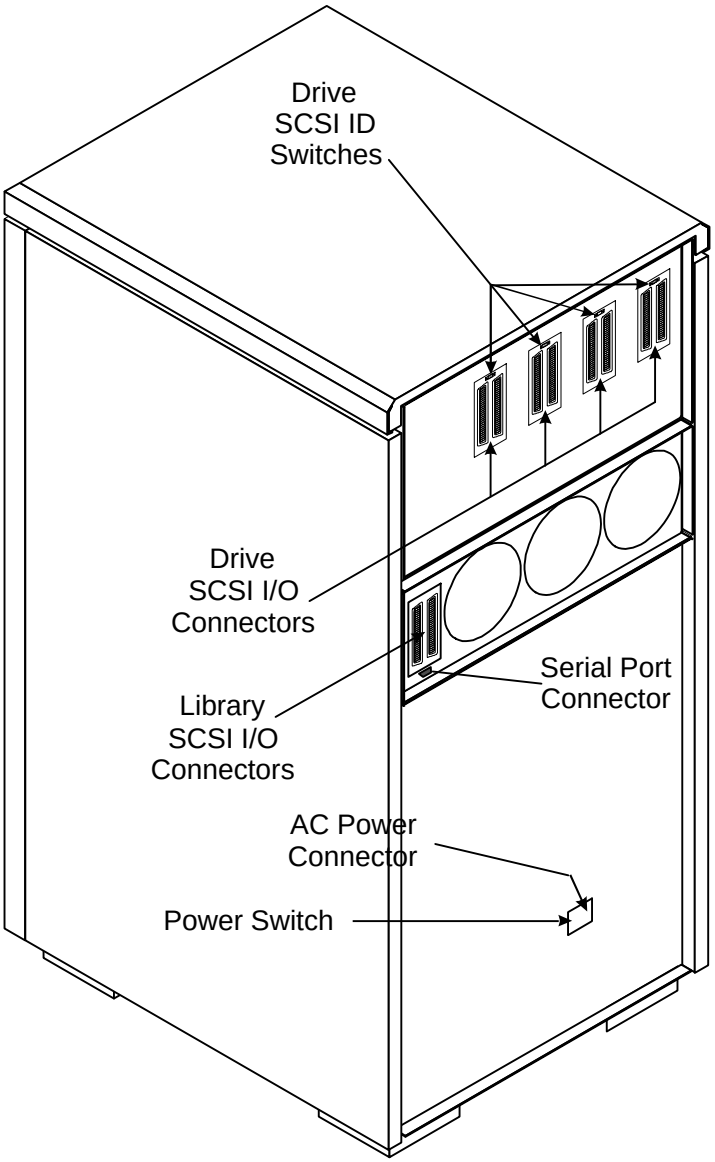
Keypad Description:	
MENU	Press this button to enter or exit Off-Line mode menus.
ALT	Selects alternate function for another button.
UP	Selects previous item or value in the menu.
DOWN	Selects next item or value in the menu.
ENTER	Selects currently displayed item.
ESC	Exits current menu and returns to previous menu.
LEFT	Selects previous field on same line.
RIGHT	Selects next field on same line.



Display and Keypad

Rear Panel Switches and Connectors

Switches and connectors on the rear of the Scalar Library are shown below.



Rear of adic Scalar 448

Rear Panel Switches and Connectors	
Power Switch	Turns on AC power to the Scalar Library.
AC Power Connector	Plug the Scalar Library AC power cord into this connector.
SCSI I/O Connectors	Connections for the interface cable (s), SCSI jumpers, and/or SCSI terminators, which are used to connect the Scalar Library to the host computer SCSI bus(es) or to other devices on the SCSI channel.
Drive SCSI ID Rotary Switches	Sets the SCSI ID for each drive.

Media Interchange Shelf (Mailbox)

During normal operation of your Mailbox-equipped Scalar Series Library it is usually not desirable to have to suspend the activities of your library to insert or remove media cartridges. Both manual and automatic insertion and removal of media cartridges from your library, without having to open the door, is made possible by the Mailbox.

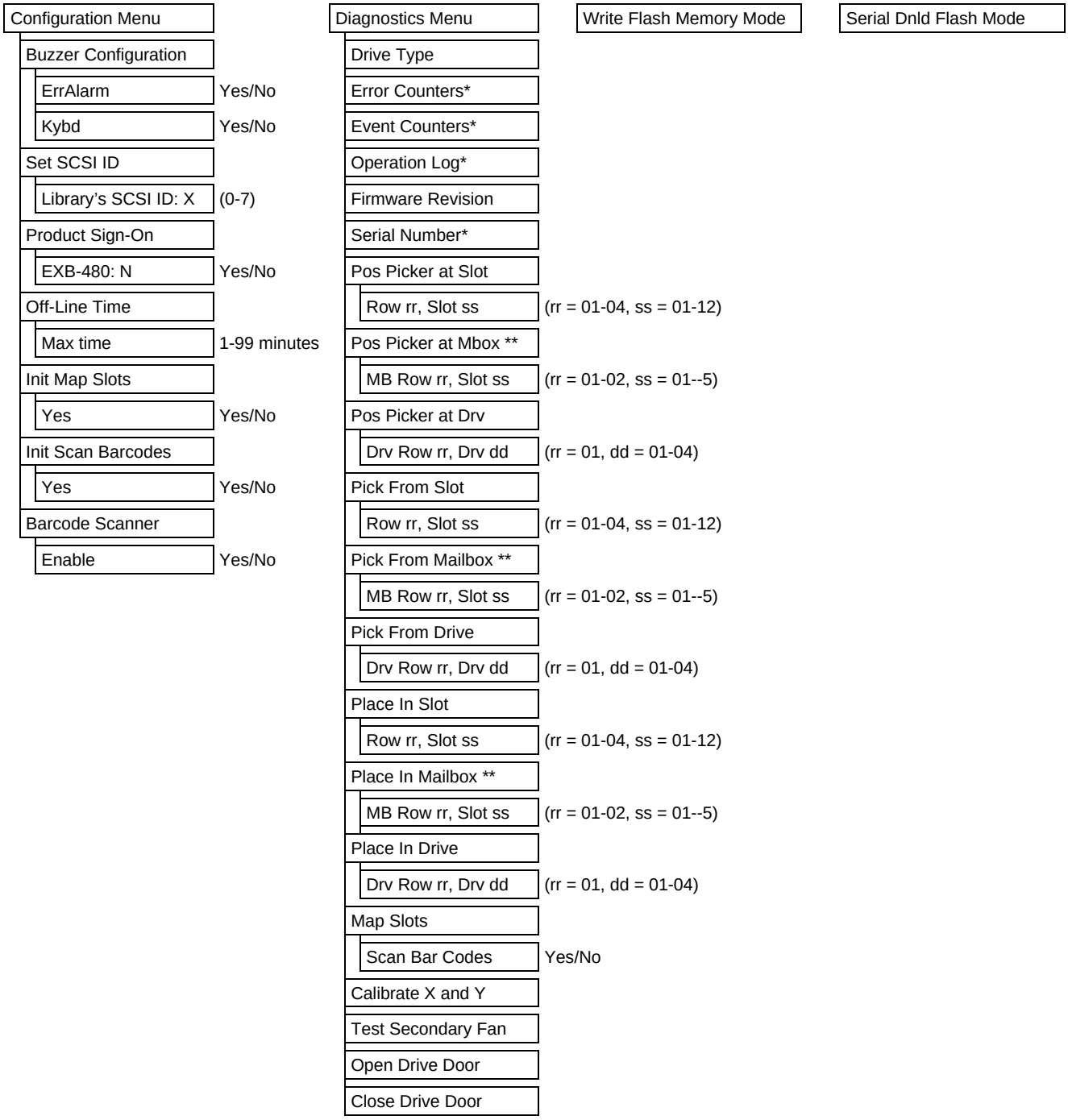
The Mailbox consists of a pair of 5-slot cartridge shelves that feature lockable front doors. The library automatically locks the doors to prevent insertion or removal of cartridges while the robotics is performing pick or place operations. In the On-Line Mode, access to the Mailbox slots is controllable by your application software.

Use the Mailbox whenever you need to insert, or remove media cartridges from your library. One example would be to load and unload a cleaning cartridge when cleaning a drive head. Another example would be when it's time to migrate your periodic backup to an off-site location. In this example, use the Mailbox to remove the backup cartridges, and to insert the replacement cartridges.

> ***Note***
>
> During the short time it takes you to manually access the media, the Scalar is off-line to your backup application software.

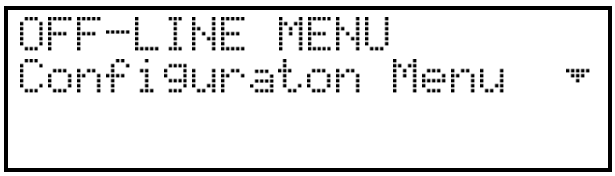
Off-Line Mode Menus

The following diagram is a quick reference to the LCD menus described on the next few pages.



* not implemented at this time
** If equipped with Mailbox

❒ To access the Off-Line Mode menu, press the **MENU** key. The display will appear as follows:



❒ Use the **UP** or **DOWN** keys to scroll through the menu choices. Press **ENTER** to select the item displayed on the top line. Use the **RIGHT** or **LEFT** keys to scroll through fields on the same line.

❒ To exit the Off-Line Mode menu and return to the On-Line Mode from anywhere in the menu, press the **MENU** key.

❒ Press **ENTER** to select the Configuration Menu.

Configuration Menu

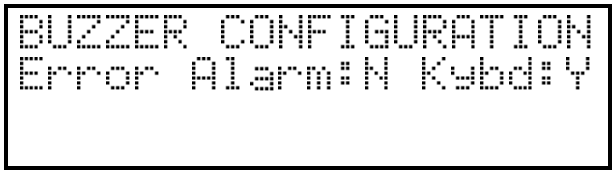
The Configuration Menu allows you to select the following operating parameters:

- Buzzer Configuration
- Product Sign-On
- Initialize Map Slots
- Barcode Scanner
- Set SCSI ID of the Library Robotics
- Off-Line Time
- Initialize Scan Barcodes

Buzzer Configuration

Enables/disables the sounding of an alarm when an error message or warning alarm is displayed. Enables/disables the beep sound when you press a keypad key.

When you select the Buzzer Configuration option a display similar to the following appears.



❒ To enable the error alarm use the **LEFT** key to select the ErrAlarm field. Use **UP** or **DOWN** to select "Y" to enable alarm or "N" to disable alarm. When the error alarm is enabled, a continuous alarm tone will sound in the event of an error message. The alarm will sound until the condition that caused the error has been removed or any key is pressed. To clear an error message from the display, press **ALT** and **ENTER.**

❒ If you wish to change the status of the keyboard beep, use the **RIGHT** key to select the Kybd field. Use **UP** or **DOWN** to select "Y" to enable a beep when you press a key or "N" to disable the beep.

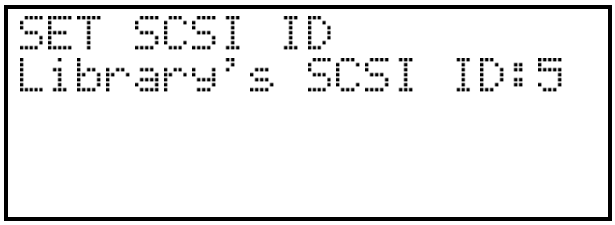
Note

Buzzer Configuration default: Err Alarm: N, Kybd: Y

❒ Press **ENTER** to make the changes effective or press **ESC** to return to previous menu item.

Set SCSI ID

Lets you select the SCSI ID for the robotics on the library.



❒ Use **UP** and **DOWN** to select the desired ID. Press **ENTER** to execute the change. Confirm the change by pressing **ENTER** again.

Product Sign-On

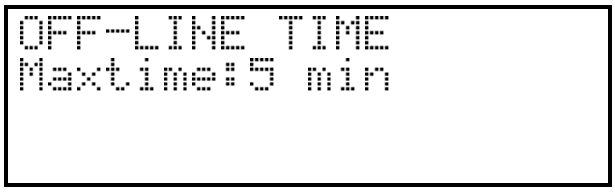
Lets you select how the Scalar Library appears to application software. The library can be set to sign-on as an Exabyte® EXB-480™ library. This permits maximum application software compatibility.

❒ Use **UP** or **DOWN** to select "Y" or "N". Press **ENTER** to execute the change.

> ***Note***
>
> Product Sign-On default is EXB-480: N.

Off-Line Time

Lets you set the number of minutes the Scalar Library will remain in the Off-Line Mode. If someone leaves the library in the Off-Line mode, after the pre-set number of minutes the library will automatically return to the On-Line Mode. This assures that your automatic backup will be done even if the library has accidentally been left off-line.

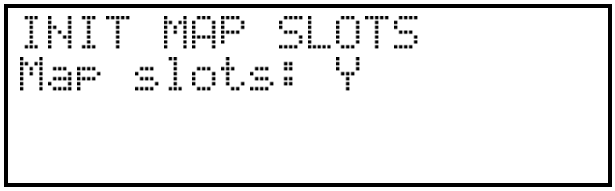


> ***Note***
>
> Off-Line Time default setting is "5" minutes.

❒ Use **UP** or **DOWN** to select the number of minutes you wish the Scalar Library to remain in Off-Line Mode. Press **ENTER** to execute the change.

Initialize Map Slots

Enables/disables the mapping of the storage slots whenever the Scalar Library is powered-up, after the front door has been opened and then closed, or if a SCSI bus Reset occurs



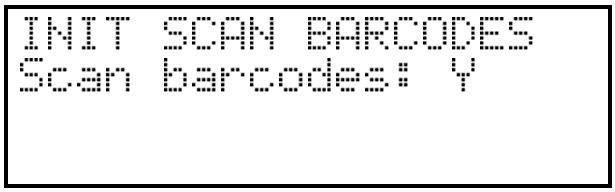
❒ To disable the mapping of slots use the **UP** or **DOWN** keys to select "N". Press **ENTER** to execute the change.

> ***Note***
>
> Init Map Slots default setting is Y.

> ***Note***
>
> Disabling Init Map Slots by selecting “N” will force Init Scan Barcodes to “N” (see below).

Initialize Scan Barcodes

Enables/disables the scanning of the cartridge barcodes whenever the Scalar Library is powered-up, or after the front door has been opened and then closed. The application software overrides the setting of this parameter. If Barcode Scanner configuration is set to No, Initialize Scan Barcodes is ignored, and the barcode reader is not available to the application software.



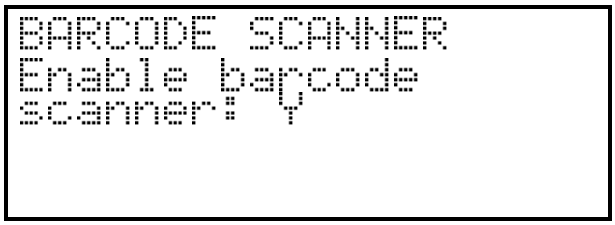
❒ To disable the scanning of barcodes use the **UP** or **DOWN** keys to select "N". Press **ENTER** to execute the change.

> ***Note***
>
> Init Scan Barcodes default setting is Y.

> ***Note***
>
> Enabling Init Scan Barcodes by selecting “Y” will force Init Map Slots to “Y” (see above).

Barcode Scanner

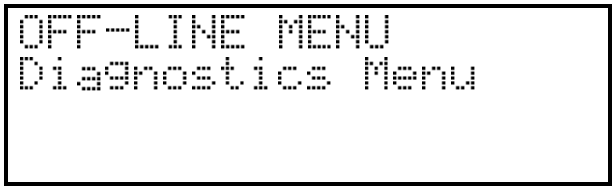
Enables/disables the barcode scanner. If disabled, the Initialize Scan Barcodes, Configuration Menu parameter (see above), and the Scan Barcodes sub-function of the Map Slots Diagnostics Menu function (see Appendix A), is ignored. If disabled, the barcode scanner ***is not*** available to the application software.



❒ To disable the barcode scanner use the **UP** or **DOWN** keys to select "N". Press **ENTER** to execute the change.

> ***Note***
>
> Enable Barcode Scanner default setting is Y.

Diagnostics Menu



The following functions are available under the Diagnostics Menu:

- Drive Type
- Event Counters
- F/W Revision
- Position Picker at Mailbox (When Mailbox-equipped)
- Pick From Slot
- Pick From Drv
- Place In Mailbox (Scalar 458 only)
- Map Slots
- Test Secondary Fan
- Close Drive Door
- Error Counters
- Operation Log
- Position Picker at Slot
- Position Picker at Drv
- Pick From Mailbox (When Mailbox-equipped)
- Place In Slot
- Place In Drv
- Calibrate X and Y
- Open Drive Door

For detailed descriptions of these functions, refer to Appendix A.

> ***Note***
>
> We strongly recommend that these diagnostic functions be used only by a qualified service technician. Some diagnostic functions assume the Scalar Library has been configured correctly and many of the normal built-in safety checks are turned off. Misusing these diagnostic functions without the normal safety checks could result in improper operation (or damage to media and/or the Scalar Library).

Write Flash Memory Mode

The Write Flash Memory Mode is used whenever you upgrade the Scalar Library firmware using the SCSI bus. When adic releases new firmware for the Scalar Library complete instructions on using Write Flash Memory Mode and performing the upgrade will be included with the firmware.

Serial Dnld Flash Mode

The Serial Dnld Flash Mode is used whenever you upgrade the Scalar Library firmware using the serial port on the rear panel. When adic releases new firmware for the Scalar Library complete instructions on using Serial Dnld Flash Mode and performing the upgrade will be included with the firmware.

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Chapter 5

Operation and Maintenance

This Chapter …

- describes normal operation features of the Scalar Library
- provides details on the media and drive head cleaning cartridge
- explains normal maintenance procedures

Normal Operations

General Guidelines

Once your Scalar Library and your choice of application software are installed and configured, you can automatically perform backup and restore operations through the application software. You do not need to intervene unless you need to replace cartridges through the Mailbox (Scalar 458 only) or by opening the front door (Scalar 224/448).

Always follow these general operating guidelines:

- ❒ Do not open the front door of the Scalar Library unless you absolutely must. Your library cannot operate when the door is open and always updates the valid cartridge inventory log when the door has been closed again. Even if you power down your library, you should keep the door closed to protect the internal components from dust.
- ❒ Use only the recommended types of media cartridges, described earlier in this manual.
- ❒ Clean each of the DLT drives once a month, or whenever the **Use Cleaning Tape** LED is illuminated on a drive front panel (see the subsection titled *Cleaning the Drive Head* in the *Maintenance* section later in this chapter).

Power Up Checks

When you apply power to your library it will perform the following actions:

- Verifies drive configuration and status.
- Builds a valid cartridge inventory log.
- Calibrates the Media Picker and X -Y position of the robotics.

When the library has completed the Power Up Checks it will automatically place itself in On-Line Mode.

Opening the Front Door

Caution

Do not open the front door unless you need to replace data cartridges (Scalar 224/448), or perform a maintenance operation.

- ❒ Insert the key into the lock and turn it to the left.

Warning

Wait until any current application operations are completed. If the door is opened during a motion, all motion will stop and an error will be sent to the application.

- ❒ Open the front door.

What Happens When Door is Opened

Whenever you open the front door of the Scalar Library , the following actions occur:

- The library will return Unit Attention and Not Ready status to the host computer.
- Any function, if executed, that would change the state of the robotics machine is disabled.

Resuming Operation

To resume normal operation, close the door and lock it.

After the door is closed:

- The library will perform its power up checks.
- The application software may update its own cartridge inventory.

Drive Power-on Self-Test

When you power up your Scalar Library , the DLT drives each perform a Power-on Self-Test (POST) while the library is performing the Power Up Checks. The sequence of events for each drive is:

1. The LEDs on the right front panel of the drive will turn on sequentially from top to bottom. All LEDs will remain ON for a few seconds.

2. The LEDs on the left front panel of the drive will turn ON at the same time for about three seconds and then turn OFF.

3. The **Operate Handle**, **Write Protected**, and **Use Cleaning Tape** LEDs will turn OFF. The **Tape in Use** LED will blink while the tape drive initializes.

✓ If your external SCSI bus terminator has a Term Power LED it should also be illuminated.

Drive Status

After completion of the drive POST and initialization, each drive will be in one of the four states listed in the following table:

Drive State	Indicator Displays and Actions
1. No cartridge is present	A. The **Tape in Use** LED turns OFF. B. The **Operate Handle** LED turns ON. C. The handle is unlatched. D. The drive beeps momentarily.
2. A cartridge is present and the handle is closed.	The drive loads the cartridge. When the **Tape in Use** LED stops blinking and stays ON, the tape's actual density lights. For example, if the actual tape density is 2.6, then the LED turns ON next to the 2.6 label. When the **Density Override** LED blinks, you can select a density. The drive is ready for use.
3. A cartridge is present, but the handle is open.	The **Tape in Use** LED turns OFF. The **Operate Handle** LED flashes. The Scalar Library will close the handle and the drive will load the cartridge. When the **Tape in Use** LED stops blinking and stays ON, the tape's actual density lights. For example, if the actual tape density is 2.6, then the LED turns ON next to the 2.6 label. When the **Density Override** LED blinks, you can select a density. The drive is ready for use.
4. The drive detects an error condition.	Then all right or left side LEDs blink repeatedly. You may try to unload the tape and reinitialize the drive by pressing the **Unload** key or turn power OFF and then ON again. The right or left side LEDs stop blinking and the drive tries to reinitialize. The LEDs turn ON steadily again and then turn OFF if the test succeeds.

The drive POST completes in about 13 seconds on each drive, and the drives will respond normally to all commands. However, it may take longer for the media to become ready.

Drive Operating Conditions

Use the following table to determine each drive's operating condition:

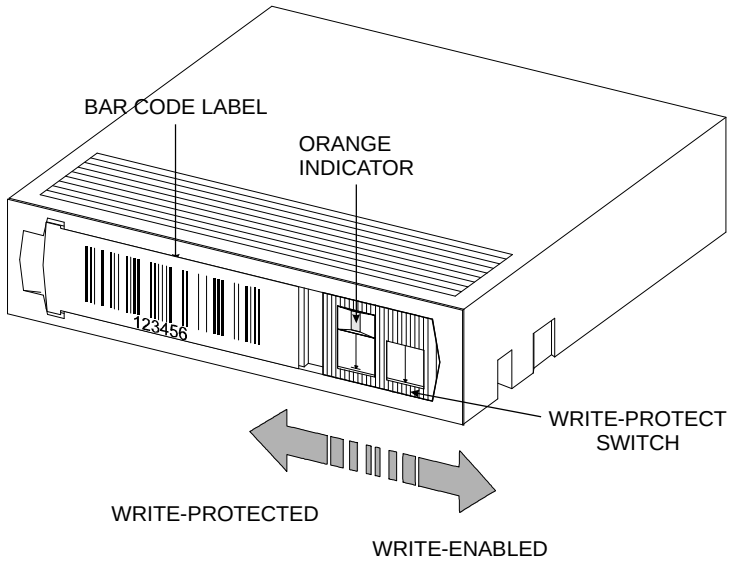
Label	Color	State	Operating Condition
LED (Right Indicator Panel)			
Write Protected	Orange	ON OFF	Tape is write-protected. Tape is write-enabled.
Tape in Use	Yellow	Blinking ON	Tape is moving. Tape is loaded; ready for use.
Use Cleaning Tape	Yellow	ON Remains on after unloading cleaning tape After cleaning, turns on again when reloading data cartridge	Drive head needs cleaning, or the tape is bad. Cleaning attempted, but tape expired, so cleaning not performed. Problem data cartridge. Try another cartridge.
Operate Handle	Green	ON OFF	OK to operate the Cartridge Insert/Release Handle. Do not operate the Cartridge Insert/Release Handle.
All Right Indicator Panel LEDs or, **All Left Indicator Panel LEDs**	–	ON Blinking	POST is starting. An error has occurred.

(continued on next page)

Label	Color	State	Operating Condition
LED (Left Indicator Panel)			
2.6	Yellow	ON Blinking	Tape is recorded in 2.6 format. Tape is recorded in another density. You selected this density for a write from BOT.
6.0	Yellow	ON Blinking	Tape is recorded in 6.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
10.0	Yellow	ON (default) Blinking	Tape is recorded in 10.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
15.0 (DLT2000XT)	Yellow	ON (default) Blinking	Tape is recorded in 15.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
20.0 (DLT4000)	Yellow	ON (default) Blinking	Tape is recorded in 20.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
35.0 (DLT7000)	Yellow	ON (default) Blinking	Tape is recorded in 35.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
Compress	Yellow	ON OFF	Compression mode enabled. (Compression available only in 10.0, 15.0, 20.0, and 35.0 density.) Compression mode disabled.
Density Override	Yellow	ON OFF (default) Blinking	You selected a density from the front panel. Density will be selected by the host (automatic). You are in density selection mode.
All Right Indicator Panel LEDs, or, **all Left Indicator Panel LEDs**	–	Blinking	A POST error has occurred.

DLT Media

The data cartridges used in the DLT drives are housed in 4-inch plastic cases and employ ½-inch metal particle tape.



DLT Data Cartridge

The write-protect switch is used to prevent recording over existing data. To prevent recording or deleting, place the write-protect switch to the open position. The drive senses the position of the switch and will not allow writing in this position. When installing cartridges in the library or Mailbox, place the switch in the closed position (unless you do not wish to record on a specific cartridge).

If the switch is moved all the way to the left, the cartridge is write-protected and the drive cannot write to, or erase data from, the cartridge. The small orange rectangle will be visible whenever the cartridge is write-protected. Additionally, an arrow (beneath the orange rectangle and above the two lines on the switch), lets you know that data cannot be written to the cartridge. If the switch is moved all the way to the right, the cartridge is write-enabled and the drive can write data to, or erase data from, the cartridge. The orange rectangle will not be visible whenever the cartridge is write-enabled. On the right side of the write-protect switch an arrow over one line indicates that if you slide the switch to the right, data can be written to the cartridge.

Note

- Store data cartridges in a dry, cool environment.
- Never reset or power down your computer or Scalar Library while a function is in process or a tape is moving.

Using the Mailbox (Scalar 458 only)

On-Line Mode

When the Scalar Library is in On-Line Mode the application software is in control and directs all library operations. The application software can use the Mailbox to insert or remove individual cartridges to/from the drives, or to/from the cartridge storage shelves. Follow closely the instructions the application software provides on your host computer system monitor.

The design of the Mailbox includes access control doors and cartridge stops in each of the media slots. The doors are ***unlocked,*** except when the library is performing a media transport operation (pick and place). The cartridge stops are solenoid controlled and prevent incorrect insertion of the media. The stops are held in the ***raised*** position whenever the Mailbox access doors are ***unlocked***. During library pick and place operations the stops are ***lowered,*** allowing the library to insert or remove cartridges from the slots using the Media Picker.

> ***Warning***
>
> The Mailbox access control doors are ***locked*** when the application software performs a media transport operation (pick and place), or, the application can lock the access control doors at any time. You cannot open either door during this operation without severely damaging the Scalar 458. Wait until your application software instructs you to open either of these doors.

Loading a Cartridge into Scalar 458 Library

- ❒ Open the appropriate Mailbox access control door as instructed.
- ❒ Place the cartridge into the appropriate slot of the Mailbox with the write-protect switch at the top and the barcode label facing you. Slide the cartridge in until the stop will not allow it to go any farther.

> ***Note***
>
> The cartridge is inserted with the write-protect switch at the top and the barcode label facing you. However, the cartridge stops will prevent you from installing the media incorrectly.

- ❒ Close the Mailbox access control door.
- ❒ Follow any additional instructions provided by the application software.

The application software will now perform the intended operation with the cartridge.

Unloading a Cartridge from Scalar 458 Library

The application software will cause the cartridge to be ejected from the drive and will issue the pick and place commands to have the library move the cartridge to a Mailbox slot.

- ❒ Open the appropriate access control door and remove the cartridge from the Mailbox.
- ❒ Close the access control door.

Off-Line Mode

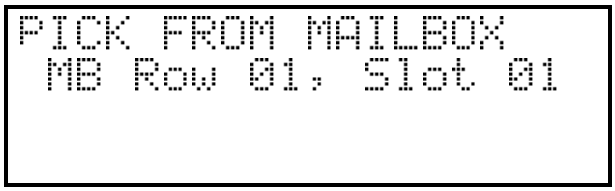
When the Scalar 458 Library is in Off-Line Mode you can use the Mailbox to insert or remove individual cartridges to/from the drives, or to/from the cartridge storage shelves. If your application software does not automate the drive head cleaning, use this procedure to manually perform the head cleaning

As in On-Line Mode the access control doors are ***unlocked,*** except when the library is picking or placing a cartridge. The cartridge stops are held in the ***raised*** position whenever the Mailbox access doors are ***unlocked***. During library pick and place operations the stops are ***lowered,*** allowing the library to insert or remove cartridges from the slots using the Media Picker.

Loading a Cartridge into Drive

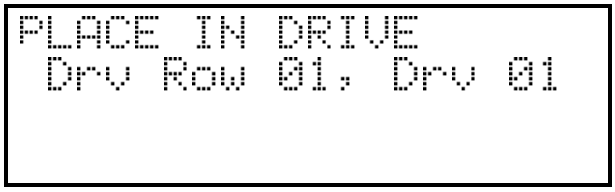
- ❒ Place the Scalar Library in the Off-Line Mode by pressing the **MENU** key on the Operator Panel.
- ❒ Open the Mailbox access control door as instructed.
- ❒ Place the cartridge into the appropriate slot of the Mailbox with the write-protect switch at the top and the barcode label facing you. Slide the cartridge in until the stop will not allow it to go any farther.
- ❒ Close the access control door.
- ❒ Use the **DOWN** key to move to the **Diagnostic Menu** option. Press the **ENTER** key to select the **Diagnostic Menu**.
- ❒ Use the **DOWN** key to move to the **Pick From Mailbox** function. Press the **ENTER** key.

The display will now show:



- ❒ Use the **DOWN** key to move to the **MB Row** field. Use the **UP** or **DOWN** key to select the Mailbox row that you placed the cartridge in. Use the **RIGHT** key to move to the **Slot** field. Use the **UP** or **DOWN** keys to select the Mailbox slot that you placed the cartridge in. Press **ENTER** to have the Media Picker pick the cartridge from the appropriate Mailbox slot.
- ❒ Use the **DOWN** key to move to the **Place In Drive** function. Press the **ENTER** key.

The display will now show:



- ❒ Use the **DOWN** key to move to the **Drv Row** field. Use the **UP** or **DOWN** key to select the row the drive is in. Use the **RIGHT** key to move to the **Drv** field. Use the **UP** or **DOWN** keys to select the drive you wish to place the cartridge in. Press **ENTER** to have the Media Picker place the cartridge into the drive.

After you have completed the intended manual operation with this cartridge, follow the procedure outlined in the next subsection, *Unloading a Cartridge from Drive*, if you are going to unload the cartridge from the drive and remove it from the library.

❒ Return the Scalar 458 Library to the On-Line Mode by pressing the **MENU** key on the Operator Panel.

Your Scalar 458 Library is once again ready for use.

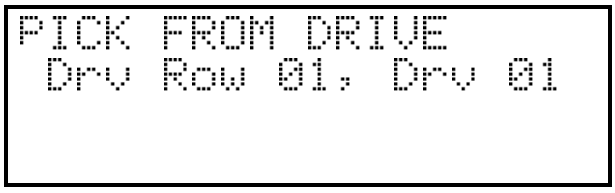
Unloading a Cartridge from Drive

This description of this procedure assumes that the cartridge you wish to unload from a drive has been loaded into the drive, since you should not normally have to ***manually*** unload a cartridge that has been loaded by application software. It is further assumed that the cartridge is in the drive, has been logically unloaded by the application software*, the library is in Off-Line Mode, and you are accessing the Diagnostics Menu.

* If the application software has not logically unloaded the tape, you will need to open the door, reach-in and press the unload button.

❒ Use the **DOWN** key to move to the **Pick From Drive** function. Press the **ENTER** key.

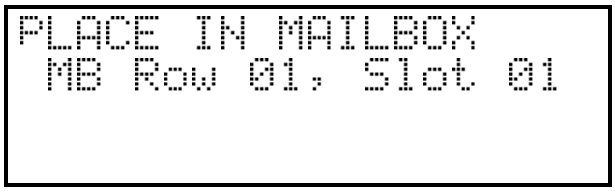
The display will now show:



❒ Use the **DOWN** key to move to the **Drive Row** field. Use the **UP** or **DOWN** key to select the row the drive is in. Use the **RIGHT** key to move to the **Drv** field. Use the **UP** or **DOWN** keys to select the drive. Press **ENTER**. The drive will automatically unload the tape and then eject it. When the drive has ejected the cartridge completely, the Media Picker will pick the cartridge from the drive.

❒ Use the **DOWN** key to move to the **Place In Mailbox** function. Press the **ENTER** key.

The display will now show:



❒ Use the **DOWN** key to move to the **MB Row** field. Use the **UP** or **DOWN** key to select the Mailbox row that you want to use. Use the **RIGHT** key to move to the **Slot** field. Use the **UP** or **DOWN** keys to select the slot you wish to place the cartridge in. Press **ENTER** to have the Media Picker place the cartridge into the Mailbox slot.

❒ After the Media Picker has completed placing the cartridge in the slot, open the appropriate access control door and remove the cartridge from the Mailbox. Close the access control door.

> ***Note***
>
> Remember, the access control doors are ***locked*** whenever the library is performing a pick or place operation.

❒ Return the Scalar 458 Library to On-Line Mode by pressing the **MENU** key on the Operator Panel.

Your Scalar 458 Library is once again ready for use.

Moving a Cartridge to/from the Storage Shelves

The same functions are performed as loading or unloading a cartridge from a drive to move a cartridge between the library storage shelves and the Mailbox. The difference is that you use the **Pick From Slot**, and **Place In Slot** functions in addition to the **Pick From Mailbox** and **Place In Mailbox** functions in the **Diagnostics Menu**.

Manually Loading/Unloading Cartridges to/from the Storage Shelves (Bulk Loading)

Media can be exchanged on a "bulk" basis by opening the front door and exchanging any or all cartridges in the shelves (Scalar 458 optional method, see previous section for information on using the Mailbox to exchange cartridges). The application software will have to re-map the shelves to update it's cartridge inventory log.

> ***Note***
>
> You can manually move the Media Picker assembly right or left to provide access to the storage shelves. Avoid manually moving the Media Picker assembly up or down.

Normal Maintenance

Cleaning the Drive Head

Cleaning Tape

The tape heads should be cleaned once a month, or when the **Use Cleaning Tape** LED is illuminated on the drive front panel. Use a DLT cleaning tape to clean the drive heads. A cleaning tape is shipped with your adic Scalar Library.

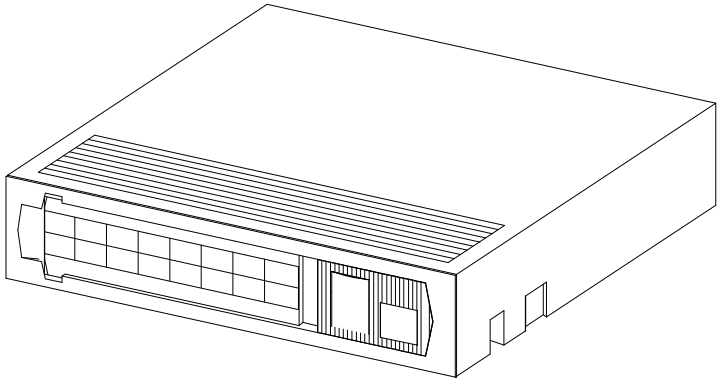


Figure 16:. DLT Cleaning Tape

Cleaning the head should always be performed as the first step if the **Use Cleaning Tape** LED is illuminated on the drive.

> ***Note***
>
> The cleaning cartridge is exhausted after it has performed 20 cleanings. The cleaning tape includes a label with 20 small boxes printed on it. Always place a check mark in a box each time the tape performs a cleaning. Replace the cleaning cartridge when it has performed 20 cleanings (all boxes will be checked).

The following table tells you when to use the cleaning tape:

If . . .	It means . . .	You should . . .
1. The **Use Cleaning Tape** LED is illuminated on the drive front panel	The drive head needs cleaning or the tape is bad	Use the cleaning tape. Load the cleaning tape using the procedure in section *Using the Mailbox*, subsection *Loading a Cartridge into Drive*. When cleaning is complete, the beeper will sound alerting you to remove the cleaning tape. Use the procedure in section *Using the Mailbox*, subsection *Unloading a Cartridge from Drive* to remove the cleaning tape from the drive. Log the cleaning onto the label.
2. A data cartridge causes the **Use Cleaning Tape** LED on the drive front panel to blink	The data cartridge may be damaged	Back up the data from this cartridge onto another cartridge, it may be damaged. A damaged cartridge may cause unnecessary use of the cleaning cartridge.
3. The **Use Cleaning Tape** LED re-illuminates after performing a cleaning and reloading the data cartridge.	Cleaning was not accomplished because the cleaning tape has exhausted all cleaning cycles. **OR** The data cartridge may be damaged	Replace the cleaning cartridge. Back up the data from this cartridge onto another cartridge, it may be damaged. A damaged cartridge may cause unnecessary use of the cleaning cartridge.

Note

Keeping a drive clean is the single most important requirement for achieving and maintaining superior performance.

Head Cleaning Procedure

Cleaning Tape in Mailbox (Scalar 458 only) or Storage Slot

If your application software cannot, or is not configured to automate the cleaning cycle, use the Off-Line Mode, Diagnostics Menu pick and place functions to move the cleaning cartridge into and out of the appropriate drive.

Caution

Cleaning cartridges are considerably more abrasive to the drive's recording head than standard data cartridges. Usage should be kept within the recommended limits.

When you have completed the cleaning procedure be sure to return the Scalar Library to the On-Line Mode by pressing the **MENU** key on the Operator Panel.

Manually Inserting the Cleaning Tape

If desired, you can manually insert and remove the cleaning tape into/from the drive. To do this you must open the front door to the Scalar Library. Review the section titled *Opening the Front Door* on page 30 before proceeding.

Note

To initiate the cleaning cycle manually you must be aware of the present state of the Scalar Library and the drive that you wish to clean.

If a cartridge is present in the drive, you must first press the **UNLOAD** button on the drive front panel, then, when the **OPERATE HANDLE** LED is illuminated, open the drive door and remove the cartridge. You can then proceed with these instructions.

If the drive is empty, but the door is closed, make sure that the **OPERATE HANDLE** LED is illuminated before opening the door. You may then proceed with these instructions.

If the drive is empty, and the door is open, proceed with these instructions.

❒ Open the front door of the Scalar Library.

Note

You can manually move the Media Picker assembly right or left to provide access to the drives. Avoid manually moving the Media Picker assembly up or down.

❒ Insert the cleaning cartridge into the drive you wish to clean. Close the drive door handle.

The cleaning cycle will be performed. When cleaning is completed, the drive will unload the cleaning cartridge. Remove the cleaning cartridge and check a usage box on the label.

❒ To resume normal operation, close the door and lock it.

Causes of the Use Cleaning Tape Warning

The most common reasons that the **Use Cleaning Tape** LED gets turned on for, in order of highest rate of occurrence, are listed below:

- Dirty ("Stained") heads.

  A cleaning cycle ***must*** be executed to clear this indication.

- Worn tape.

  DLT tapes are rated at 500,000 passes. Applications that overwrite small blocks of data cause "shoe shining" of the tape against the head and will reach the 500,000 passes sooner than might be expected.

- Bad environment.

  Data errors result from a number of factors, each of which subtract from the margin between good data recovery and an error. High levels of dust contamination, high humidity, and heat can be significant factors.

- Worn heads.

  The tape heads will eventually wear out causing the time between cleanings to get shorter and shorter. The DLT2000XT, DLT4000, and DLT7000 drives have a head life rating of 30,000 hours.

Cleaning the Enclosure

The outside of the enclosure can be cleaned with a damp towel. If you use a liquid all-purpose cleaner, apply it to the towel. Do not directly spray the enclosure.

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Chapter 6

Troubleshooting and Diagnostics

This Chapter …

- contains some general suggestions to aid you in solving problems – should you ever run into them.
- includes information on error codes and the built-in diagnostics.

Installation Problems

Usually, problems encountered during the installation of your Scalar Library are caused by improper SCSI bus configuration, application software configuration errors or by an OS that has not been correctly configured. If the application software that you are attempting to use is not communicating with your library after installation, check the following:

✓ SCSI IDs

Make sure that the IDs you selected for the library robotics and tape drives are not the same as the ID used by any other SCSI device on that bus, including the host SCSI adapter card.

✓ SCSI Cabling

Verify that all SCSI cables are securely connected at both ends and that the bail locks are secured. Also, check the length and integrity of your SCSI cabling. The total length of all cables connected to a SCSI II bus must not exceed 9.85 feet (3.0 meters) for single-ended configurations and 82 feet (25 meters) for differential configurations. Try replacing suspected cables with known good cables.

> ***Note***
>
> The length of the Scalar Library internal SCSI cables is 3 feet. This length must be included in any calculations of cable length.

✓ Termination

Check that all SCSI buses are properly terminated.

✓ Compatibility

Ensure that your library and its tape drives are compatible with the SCSI adapter card and application software you plan to use.

> ***Note***
>
> For a list of compatible SCSI adapters and application software, call adic's Customer Assistance Center at (206) 883-HELP (4357).

✓ SCSI Adapter Card Installation

Verify that you have installed your SCSI adapter card correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay particular attention to any steps describing the settings of various jumpers and/or switches on the card. Check that the card is seated fully in your computers I/O connector.

✓ Application Software Installation

Refer to the documentation included with your software for instructions on how to verify installation.

Library and Drive Operational Problems

Most problems with the operation of your Scalar Library and/or DLT drives happen when the drives are not cleaned regularly or when you use incorrect data cartridges. If you have been successfully operating the application software and library in the past, but are now experiencing problems reading and writing data, check the following:

- ✓ If you are writing data, make sure that the cartridge is write enabled (move the write-protect switch to the enabled position).
- ✓ Check the data cartridge you are using. If your library has DLT2000XT drives installed, you can only use CompacTape III and CompacTape IIIXT cartridges. The DLT4000 and DLT7000 drives can use CompacTape III, CompacTape IIIXT, and CompacTape IV cartridges.
- ✓ If the cartridge has been in use for a long time or if it has been used frequently, try using a new cartridge.
- ✓ Clean the drive head.

Library Error Codes

If, during operation of your Scalar Library an error occurs, the library will halt the current operation and an error code will be displayed on the operator's display. The error code is displayed at the beginning of the 4th line and will consist of 2 hexadecimal characters. The first three lines will not be changed.

In all cases, after removing the cause of the problem push **MENU** to return the Scalar Library to the On-Line Mode.

If you cannot find a cause for the error, try to return the Scalar Library to the On-Line Mode by pressing **ALT** and/or **ENTER**. If that does not work, or if the error code reappears, call adic Customer Assistance and be prepared to tell them what the error code is – and what the conditions are (see *When You Call* adic *Customer Assistance* later in this chapter).

See *Appendix D: Error Codes* in this manual for a detailed description of each error code. This appendix is also available for downloading from our World Wide Web site; www.adic.com, or by calling the adic Customer Assistance Center.

Environmental Considerations

For best performance of your Scalar Library, and to minimize the chance of condensation, please observe the following guidelines:

- ❒ Install your Scalar Library on a level floor.
- ❒ If you expose cartridges to temperatures outside the operating limits – 40-113°F (5-40°C) – stabilize them by leaving the cartridges in the operating temperature for a minimum of two hours before you use them.
- ❒ Avoid temperature problems by ensuring that the Scalar Library rear panel is not obstructed so that the drives have adequate ventilation.
- ❒ Position the Scalar Library where the temperature is relatively stable (i.e., away from open windows, fan heaters, and doors).
- ❒ Avoid leaving cartridges in severe temperature conditions, for example, in a car standing in bright sunlight.
- ❒ Avoid transferring data (reading from and writing to cartridges) when the temperature is changing by more than 15°F (10°C) per hour.

When You Call adic Customer Assistance

Before calling adic Customer Assistance, follow these steps – which will help you take full advantage of your call:

- ❒ Review all documentation carefully. (Experience has demonstrated that most questions are answered in your documentation.)
- ❒ Be prepared to explain whether the software or hardware has worked properly at anytime in the past. Have you changed anything recently?
- ❒ Pinpoint the exact location of your problem, if possible. Note the steps that led to the problem. Are you able to duplicate the same problem or is it a one-time occurrence?
- ❒ Note any error messages displayed on your PC screen or file server. Write down the exact error message.
- ❒ If at all possible, call while at your computer, with adic's system installed and turned on.
- ❒ If running on a network, have all relevant information available (i.e. type, version #, network hardware, etc.).
- ❒ Be prepared to provide:

- Your name and your Company's name
- Model number
- Serial number of unit (located on the rear face by the power switch)
- Software version numbers
  – device driver
  – archive/restore
- Hardware configuration, including firmware version, date and number
- Type of PC, DOS version, clock speed, RAM, network type, network version, and any special boards installed
- A brief description of the problem
- Where you purchased the adic system

Having this information available when you call for customer assistance will enable adic to resolve your problem in the most efficient manner possible.

Note

Call adic Customer Assistance at (206) 883-HELP (4357).

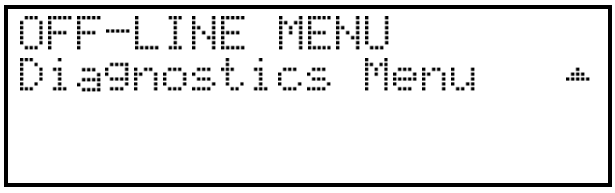
Appendix A

Diagnostics Menu

This Appendix …

- describes the built-in diagnostic functions available via the Off-Line Mode Diagnostics Menu

One of the most valuable features of the Scalar Library is the extensive built-in diagnostics. In this Appendix we discuss each of the Diagnostic functions available through the front panel keypad.



The following functions are available under the Diagnostics Menu:

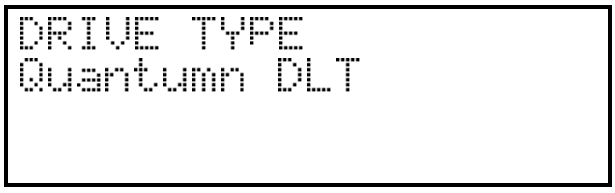
- Drive Type
- Event Counters
- F/W Revision
- Position Picker at Mailbox (When Mailbox-equipped)
- Pick From Slot
- Pick From Drv
- Place In Mailbox (Scalar 458 only)
- Map Slots
- Test Secondary Fan
- Close Drive Door
- Error Counters
- Operation Log
- Position Picker at Slot
- Position Picker at Drv
- Pick From Mailbox (When Mailbox-equipped)
- Place In Slot
- Place In Drv
- Calibrate X and Y
- Open Drive Door

Warning

We highly recommend that these diagnostic functions be used only by a qualified service technician (or on the instruction of a qualified technician). Some of these functions assume that the unit has been set up correctly and thus many of the normal built-in safety checks are turned off. Misusing these diagnostic functions without the normal safety checks could result in improper operation (or even damage to media or the Scalar Library).

Drive Type

Provides a listing of the type of drives installed in the Scalar Library system. Although the Scalar Library is only available with Quantum DLT drives at this time, this may change in the future.



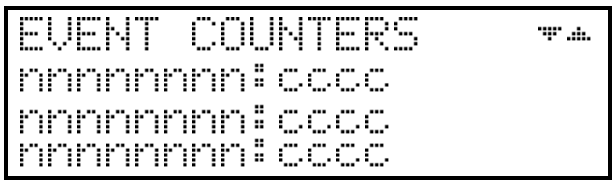
*Error Counters **

Provides a chronological listing (beginning with the last error issued) of the errors encountered by the Scalar Library system. These are library internal hardware/firmware errors. This register records each error name and assigns it a sequential number. Below is a listing of Error Counter listings with an indication of what each refers to:

nnnnnnnn	=	Counter name
cccc	=	Counter value (0 - 65535)

* Not implemented at this time.

*Event Counters **

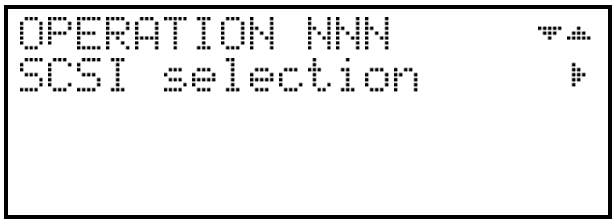


Provides a listing of the various Scalar Library operations and how many times they have occurred. Below is a listing of Event Counter listings with an indication of what each refers to:

nnnnnnnn	=	Counter name
cccc	=	Counter value (0 - 65535)

* Not implemented at this time.

*Operation Log **



Provides a chronological logging (beginning with the latest) of up to 255 operations. These operations can be SCSI commands, operator requested operations, errors, and status operations. This information can be vital for trouble shooting problems. The following is a partial listing of some of the loggable operations. You may encounter other operations not included here.

* Not implemented at this time.

NNN	=	Logged operation number (1-255). When log is full, new operations are logged in as operation 255, scrolling the

old operation 1 off the log.

Power on or user reset

Unit on-line due to user request

Unit off-line due to user request

Cmd: 03 00 00 00 20 00 (cmd is from SCSI host adapter)

SCSI selection by SCSI ID N (N = SCSI ID of host adapter)

SCSI reselection of SCSI ID N

SCSI disconnect from SCSI ID N

SCSI status = 00h (status to SCSI host adapter)

Door opened

Door closed

Load from MB row rr, slot ss to row rr, drv dd

Unload from row rr, drv dd to row rr slot ss

ERROR: Can't unload, media in drive(s)

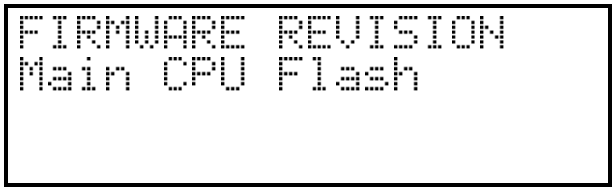
ERROR: Source location empty

ERROR: Unexpected Gripper Arm Sensor brk

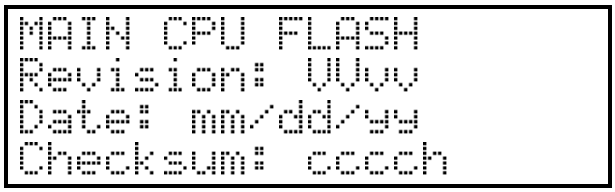
Retrying operation

Firmware Revision

Provides a record of the internal revision date and number, and internal checksum value of the firmware for the Main CPU, Picker CPU, and Servo Controller. This information is vital for trouble shooting problems.



❒ Press **ENTER** to list the F/W revision information for the Main CPU.

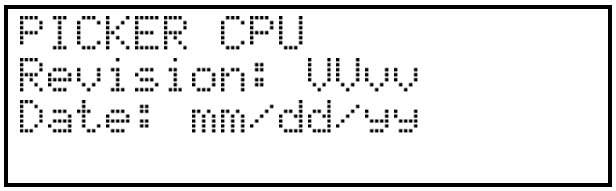


VV	=	Major version number (00-99)
vv	=	Minor version number (00-99)
mm	=	Build date month (01-12)
dd	=	Build date day (01-31)
yy	=	Build date year (00-99)
cccc	=	Internal checksum (0000-FFFF) [hexadecimal]

❒ Press **ESC** to return to the **FIRMWARE REVISION** main screen.

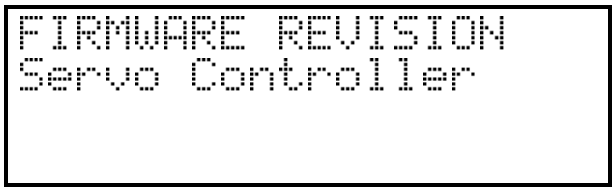
❒ Press the **DOWN** arrow key to bring up the **Picker CPU** selection.

❒ Press **ENTER** to select the **Picker CPU**.

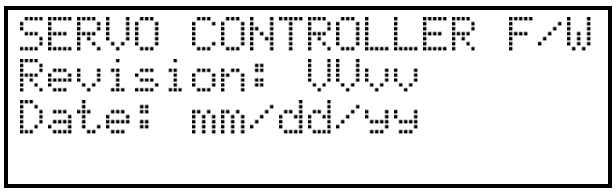


❒ Press **ESC** to return to the **FIRMWARE REVISION** main screen.

❒ Press the **DOWN** arrow key to bring up the **Servo Controller CPU** selection.

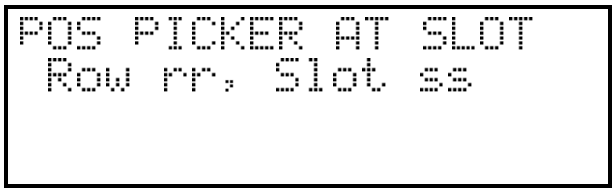


❒ Press **ENTER** to select the **Servo Controller**.



❒ Press **ESC** twice to return to the **Diagnostics Menu** main screen.

Position Picker at Slot



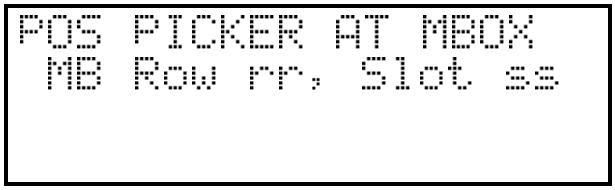
The **Position Picker at Slot** function is used to position the Media Picker at a particular cartridge storage slot in preparation to either pick a cartridge from the slot, or place a cartridge into the slot.

❒ Use **LEFT** r **RIGHT** to select the desired field. Select the row or slot using **UP** or **DOWN** Press **ENTER** to activate.

rr	=	Row number (01 - 4)
ss	=	Slot number (01 - 12)

This function is usually used for diagnostics only by a trained technician.

Position Picker at Mbox (when Mailbox equipped)



The **Position Picker at MBox** function is used to position the Media Picker at a particular cartridge slot of the Mailbox (Media Interchange Shelf) in preparation to either pick a cartridge from the slot, or place a cartridge into the slot.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the row or slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 02)
ss	=	Slot number (01 - 05)

This function is usually used for diagnostics only by a trained technician.

Position Picker at Drv

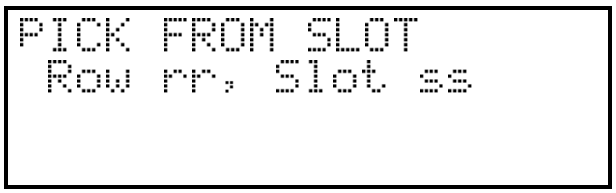
The **Position Picker at Drv** function is used to position the Media Picker at a drive in preparation to either pick a cartridge from the drive, or place a cartridge into the drive.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the row or slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
dd	=	Drive number (01 - 04)

This function is usually used for diagnostics only by a trained technician.

Pick From Slot



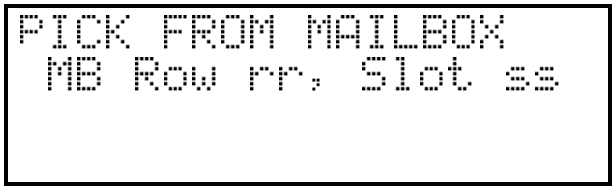
The **Pick From Slot** function will cause the Media Picker to pick the cartridge from a particular cartridge storage slot in preparation to place it either in another storage slot, into a Mailbox slot, or in a drive.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the row or slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 04)
ss	=	Slot number (01 - 12)

This function is usually used for diagnostics only by a trained technician.

Pick From Mailbox (when Mailbox equipped)



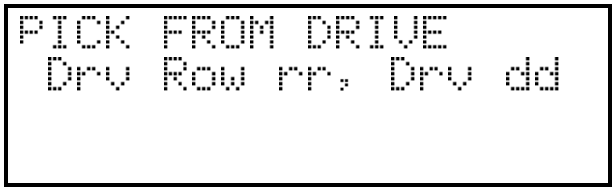
The **Pick From Mailbox** function will cause the Media Picker to pick the cartridge from a Mailbox slot in preparation to place it either in another Mailbox slot, in a storage slot, or in a drive.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the row or slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
ss	=	Slot number (01 - 05)

This function is usually used for diagnostics only by a trained technician.

Pick From Drive



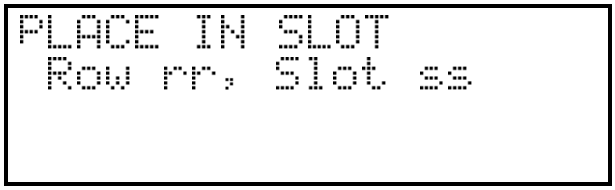
The **Pick From Drive** function will cause the drive to unload and eject the cartridge and the Media Picker to pick the cartridge in preparation to placing the cartridge either in a storage slot or in a Mailbox slot.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the row or slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
dd	=	Drive number (01 - 04)

This function is usually used for diagnostics only by a trained technician.

Place In Slot



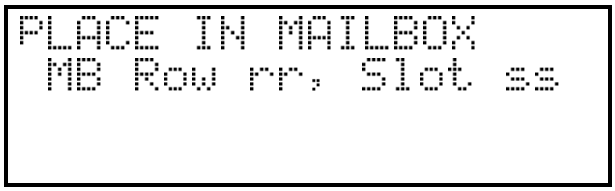
The **Place In Slot** function will cause the Media Picker to place the cartridge into a storage slot.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the row and slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 04)
ss	=	Slot number (01 - 12)

This function is usually used for diagnostics only by a trained technician.

Place In Mailbox (when Mailbox equipped)



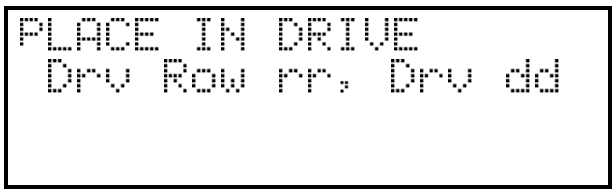
The **Place In Mailbox** function will cause the Media Picker to place the cartridge into a Mailbox slot.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the MB row and slot using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
ss	=	Slot number (01 - 05)

This function is usually used for diagnostics only by a trained technician.

Place In Drive



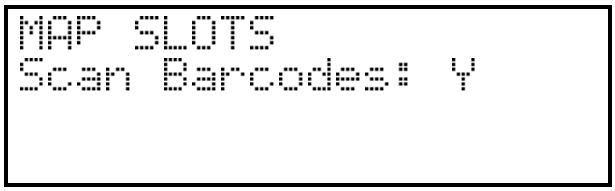
The **Place In Drive** function will cause the drive door to open and the Media Picker to place the cartridge into the drive.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the drive row and drive using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
dd	=	Drive number (01 - 04)

This function is usually used for diagnostics only by a trained technician.

Map Slots

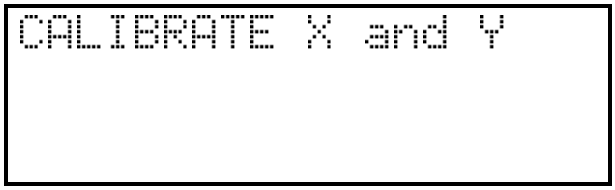


The **Map Slots** function will cause the Scalar Library to update its cartridge inventory log. Selecting "N" in the **Scan Barcodes** field will prevent the library from updating its barcodes inventory log. If the Barcode Scanner configuration parameter is set to "N", the setting of the **Scan Barcodes** field is ignored.

❒ Use **LEFT** or **RIGHT** to select the **Scan Barcodes** field. Use **UP** or **DOWN** to select **Y** or **N**. Press **ENTER** to activate.

This function is usually used for diagnostics only by a trained technician.

Calibrate X and Y

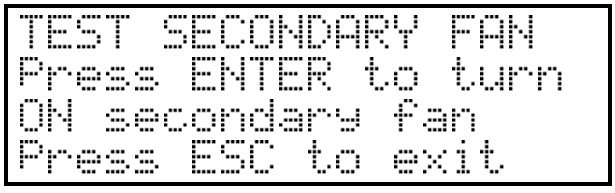


The **Calibrate X and Y** function will cause the Scalar Library to move the Media Picker to the home position (x = left, y = bottom) and update its home position constant.

❒ Press **ENTER** to activate.

This function is usually used for diagnostics only by a trained technician.

Test Secondary Fan

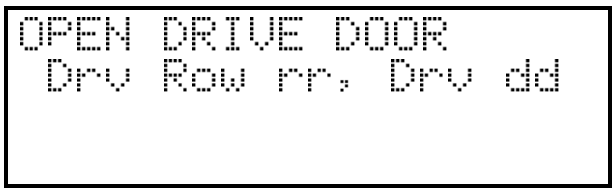


The **Test Secondary Fan** function will cause the Scalar Library to turn the secondary cooling fan on or off. Exiting this function via either the **ESC** or **MENU** key will turn off the secondary fan, unless the thermal IC on the Main Controller board reads 45º C or more.

❒ Press **ENTER** to turn the secondary cooling fan on or off.

This function is usually used for diagnostics only by a trained technician.

Open Drive Door



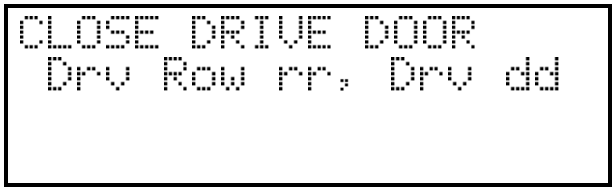
The **Open Drive Door** function will cause the Scalar Library to open the door of the selected drive. If the door is already open the drive door motor will run for a short time. If a tape is present in the drive, and it has not been logically unloaded, as error will occur and an error message will be displayed on the Operators Panel.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the drive row and drive using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
dd	=	Drive number (01 - 04)

This function is usually used for diagnostics only by a trained technician.

Close Drive Door



The **Close Drive Door** function will cause the Scalar Library to close the door of the selected drive. If the door is already closed the drive door motor will run for a short time.

❒ Use **LEFT** or **RIGHT** to select the desired field. Select the drive row and drive using **UP** or **DOWN**. Press **ENTER** to activate.

rr	=	Row number (01 - 2)
dd	=	Drive number (01 - 04)

This function is usually used for diagnostics only by a trained technician.

Appendix B

Glossary

This Appendix …

- contains terms and definitions of common expressions used with the Scalar Library and the DLT drive.

cartridge	A storage medium item. A cartridge is sometimes called a tape or cassette and is capable of storing vast amounts of magnetically-written data. The DLT drives in the Scalar Library uses CompacTape III, IIIXT, and/or IV cartridges.
cleaning cartridge	Media used to clean the drive heads and tape path.
DLT	DLT (Digital Linear Tape) is the industry-standard data interchange recording format that supports the use of DLT for computer applications.
DLT media cartridge	Media used with the DLT drive in the Scalar Library unit. It is a 4-inch cartridge containing either 1100 or 1800 feet of ½-inch metal-particle tape. These cartridges require no formatting or other media conditioning before use.
DLT drive	Drive used in the Scalar 448.
FCC	Federal Communications Commission
HSM	Hierarchical Storage Management – a system where different types of storage medium are used based on cost and time efficiency. For example, for fastest access, data is usually stored on a local drive. If you have a very large file that is needed occasionally, you may store it on a tape in the Scalar 448, or on an optical drive. In an HSM system, the data source should be transparent to the user.
LCD	Liquid Crystal Display, a commonly used alphanumeric display that responds to specified input voltages and signals
LED	Light Emitting Diode, a commonly used semiconductor device that glows when supplied with a specified voltage.
load	The process where the Scalar Library uses the Media Picker to pick a cartridge from either a cartridge storage slot location, or from a Mailbox (Scalar 458 only) slot and load it into a drive.
POST	Power-On Self-Test is a built-in self-test for the DLT drive. POST automatically occurs each time the Scalar Library powers up.
RMA	Return Merchandise Authorization.
RMA number	An identifying number given to a customer who needs to return equipment for repair, whether under warranty or not.
SCSI	Small Computer System Interface. An industry standard for connecting peripheral devices and their controllers to a microprocessor. The SCSI defines both hardware and software standards for communication between a host computer and a peripheral.
SCSI ID	The octal representation of the unique address (0 to 7) assigned to a SCSI device.

SCSI bus	Signal path or line shared by the devices on the same SCSI channel. Information is often sent to all devices throughout the same bus; only the device to which it is addressed will accept it.
slot	A slot is the place within the cartridge storage area, or the Mailbox (Scalar 458 only), where the media is placed. Each slot has a reference position, i.e. row 1, position 1 through position 12 (storage slots) and row 1, position 1 through 10 (Mailbox).
terminator	a physical block which tells the SCSI bus that this is the end of the line. A terminator is required at both ends of a SCSI bus. A bus may be terminated internally (on a device inside the host system) or externally on a peripheral device.
unload	The process where the Scalar Library causes a drive to eject a cartridge, then uses the Media Picker to move the cartridge to either a storage slot location, or to a slot in the Mailbox.

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Appendix C

Specifications

This Appendix …

- contains specification information on the Scalar Library and the DLT drive.

Drive*:*

Type:	Quantum® model DLT2000XT Quantum® model DLT4000 Quantum® model DLT7000
Data Capacity:	Up to 30 GB per 1800 ft cartridge (DLT2000XT) Up to 40 GB per 1800 ft cartridge (DLT4000) Up to 70 GB per 1800 ft cartridge (DLT7000) Up to 1.68 TeraBytes – Scalar 224 (with 24 cartridge slots full) Up to 3.36 TeraBytes – Scalar 448/458 (with 48 cartridge slots full)
Data Transfer Rate:	2.5 MB/sec. sustained (600 MB/min., 4 DLT2000XT drives) 3.0 MB/sec. sustained (720 MB/min., 4 DLT4000 drives) 5.0 MB/sec. sustained (1.2 GB/min., 4 DLT7000 drives)

Library:

Media type:	DLT ½-inch, metal-particle cartridges
Cartridge Change:	8 seconds
Indicators/Controls:	8 key keypad with LCD menu display, 2 LOCKED LEDs, to monitor and control system status, diagnostics and configuration
Interface:	SCSI-2, Fast SCSI-2, Differential Serial

Reliability:

Maintenance:	Use cleaning cartridge whenever **Use Cleaning Tape** message is announced on a drive front panel
MSBF:	Greater than 1,000,000 cartridge changes (net, drive and media) with scheduled maintenance.
MTBF:	More than 50,000 power-on hours
MTTR:	Within 30 minutes

Physical:

Dimensions:	19.0" (w) x 23.0" (d) x 40.5" (h)
Weight:	151 lb. (Scalar 458 w/2 drives)
Shipping Weight:	307 lb. (Scalar 458 w/2 drives)

Power Consumption:

Less than 100 Watts

Environment:

Electrical:	100-120/220-240 Vac, 4.0/2.0 Amps, 50/60 Hz
Temperature:	25° C to 40° C (Operating) -40° C to 70° C (Storage/Shipping)
Humidity:	5% to 80% RH, non-condensing (Operating) 90% maximum (Storage/Shipping)
Vibration:	0.3 g peak, 5-500 Hz, swept sine; 0.0002 g (sq.)/Hz, 5-350 Hz (Operating) 0.01 g continuos, 0.50 g peak (Storage/Shipping)
Shock:	3 g for 15 ms, ½ sine (Operating) 20 g peak 3 ms ½ sine (Storage/Shipping)

Appendix D

Error Codes

This Appendix …

- contains descriptions of the error codes that can be displayed on the Scalar Library Operator's Panel.

Error Code Listing

The Scalar Series Libraries will display a 2-digit hex code on the bottom line of the LCD whenever certain types of errors occur. The characters will be placed in the first 2 columns on the line. A description of each of the error codes is provided below:

Scalar Series Error Codes

Code	Name	Description
06	S_EMPTY	The source location was empty when the Picker attempted to pick from it during a pick and place operation.
07	D_FULL	The destination was full when the Picker attempted to place a cartridge in it during a pick and place operation.
0C	DOOR_OPEN	This code is displayed whenever the door is open when the Picker is starting to execute a motion command.
0D	DOOR	Means that the door was open, but is now closed. This code will only appear on the serial port, it should never appear on the display. It should never be output on the serial port unless it is preceded by a 0C (see above).
12	LOST_CASS	A pick from Mailbox failed to pick a cartridge. This code is picker revision dependent. Only early pickers will display this code.
27	INV_PICK_RESP	This error code appears whenever the Picker cpu does not return the ***proper*** response to a Master cpu command.
28	DRV_RDY_TIMEOUT	This error appears whenever the 'OK to Operate Handle' bit is not set within a specific time-out period.
29	NO_DRIVE	During Power-up the drive did not output a serial data stream. This normally occurs during the Scalar boot process.
2A	PICK_NO_RESP	This error code appears whenever the Picker cpu does not return ***any*** response to a Master cpu command.
2B	PICK_CMD_TIMEOUT	This error appears whenever the Picker cpu does not return results from executing a command within a time-out limit.
2C	BARCODE_FAIL	All barcode errors return this code.
2D	MB_DOOR_OPEN	One or both of the Mailbox doors were open when a Mailbox pick and place operation was attempted.
32	X_POSITION	An X-Position Error will occur whenever the X position reported by the servo cpu does not match the position reported by the x-axis optical tachometer plus or minus a margin value.
33	Y_POSITION	A Y-Position Error will occur whenever the Y position reported by the servo cpu does not match the position reported by the y-axis optical tachometer plus or minus a margin value.
FE or 7E	FRAME_ERR	An inter-processor communications error on the serial communications line.
FD or 7D	JAW_CTR_ERR	Picker jaw centering error. May be caused by something blocking the jaw.
FC or 7C	NOT_EMPTY_ERR	The Picker attempted a pick operation but already had a cartridge in it.

FB or 7B	LOST_CART_ERR	The Picker should already have a cartridge, but no cartridge is present.
FA or 7A	NO_CART_ERR	The Picker attempted a place operation, but no cartridge was present in Picker.
F9 or 79	CANT_PLACE_ERR	The Picker attempted a place operation, but the Picker carriage could not get to the correct location.
F8 or 78	UNK_PICK_POS_ERR	The Picker carriage is not where it should be and the Picker cannot return it to a known location.
F6 or 76	PICK_CNTR ERR	The Picker attempted to center the carriage, the jaw, and the gripper, but one or more of them would not center.
F5 or 75	PICK_TO_ERR	The Picker attempted a pick operation, but could not complete the operation and timed-out.
F4 or 74	CART_JAM_ERR	This is a roller time-out error that occurs when the picker is rolling a cartridge out.
F3 or 73	CART_TO_ERR	This is a roller time-out error that occurs when the picker is rolling a cartridge in.
F2 or 72	JAW_FROZ_ERR	The jaws do not move at all.
F1 or 71	JAW_TO_ERR	The jaws are able to move, but cannot complete a function.
F0 or 70	JAW_POS_ERR	The jaws are not in the proper position.
EF or 6F	JAW_LIMIT_ERR	The jaws are moving and expecting to see sensor feedback to know when to stop movement, but the servo processor says that the jaws have reached a limit first.
EE or 6E	MAIL_EMPTY_ERR	Attempted Mailbox pick operation, but no cartridge is present.
ED or 6D	BC_TO_ERR	The barcode reader did not return the barcode data in time.
EC or 6C	SYS_FAULT_ERR	This indicates that a Picker controller board error occurred.
EB or 6B	PICK_POS_ERR	The Picker carriage is in the wrong position.
EA or 6A	BARCD_TERM_ERR	This is an acknowledgment of a barcode read abort command.
E9 or 69	BARCD_RX_ERR	This is caused by any serial data stream formatting error.

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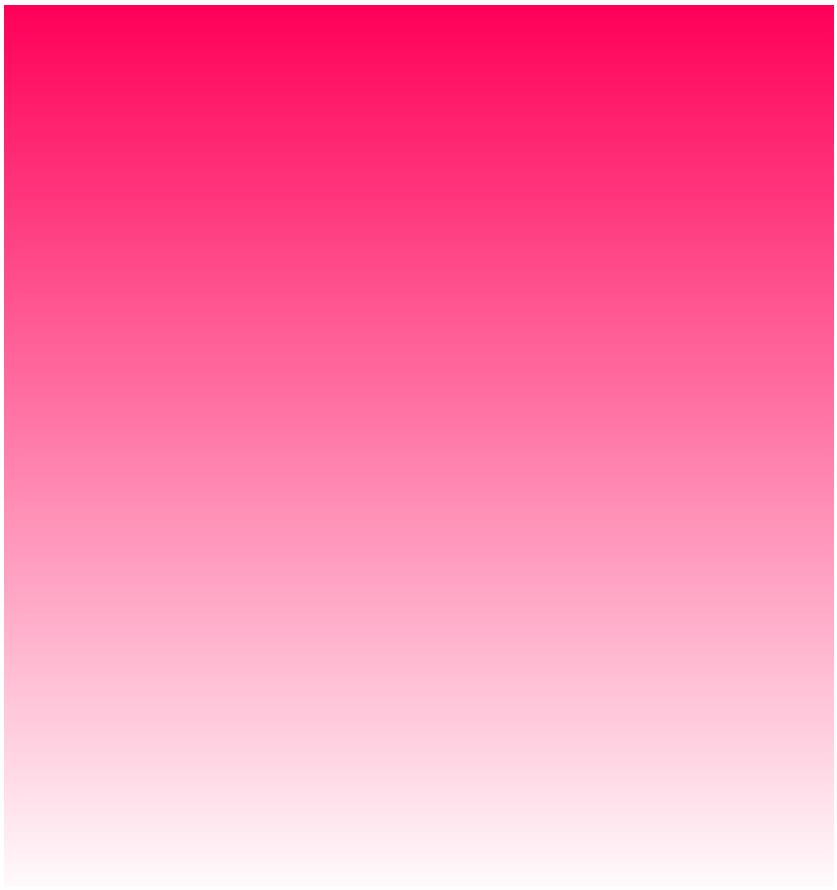

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