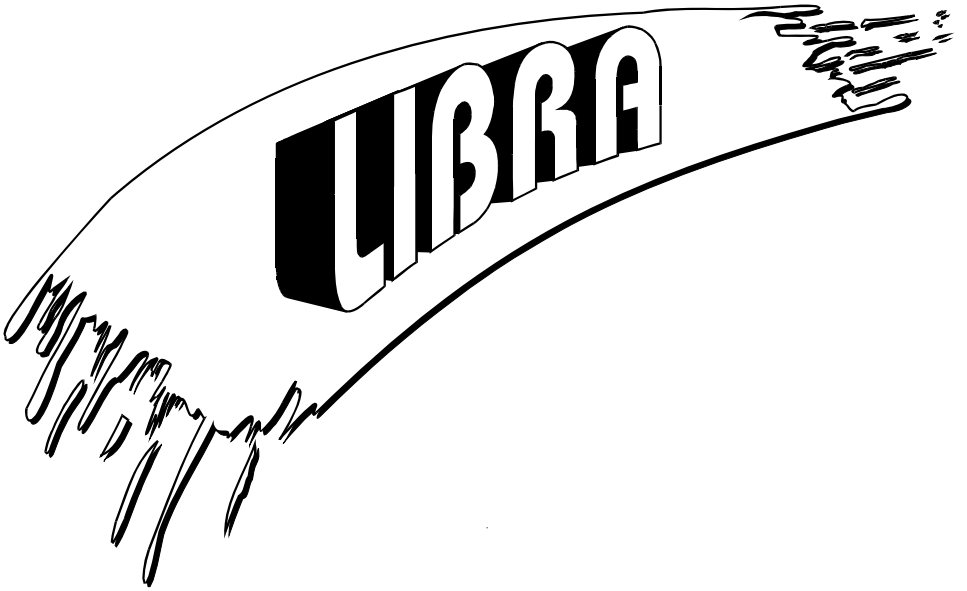

INSTALLATION & USER'S MANUAL FOR THE LIBRA DAT LIBRARY SERIES

Part Number: 2122-1040 05/94
Unpdated and PDF created on 8/07

Federal Communications Commission

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference , in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio or television reception, which can be determined by turning equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that the equipment and receiver are on different branch circuits.
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The user may find the following booklet helpful that has been prepared by the Federal Communications Commission.

"How To Identify and Resolve Radio-TV Interference Problems"

NOTE: *As part of obtaining FCC compliance, certain shielded cables are employed. Use of any other cables than those supplied with the unit may require reverification that the unit continues to comply with the substituted cabling.*

REFERENCE DOCUMENTS

IBM PC/AT technical reference manual

Small Computer System Interface, ANSI X3.131-198x

LIBRA 8/16 DAT Library Technical Reference Manual, Part Number 2122-1041

TRADEMARKS

All product names mentioned in this manual are Trademarked or copyrighted by their respective manufacturers.

CHANGES

The Material in this manual is for information only and is subject to change without notice.

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Chapter 2

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CHAPTER 2
LIBRA SPECIFICATIONS

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2.1 LIBRA DAT LIBRARY SPECIFICATIONS

Section sub-title & number
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2.1.1 Changing from Random to Sequential

Main body text
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To change the operational mode from Random to Sequential, follow steps 1 thru 7 below:

Procedure steps
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1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

Notes
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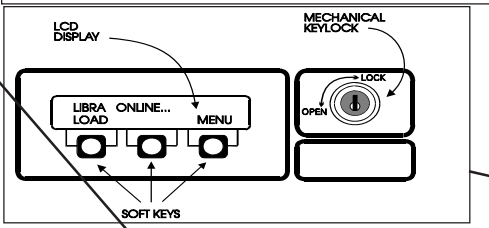
NOTE: If Front Panel control is locked, you will have to unlock it before accessing the menu system. Refer to "Unlocking the Front Panel"



Graphic figures

Figure 2-1 Front Operator Panel

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CHAPTER 1
INTRODUCTION TO THE LIBRA DAT LIBRARY SYSTEM

CHAPTER 2
LIBRA SPECIFICATIONS

CHAPTER 3
INSTALLING THE LIBRA

ALL NOTES ARE LABELED WITH.....

CHAPTER 1
INTRODUCTION TO THE LIBRA DAT LIBRARY SYSTEM

1.1 PRODUCT DESCRIPTION

The LIBRA product family, including the LIBRA-8 and LIBRA-16 models, are an advanced line of 4mm Digital Audio Tape (DAT) cassette autoloaders which are more than just large capacity storage devices. Equipped with "intelligent stacker" technology, LIBRA DAT Libraries are designed to provide today's Systems Administrators with complex ***storage management solutions***. When coupled with software, the LIBRA DAT Libraries satisfy users with diverse massive storage requirements by providing them with a wide-range of backup, archival and near-line storage capabilities.

The LIBRA achieves a very low cost/megabyte and is designed for use on mini-computer, workstation, and PC based computing systems supporting host-based and distributed processing architectures. Ideal for networked computing, the LIBRA is well suited for master/slave, client/server, and even peer-to-peer processing environments.

The LIBRA uses Digital Data Storage (DDS1 & DDS2) format DAT technology which can store from 2 to 8 GBytes on a single 4mm cassette. The LIBRA 8 contains 8 tapes, while the LIBRA 16 contains 16 tapes.

The LIBRA is compatible with most backup and data management software packages including support for DOS, Windows, Windows NT, OS/2, NetWare, AIX, Solaris, HP-UX, Ultrix, SCO Unix and OpenVMS operating systems.

1.1.1 Many uses for the LIBRA

1) As a near-line storage device, LIBRA teams with "Hierarchical Storage Management (HMS) software" to transparently move files from workstation disks to a secondary storage device. User requests will automatically locate files on the LIBRA system and return them to the fastest media (hard disk).

2) As a tape backup device, LIBRA utilizes network archival software from several software suppliers (see Table 1-1). This combination of software and hardware simplifies complex scripts for repetitive, unattended backups and allows for smooth migration of files from disk to tape, with automatic verification. Retrieval is easily managed with the ability to identify data via search keys and label information.

3) As a network near-line archival and backup solution, the LIBRA offers automatic tape handling and changing, random access to any tape, and compatibility with all major networks.

1.1.2 LIBRA Modes of Operation

LIBRA can be operated in either a SEQUENTIAL or RANDOM mode. The SEQUENTIAL mode of operation allows the unit to move in a sequential manner, independent of the host computer, inserting consecutive cassettes as the preceding cassettes are ejected from the DAT drive. The RANDOM mode of operation allows the unit, under host control, to move from one cassette location to another randomly.

1.1.3 Custom Configurable

The LIBRA is custom-configurable through an Operator Front Panel where you may:

- **Enable or disable password protection**
- **Select SEQUENTIAL or RANDOM mode of operation**
- **RESET the system.**
- **Determine the LIBRA operational status.**
- **Insert/retrieve cassettes independent of the host computer.**

1.1.4 Mechanics of the LIBRA

The LIBRA loads and unloads tape cassettes contained in the DATpak into a DAT drive. After the DAT drive has read or written to a cassette, the cassette may be retrieved into the DATpak, raised to the next position, and another tape cassette inserted.

The patented robotics mechanism consists of the Cassette Insertion/ Retrieval Assembly and the Elevator Assembly. The Cassette Insertion/ Retrieval Assembly inserts tapes into and retrieves tapes from the tape drive. The Elevator Assembly raises and lowers the DATpak.

Optical sensors control the operation of the elevator motor, and the orientation of the DATpak and cassettes. As cassettes are accessed, the elevator motor stops at the appropriate position while the Cassette Insertion/Retrieval Assembly inserts the tape into the tape drive. After the tape is ejected from the DAT drive, the cassette Insertion/Retrieval Assembly returns the cassette to the DATpak.

1.2 THE LIBRA DAT LIBRARY FEATURES

- **High Reliability DAT Technology**
- **8 or 16 Cassette DATpak**
- **Capacities up to 32GB in DAT Native Mode**
- **Capacities up to 128GB using DCLZ Data Compression Mode**
- **Capacities up to 128GB using DDS2 Drive & Media Technology**
- **LCD-based Operator Front Panel**
- **Front Panel selectable Random/Sequential mode of operation**
- **High MTBF (Mean Time Between Failures)**
- **Low MTTR (Mean Time To Repair)**
- **DAT Fast File Search Capability**
- **Enclosed "CleanStor" DATpak Elevator Area**
- **Security Key lock & Password Control**
- **ADD-IN Mounting for up to 2 (two) 5-1/4" hard drives**
- **SCSI ID switch for ease of installation**
- **Intelligent embedded error recovery**
- **Wide range of software package support**
- **Compatibility with NetWare, UNIX, DOS, and DEC VMS operating environments**
- **230W PS2 Power Supply**

1.2.1 Specific Product Features

8 or 16 Cassette DATpak
The LIBRA is available in both 8 cassette (mini-tower enclosure) or 16 cassette (full tower enclosure) versions with optional choices of 4mm DDS and DDS2 DAT drives.

1.2.1 Specific Product Features cont.

LIBRA Capacities
LIBRA System storage capacity, as follows:

- **The LIBRA-8 can store 16GB in native mode and up to 64GB of data in compressed mode.**
- **The LIBRA-16 can store 32GB in native mode and up to 128GB of data in compressed mode.**

LCD-Based Front Panel
The LIBRA is operated from a Front Panel consisting of a 2 line by 20 character LCD display which allows the user to interact with the LIBRA.

"CleanStor" DATpak Data Elevator Area
LIBRA Systems contain an enclosed DATpak Data Elevator Area protected and secured by a smoked glass door. The LIBRA is cooled by a whisper fan for continuous cooling and the removal of foreign particles within the unit.

Patented Robotics Mechanism
The LIBRA operates through a highly-reliable patented Robotics mechanism, with only 6 moving parts, which has a MTBF (Mean Time Between Failures) rate in excess of 65,000 insertions. The entire robotics and drive assembly can be removed as one field-replaceable unit.

Reliability Thru Error Recovery
The LIBRA is equipped with sophisticated error sensing and recovery capabilities providing a significant increase in reliability. Intelligent algorithms proven over time allow the LIBRA to sense error conditions, thereby preventing system failures common to other tape autoloaders.

LIBRA Data Security
LIBRA data security consists of a key lock to prevent unauthorized access to the LIBRA DATpak plus password controlled Front Panel lockout to prevent unwarranted operation or intervention with the software.

1.3 SUPPORTED SOFTWARE PACKAGES

Table 1-1 illustrates representative supported software packages that may be utilized with the LIBRA DAT Library. The Table includes the hardware platform, Operating System and specific software package. Other software packages and hardware platforms may be supported. Contact your local supplier for a complete list.

HARDWARE PLATFORM		OPERATING SYSTEM	SOFTWARE PACKAGE
UNIX	SUN SPARC	SOLARIS (SUN OS)	Software Generation Ltd. DATTOOL PLUS
	IBM RS-6000	AIX	Software Generation Ltd. DATTOOL PLUS
	HP 9000	HP-UX	Software Generation Ltd. DATTOOL PLUS
	NCR 3400	NCR UNIX system V	AT&T NetVault
DEC		OpenVMS	Acorn Software, Inc. BRANCHES
PC-NETWORK		NETware	Cheyenne Software, Inc. ARCserve 4.0
PC-NETWORK		NETware (Windows)	Cheyenne Software, Inc. ARCserve 5.0
PC IBM Compatible		DOS	Gazelle Systems BACK-IT 4
PC IBM Compatible		WINDOWS	Gazelle Systems BACK-IT 4 WINDOWS

TABLE 1-1. SUPPORTED SOFTWARE PACKAGES

1.4 THE LIBRA FAMILY PICTURE

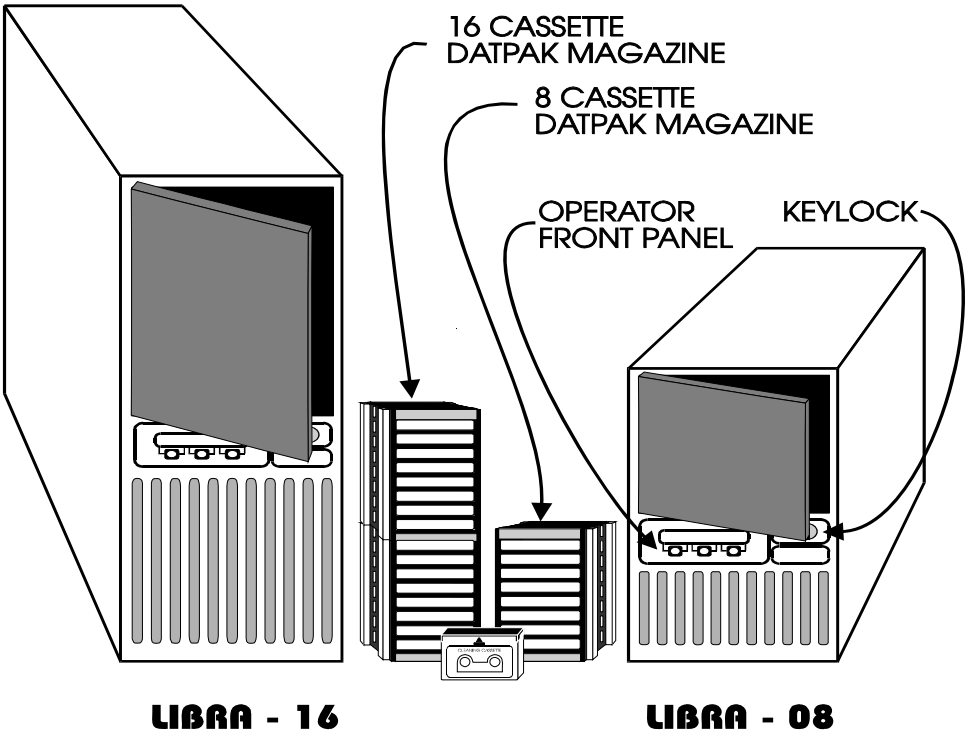
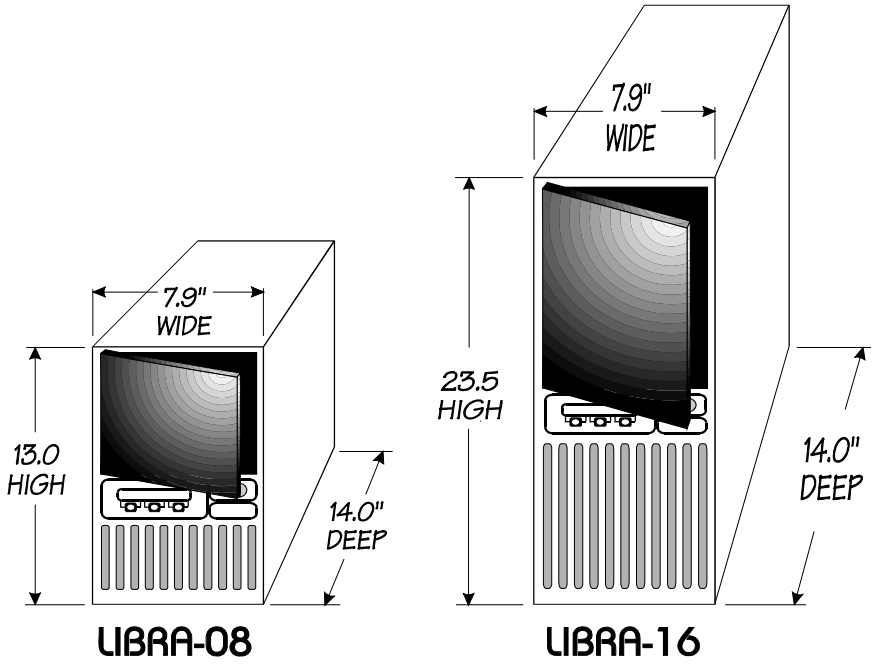


Figure 1-1. LIBRA FAMILY OF PRODUCTS

CHAPTER 2
LIBRA SPECIFICATIONS

2.1 LIBRA DAT LIBRARY SPECIFICATIONS



GENERAL	Dimensions	LIBRA-8	13.0H x 7.9W x 14.0D inches 28.2H x 20.1W x 35.6D cm
		LIBRA-16	23.5H x 7.9W x 14.0D inches 59.7H x 20.1W x 35.6D cm
	Shipping Weight	LIBRA-8	25 lbs.
		LIBRA-16	32 lbs.
	Power Requirements		100 to 260 VAC 47 Hz to 63 Hz
ENVIRONMENT	Temperature	Operating	5 to 45°C (41 to 113°F)
		Non-Operating	-40 to 65°C (-104 to 149°F)
	Relative Humidity	Operating	20% to 80% non condensing
		Non-Operating	0 to 90% non condensing
	Altitude	Operating	-100 to +4,575m (-328 to 15,000ft)
		Non-Operating	-300 to +15,250m (-984 o 50,000ft)
	Vibration	Operating	1.27mm Pk-Pk (0-63Hz) 1.0G (63-500Hz) Pk Acceleration
		Non-Operating	2.5mm Pk-Pk (0-17Hz) 1.5G (17-500Hz) Pk Acceleration
	Acoustic Level	Idling	50dBa maximum
		Operational	55dBa maximum
	Shock	Operating	2.5g's peak, 11 msec
		Non-Operating	30g's peak, 11 msec
	Cassette Speed and Motion Parameters	Insertion/ Retrieval	9 sec max
		Elevator (per position)	2 sec max
		Duty Cycle Limits	Continuous operation of robotics mechanism

Table 2-1. LIBRA DAT Library Specifications (page 1 of 3)

SYSTEM CHARACTERISTICS	Maximum Capacity	LIBRA-8	16GB Native Mode 64GB DCLZ Data Compression 128GB w/DDS2 Drives
		LIBRA-16	32GB Native Mode 128GB DCLZ Data Compression 256GB w/DDS2 Drives
	DAT Cassette Type		90 meter Extended Length 120 meter DDS2
	Subsystem Interface		SCSI-2 Single-Ended, Two (2) Node (DAT & Changer)
	Recording Method		DDS, DDS-DC, DDS2
	Recording Density		61,000 DPI Nominal
	Read/Write Speed		8.15mm/sec Nominal
	Transfer Rate		366KB/sec to 732KB/sec
	File Access Time		30 seconds on average
	Cassette Seek Time		5 seconds on average
	Error Rate		<1x1015
OPERATOR PANEL			2 x 20 characters (yellow/green) Backlight LCD with
			3-momentary Membrane switches
RELIABILITY	MTBF	DAT Drive	greater than 80,000 hours
	MTBF	Robotics	greater than 135,000 hours in excess of 65,000 insertions
	MTBF	Media	In excess of 15,000 insertions, In excess of 2,000 passes

Table 2-1. LIBRA DAT Library Specifications (page 2 of 3)

DAT DATA CASSETTES	Types	Sony	Model DG-60MA
			Model DG-90MA
			Model DGD-120MA
		Maxell	Model HS-4/60
			Model HS-4/90
			Model HS-4/120

Table 2-1. LIBRA DAT Library Specifications (page 3 of 3)

CHAPTER 3
INSTALLING THE LIBRA

3.1 UNPACKING & INSPECTION OF THE LIBRA

To start the installation process, place the shipping container in the upright position on a flat, stable surface, such as a desktop. Remove the Accessories Box. Refer to Figure 3-1 for components of the system contained in the shipping container and Accessories Box.

NOTE: *If any damage is found to the shipping container or the LIBRA, do not proceed with the installation. Immediately notify the shipper. The shipper's name will be found on the Packing Slip.*

Open the shipping container by cutting the tape with a blade or exacto knife. Verify that the contents of the Accessories Box agree with the Packing Slip. If any discrepancy is found, immediately notify your supplier.

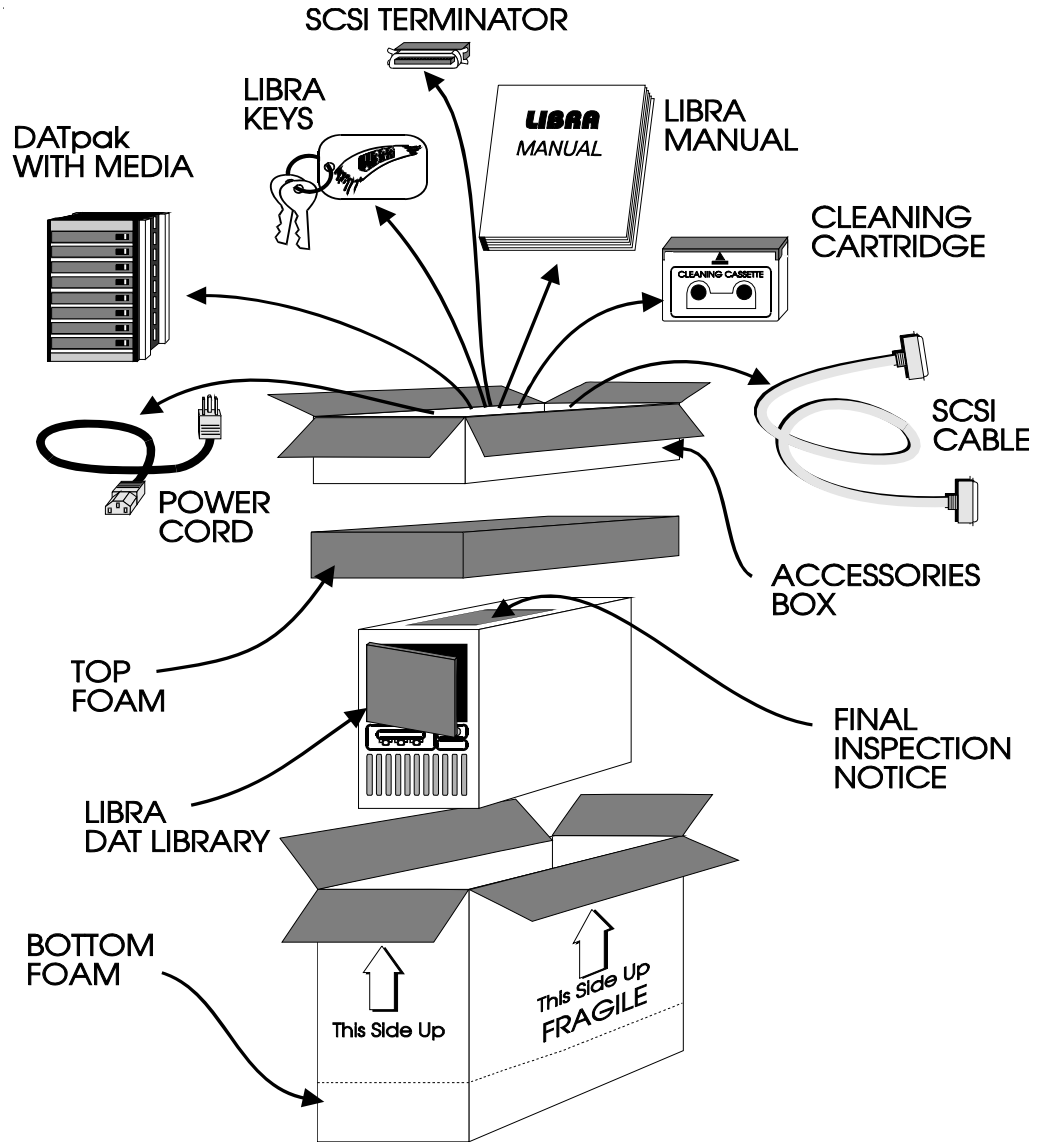


Figure 3-1. UNPACKING THE SHIPPING CONTAINER

Remove the upper foam insert.

Remove the LIBRA DAT Library from the shipping container:

- Place the LIBRA as close as possible to the other components of the computer system, to keep within the 6'-0" limitation of the SCSI cable that is provided.

- Remove the protective tape from the front and back of the smoke glass door.

- Remove the protective tape from the Operator Front Panel.

- Remove the FINAL INSPECTION Notice from the top of the LIBRA.

- Remove the key chain containing the set of identical keys from the Accessories Box. Depending on the desired security, place one of the keys in a safe, secure location.

NOTE: *All original packing material must be kept in case the need to ship the system back to your supplier arises.*

3.2 SYSTEM INSTALLATION

The installation starts with the rear panel. Figure 3-2 illustrates the various components.

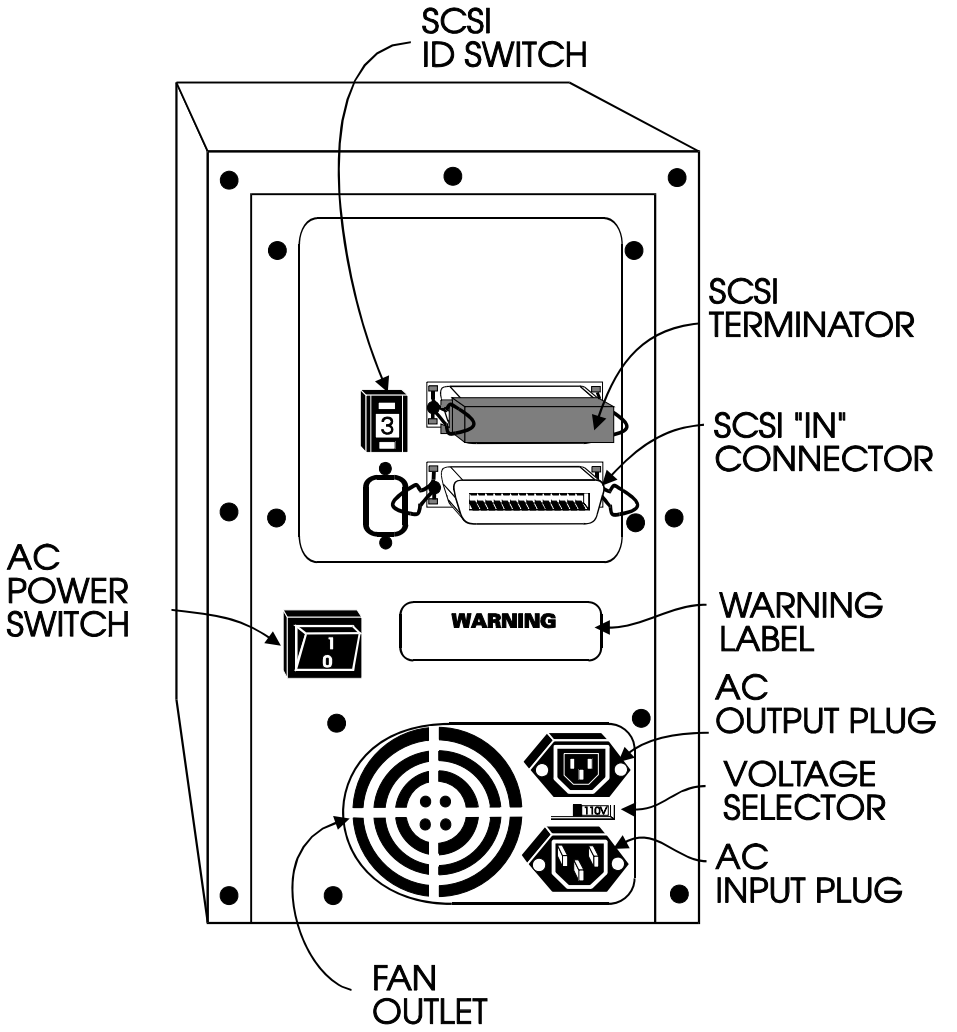


Figure 3-2. REAR VIEW OF THE LIBRA DAT LIBRARY

The components that comprise the rear panel, including the AC power switch, AC input plug and receptacle, SCSI "IN" and "OUT" connectors, and SCSI ID switch, are identified and described in Table 3-1.

Table 3-1. REAR PANEL COMPONENTS

COMPONENTS	PURPOSE
AC Power Switch	Apply and remove AC power from the LIBRA. Pressing 1 applies power while pressing 0 removes power.
AC Input Plug	Three-prong input plug for connecting the AC power cord.
AC Receptacle	To provide and external power source.
SCSI Connectors	Two 50-pin Centronics-type connectors. These are labeled the SCSI "IN" and "OUT" connectors. If required, the SCSI Terminator should be connected to the SCSI "OUT" connector.
SCSI ID Switch	Combination of a switch/display that sets the SCSI address. The center section displays the selected address in a range from 0 to 7. Press the upper button to reduce the address by 1. Press the lower button to increase the address by 1.

The first step in the installation is to connect the AC power cord between the universal AC input plug on the LIBRA enclosure to a power source between 100 to 260 AC, 47 to 63 Hz.

Be sure there is adequate clearance at the rear of the enclosure to permit unrestricted air flow from the fan outlet (see Figure 3-2 for the location of the fan outlet).

3.3 CONFIGURING THE SCSI BUS

To cable the LIBRA DAT Library to your system, you will use one of two possible SCSI bus cabling configurations::

1. Where the LIBRA DAT Library is the last device on the bus, and

2. Where the LIBRA DAT Library is not the last device on the bus.

NOTE: *The SCSI "IN" and SCSI "OUT" connectors, for purposes of this installation, only apply to the LIBRA and not to other components installed on the SCSI bus.*

NOTE: *Interconnecting the LIBRA to the SCSI devices on the bus may require cable(s) with different SCSI connector types at each end. The LIBRA SCSI connectors are of the 50-pin Centronix, single-ended type. Since other SCSI connectors may be encountered, it is important to verify that your cable, as supplied, will meet your particular requirements. Custom SCSI cables are available on request. (Refer to chapter 4, section 4.3)*

3.3.1 If the LIBRA is the last Device on the SCSI Bus

If the Library is the last device on the bus (refer to Figure 3-3), connect one end of the SCSI cable to the previous peripheral device (which may be the host computer) removing existing SCSI terminator as necessary. Connect the other end of the SCSI cable to the SCSI connector on the rear of the LIBRA enclosure (refer to Figure 3-2). Make sure the SCSI terminator, provided with the LIBRA, has not been removed from the SCSI "OUT" connector.

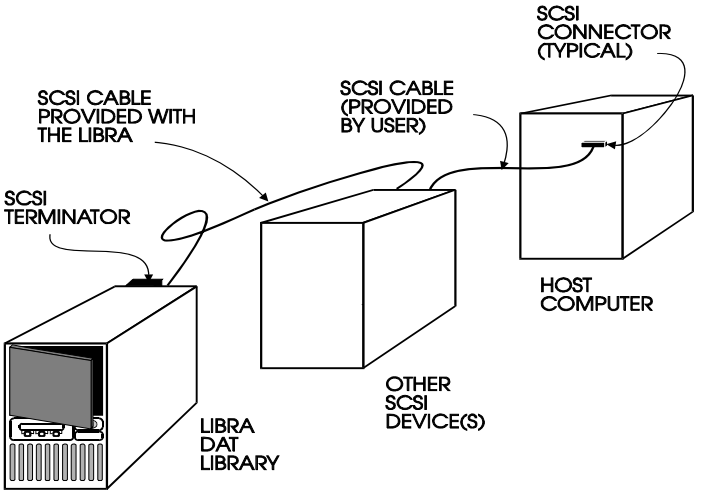


Figure 3-3. Cabling the LIBRA as the last Device.

3.3.2 If the LIBRA is not the last Device on the SCSI Bus

If the LIBRA is not the last device on the bus (refer to Figure 3-4), remove the SCSI terminator from the LIBRA. Connect one end of the SCSI bus cable provided with the unit to the SCSI "OUT" connector on the LIBRA. Connect the other end of the cable to the next peripheral device (which may be the last device) on the bus. Take the end of the bus cable that is connected to the previous peripheral and connect it to the SCSI "IN" connector on the LIBRA.

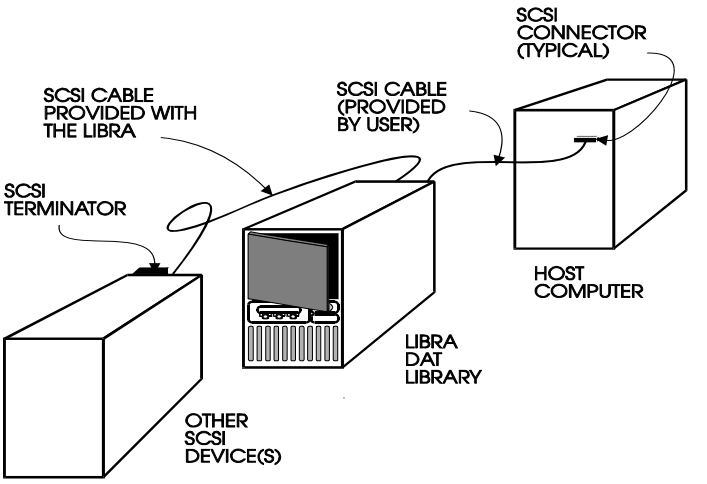


Figure 3-4. Cabling the LIBRA as an Intermediate Device

3.3.3 SCSI Addressing

The LIBRA system contains two (2) separate SCSI devices each requiring a unique SCSI address.

These addresses serve two purposes:

1. Establish a SCSI address for communications between the LIBRA devices and other devices on the bus; and

2. Set the bus priority of each device.

Typically, the LIBRA DAT Library devices will be low priority devices on the bus (example: 2 and 3); conversely, the SCSI host adapter will typically be assigned priority 7, the highest priority device.

The two devices are:

1. 4mm DAT tape drive

2. LIBRA Medium Changer

By default, the LIBRA system assigns these two devices two consecutive SCSI addresses. The instructions for setting the DAT drive and Medium Changer follow:

- Power down the host computer and then the existing peripheral devices on the bus.
- Locate the SCSI ID Switch to select a SCSI address for the DAT drive.
- Select the desired address by pressing the tab switches, and observing the address selected in the switch display.
- The Medium Changer device which controls the robotics will automatically be assigned the next consecutive SCSI address.

For example:

If the SCSI ID address switch is set to SCSI ID 3.

1) The DAT drive will be assigned to SCSI address 3.

2) The Medium Changer will be assigned to SCSI address 4.

- Power up the devices, starting with the last device and ending with the host computer.

NOTE: *In the event you have a situation where two consecutive addresses are not available on the SCSI bus, the capability exists for custom addressing via internal jumpers. For details of this procedure, refer to the appropriate section of the LIBRA Technical Reference Manual or contact your supplier.*

3.4 INSERTING THE DATpak

Open the smoke door to access the Data Elevator Area. Insert the LIBRA DATpak into the Cassette Insertion/Retrieval Assembly. Be sure the DATpak is correctly oriented with the DATpak guides properly aligned. The DATpak will fall squarely into the loading position.

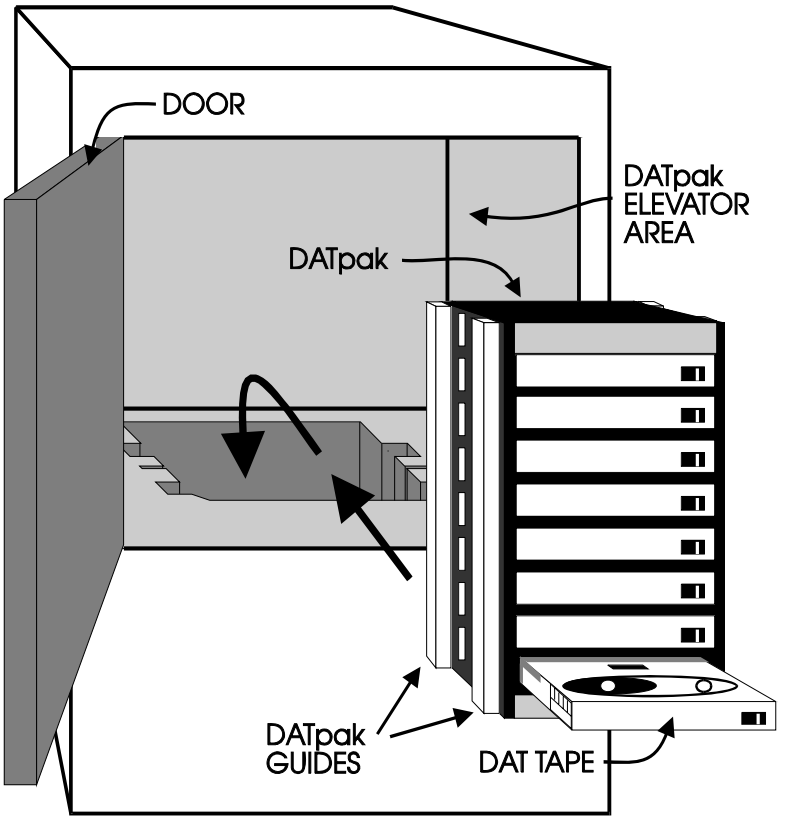


Figure 3-5. INSERTING THE DATpak INTO THE CASSETTE INSERTION/RETRIEVAL ASSEMBLY

3.5 POWERING ON

After the DATpak has been inserted, press the AC Power Switch to turn the power on. Refer to Figure 3-2 for the location of this switch.

On the Front Panel LCD, the Selftest message will display:

At the completion of testing, the ONLINE screen will display:

Your system is now ready to use on a daily basis. (See chapter 6 for a detailed description of the LIBRA display features).

3.5 INITIALIZING The DATpak

The LIBRA initializes the DATpak when one of the following occurs:

- A command is received from your software package to initialize (load) the DATpak, or
- Power is applied, the DATpak is inserted, and the LOAD Soft Key is pressed on the Operator Front Panel.

Initialization causes the DATpak to move from top to bottom so that the LIBRA can determine which DATpak slots contain cassettes and which slots are empty.

During initialization, the LIBRA senses both the DATpak and cassette orientation. If the orientation of the DATpak or an individual cassette is incorrect, these errors will be displayed on the LCD. These English Error Messages are discussed in chapter 9, section 9.1.2

Once DATpak initialization has been completed, the DATpak is positioned according to the current setting of the operational mode. (Refer to chapter 5, section 5.1)

3.7 INSTALLING LIBRA SOFTWARE

The LIBRA DAT Library has been qualified for use with many industry-leading backup and storage management software packages on all major hardware platforms (refer to Table 1-1). If software has also been purchased, detailed software installation instructions should be found in the corresponding software user's manual.

Please note, however, that the proper installation of backup and storage management software, (especially when being integrated with tape autoloaders), often requires special instructions - unique details may not be well documented in your software manuals. Because the details and special instructions pertaining to the integration of LIBRA with these software packages varies considerably, they are not reproduced here. In most cases this information is available from your supplier.

Note: *if software has been supplied with your LIBRA DAT Library, these special instructions should already be included in your documentation. If there are any difficulties with the installation of your supplied software package with the LIBRA DAT Library, notify your supplier immediately.*

3.8 REPACKING THE LIBRA FOR SHIPMENT

If you need to return the LIBRA DAT Library to your supplier for repairs or to have custom work performed on the unit, or you want to move the unit to a new location, it will be necessary to repack the LIBRA in its original shipping container.

Follow the procedure below to repack the LIBRA (refer to Figure 3-1):

1. **Disconnect the SCSI cable from the LIBRA and other devices.**
2. **Unload and remove the DATpak from the Data Elevator Area.**
3. **Place the LIBRA DAT library in the shipping container.**
4. **Place the upper foam insert over the LIBRA DAT Library.**
5. **Replace the following components in the Accessories Box:**
   - **Power cord**
   - **DATpak w/Media & Cleaning Cassette**
   - **SCSI cable & SCSI Terminator**
   - **Key chain w/Two Keys**
   - **User's Manual**
6. **Place the Accessories Box in the shipping container.**
7. **Seal the container with shipping tape.**

CHAPTER 4
SCSI HOST CONTROL

4.1 SCSI HOST CONTROL OF THE LIBRA

The LIBRA DAT Library is capable of being operated manually (similar to a stand-alone DAT drive) but is primarily intended for host computer control. Many of LIBRA's most powerful features are in fact provided via its sophisticated host computer interface. This interface, electrically and functionally compatible with the American National Standards Institute's (ANSI) Small Computer System Interface (SCSI-II), provides the user with full control of both the DAT drive and the robotics mechanism. As a result, operating system commands, Kernel utilities, and application software packages designed to support the SCSI-II standard can be used to read, write, list, find, migrate, backup, and restore selected files to specific cassettes within the DATpak.

4.1.1 SCSI Host Adapters

The SCSI HOST ADAPTER provides all the functions needed to implement the SCSI interface on a host computer. The SCSI Host Adapter provides an I/O interface between the host computer bus, the SCSI bus, and any SCSI peripherals that may be installed.

If your host computer does not have a SCSI host adapter, you will need to acquire one at this time. We suggest a 16 bit single ended SCSI adapter board that supports 0-6 SCSI devices and has a centronics external connecter. Some examples for an AT(ISA) bus host computer are, Adaptec 1542c, BusLogic BT-542B, and Future Domains 1680 SVP.

If your host computer has a built in SCSI host adapter, no extra configuration is nessesary at this time, unless you already have six SCSI devices installed. In this case an extra SCSI host adapter card is needed to connect the LIBRA to the host computer. Some examples of computers with built in SCSI host adapters are, the SUN SPARC Station, and the NCR system 3000 models.

The LIBRA DAT Library responds to specific commands that are sent over the SCSI bus through the SCSI host adapter. To support host computer control, you must first acquire a software package with a medium changer driver and install it manually on your system.

4.1.2 SCSI Devices

Internally, the LIBRA DAT Library actually consists of two different SCSI devices - the DAT drive and the Medium Changer - each being addressed by a unique SCSI ID.

4.2 SCSI COMMAND SETS

4.2.1 DAT Drive Command Set

The DAT drive responds to the unique set of SCSI commands intended for "Sequential Access Devices", as defined in the SCSI-II ANSI specification (see Reference Documents). These commands provide the host control of DAT drive functions including formatting, reading, writing, searching, rewinding, and ejecting.

4.2.2 Medium Changer Command Set

The Medium Changer responds to the unique set of SCSI commands intended for "Medium-Changer Devices", as defined in the SCSI-II specification. These commands provide the host control of the LIBRA robotics mechanism, allowing for random selection of which cassettes are to be inserted or retrieved from the DAT drive. A detailed description of the LIBRA medium changer SCSI interface is provided in the SA100 SCSI Interface Specification manual, available from your supplier.

4.3 SCSI CABLE TYPES

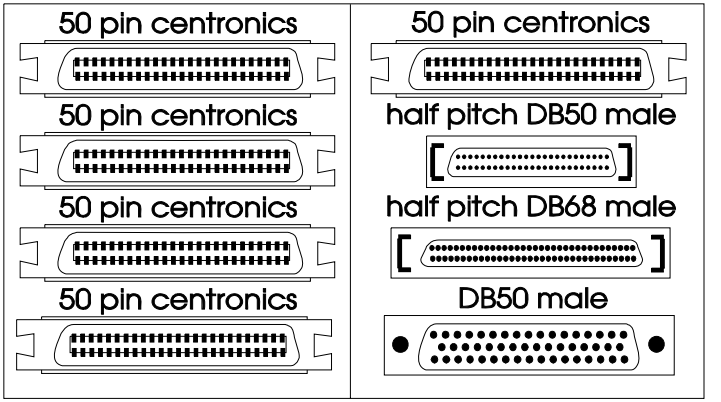


TABLE 4-1 SCSI Cable Types

CHAPTER 5
MODES OF OPERATION

5.1 *RANDOM AND SEQUENTIAL MODES*

The LIBRA DAT Library has been designed to function in either a SEQUENTIAL or RANDOM mode of operation. Selection of the operational mode is performed manually by the user via the Front Operator Panel, (Refer to chapter 7, section 7.1) and should be performed according to the limitations of the available software.

5.1.1 Random Mode of Operation

Random operation, when used in conjunction with tape autoloading devices, refers to the capability of the device to provide for random cassette access. This capability is provided for through the support of the SCSI Medium Changer device, which usually requires device-specific software. Random autoloaders such as the LIBRA DAT Library (sometimes referred to as "intelligent stackers"), when coupled with advanced capability software packages, provide the user with sophisticated storage management options.

5.1.2 Sequential Mode of Operation

Sequential operation, when used in conjunction with tape autoloading devices, refers to the limited mode of operation in which the system can access cassettes in a consecutive sequence only. The advantages of "sequential stacker" devices over "intelligent stacker" devices is that they can provide for unattended backup operation without requiring support for a Medium Changer device. Instead, the software interface communicates only with the tape drive and relies upon the stacker hardware to control the sequential loading of cassettes.

In the LIBRA DAT Library, the Sequential mode of operation is provided to allow users with only unattended backup requirements to take advantage of the many simple backup software utilities and packages available on various hardware platforms. The software allows the user to specify the attributes of the backup, and in some cases, to specify scheduling parameters. Usually, a backup package designed for use with sequential stacker devices will include the capability for unattended backups to "span multiple volumes". That is, if the software detects that the backup has reached the End Of Tape (EOT), it will issue a cassette eject command, wait for the stacker to autoload the next cassette, and continue the backup on the next cassette.

When the LIBRA is selected for Sequential operation and the DATpak is loaded, the DATpak will automatically position to the very first occupied slot and insert this cassette into the DAT drive. From here, the robotics mechanism waits, optically sensing when the cassette has been ejected. Once ejected (either from software or the LIBRA Front Panel), the robotics will retrieve the cassette, move to the next lower occupied slot, and insert this cassette. This process continues until the last cassette has been ejected, which causes the DATpak to automatically unload.

5.1.3 Changing from Random to Sequential

You may find it necessary to change the LIBRA operational mode from Random to Sequential if:

a) Your application software does not support Random operation
b) You need to install your application software from DAT tape
c) You need to access DAT tapes which are incompatible with your application software
d) You want to use Sequential software tape utilities
e) You want to install a cleaning cassette
f) You want to utilize Manual Cassette Control

NOTE: *Host communication with the SCSI Medium Changer will be unsuccessful while the LIBRA is operating in the Sequential mode. Attempts to communicate may cause SCSI bus errors that could hang the bus, possibly requiring a SCSI reset or other inconveniences. If your application supports Random operation, it is recommended that you consider possible conflicts (such as unattended job schedules) before changing to the Sequential operational mode.*

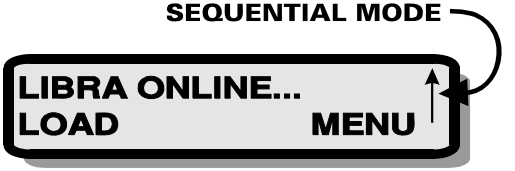
5.1.4 Sequential Manual Cassette Control

In some circumstances, the user may find it necessary to manually insert 4mm DAT cassettes into the tape drive without depending on software control of the robotics (a good example of this would be for the installation of a software-specific LIBRA Medium Changer device driver from the DAT tape). Manual cassette insertion is easily performed from the Sequential mode of operation. (Refer to chapter 7, section 7.3.3)

5.1.5 What Mode is the LIBRA in ?

When initially powered up the LIBRA automatically defaults to the Random mode of operation and will display a double arrow in the LCD display screen as shown below. This mode arrow is only displayed in the OPS display screen.

When the LIBRA is changed to the Sequential mode of operation the arrow will change to a single up arrow as shown below.



When powered down the LIBRA will store the current operational mode in its non-volatile memory. The currently stored mode of operation will be the default mode the next time the LIBRA is powered up. For more information about the Operational Modes, (Refer to chapter 7, section 7.1).

CHAPTER 6
LIBRA FRONT OPERATOR PANEL

6.1 *LIBRA FRONT PANEL FEATURES*

The LIBRA Front Operator Panel consists of three main parts, the LCD (Liquid Crystal Display), three software configured switches (soft keys) and a mechanical key lock. Refer to Figure 6-1.

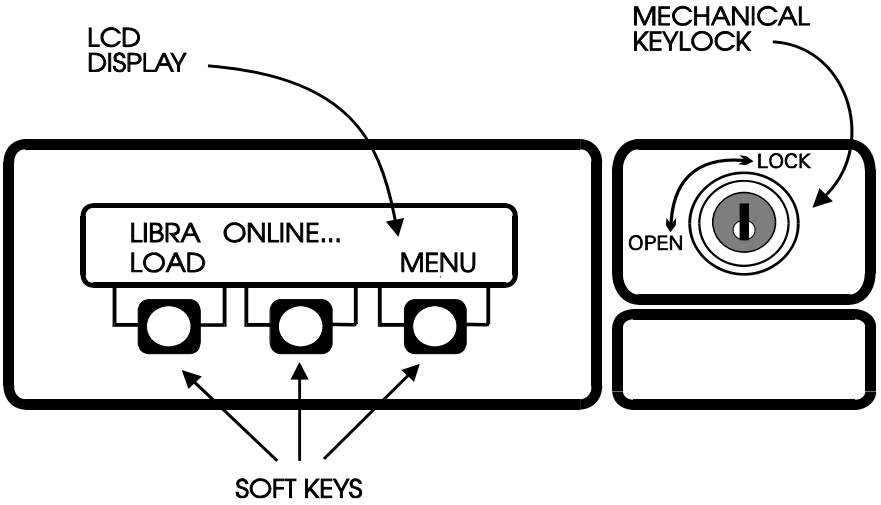


Figure 6-1. FRONT OPERATOR PANEL

6.1.1 LCD Display

The LCD is a 2 line by 20 character display, backlit for high contrast, and is used for displaying system status and configuration information in conjunction with the three soft keys located directly below the LCD. The displayed information is formatted on the 2 lines into a message line and a command line as shown below:

The top line (Message Line) displays specific information about the current operation, while the bottom line (Command Line) is used for displaying the current software defined command labels associated with each of the active soft keys.

6.1.2 Soft Keys

The three soft keys are used to issue system commands and configuration selections as defined by software on the LCD command line. Each key is composed of a thin membrane switch which is activated by a slight force of depression. Acknowledgment of soft key depression is provided by a corresponding blinking command label on the LCD command line. Soft keys may be active or inactive depending on the current configuration. Soft key command labels are not displayed for inactive soft keys.

6.1.3 Mechanical Keylock

The mechanical key lock is designed as a security/safety feature to prevent entry to the DATpak Data Elevator Area by unauthorized personnel. The lock latches the LIBRA front door, providing the user a safe, secure storage space for the DATpak and the potentially sensitive media.

Two identical keys for the lock are provided on a key chain in the Accessories Box (see Figure 3-1). Two positions are possible: LOCK and OPEN.

6.2 LIBRA FRONT PANEL DISPLAY MODES

The type of information displayed on the LCD display changes according to which of four Front Panel display modes the LIBRA is set to. The LIBRA Front Panel display modes are as follows:

1. Operational (OPS) display mode

The OPS display mode is the default Front Panel display mode. Normally, the Front Panel displays operational screens that provide the user with information and control pertaining to system status.

2. Menu display mode

When selected by the user, the Front Panel can be forced into the MENU display mode. In the Menu display mode the Front Panel displays menu selection screens that allow the user to setup and modify system configuration and perform system diagnostics.

3. Keypad Entry display mode

The Front Panel is switched to the Keypad Entry display mode automatically whenever one of several soft key sequences is required to be entered by the user.

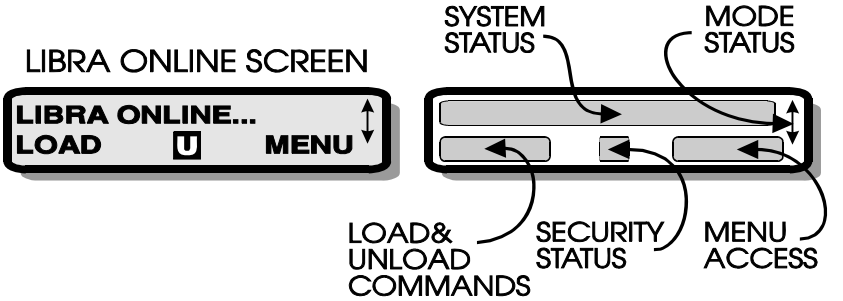
4. Error Recovery display mode

Anytime a system error is detected, the Front Panel is set to the Error Recovery display mode. In this mode the Front Panel displays error description screens which provide the user the opportunity to acknowledge the error before performing a soft system reset.

6.3 *(OPS) DISPLAY MODE*

During normal operation the LIBRA LCD provides the user with up-to-date information regarding system status and a simple soft key interface for controlling system operation. System status such as self-testing progress, DATpak positioning, cassette positioning, and DAT drive activity are dynamically displayed on the message line as the LIBRA steps through its operational states. From the command line the user may load or unload the DATpak, lock or unlock the LCD display, and switch the LCD to the menu display mode.

A typical OPS screen layout, with an example OPS screen (Online Display) is shown below:



6.3.1 System Status Messages

In the OPS display mode the message line is primarily used for displaying system status. Several examples of these status messages are discussed below.

"Self Test in Progress"
This message is displayed following power up or system reset while the LIBRA hardware performs a series of self tests. Any hardware failures detected will be reported through one of the error messages described in Chapter 9. In addition to hardware verification, the self testing process will check to see if any cassette has been left in the DAT drive or if a DATpak has been left in the loaded position. Any cassette left in the DAT drive will automatically be ejected and retrieved into the DATpak, and/or the DATpak unloaded.

"LIBRA Online..."
This message indicates that the system is powered up and idle (DATpak is not loaded).

"LIBRA Initializing..."
This message is displayed following a DATpak LOAD command (either from software or from the LOAD Soft Key) and continues while the DATpak is being loaded and initialized. During initialization the LIBRA verifies DATpak orientation and determines cassette population and orientation.

"Positioned at #n"
This message is displayed when the DATpak is positioned to a specific slot (where "n" is a corresponding slot number 1-16).

"Inserting Tape #n"
This message is displayed as a cassette is being inserted from the DATpak into the DAT drive.

6.3.2 System Status Messages cont.

"LIBRA xx READY #n"
This message is displayed after a cassette has been inserted into and initialized by the DAT drive (where "xx" is 8 or 16, depending on the number of slots detected from the DATpak, and "n" is the corresponding slot number 1-16). The message indicates that the DAT drive is idle and ready to receive commands from the host.

"LIBRA xx ACTIVE #n"
This message is displayed whenever a cassette is inserted into the DAT drive and the drive receives a read, write, or rewind command.

"Retrieving Tape #n"
This message is displayed whenever a cassette is being retrieved from the DAT drive.

"Ejecting..."
This message is displayed after a DATpak UNLOAD command has been received (either from software or from the UNLOAD Soft Key) and continues until the DATpak is fully unloaded.

6.3.3 Mode Status Arrow

The Random and Sequential modes of operation refer to two distinct methods of controlling the LIBRA from remote software. When powered up, the LIBRA automatically defaults to the Random mode of operation, but can be user selectable from the Configuration Menu. Indication of the current mode of operation is provided on all OPS screens via the Mode Arrow, located at the far right corner of the message line.

A single up arrow (↑) indicates that the LIBRA is in the Sequential mode of operation, while the double arrow (↕) indicates that the LIBRA is in the Random mode.

6.3.4 Operational Soft Key Definitions

- **LOAD/UNLOAD SOFT KEY**

In the OPS display mode the left most soft key is configured to issue DATpak LOAD and UNLOAD commands. If the DATpak is not loaded and the soft key is active, the soft key is labeled “LOAD”. The LOAD soft key is depressed to issue a DATpak LOAD command. Under certain situations, as in Front Panel control lockout, the LOAD/UNLOAD soft key is deactivated and its label blanked.

If the DATpak is already loaded and the soft key is active, the soft key is labeled “UNLOAD”. The UNLOAD soft key is depressed to issue a DATpak UNLOAD command. If the UNLOAD soft key is depressed while a cassette is inserted in the DAT drive, an eject command is issued to the drive and the DATpak UNLOAD command is queued while waiting for the cassette to be ejected. While the LIBRA is waiting for the cassette to be ejected, the “UNLOAD” Soft Key label will blink, acknowledging the pending DATpak unload. Once the cassette has been successfully retrieved into the DATpak, the DATpak will be unloaded.

For more information regarding loading and unloading DATpaks.(Refer to chapter 7, sections 7.2 & 7.3)

- **SECURITY STATUS SOFT KEY**

In the OPS display mode the center soft key is configured to issue Front Panel Security Status requests. The soft key is only active when the Security Feature has been enabled (Refer to chapter 7, section 7.4.1). When the LIBRA is powered up for the first time, the Security Feature is disabled and the Security Status soft key is inactive, its label blanked. When the Security Feature has been enabled, a special “U” character label is displayed above the soft key. This label indicates that the Security Feature has been enabled but that the Front Panel Control is unlocked. As long as the Front Panel Control remains unlocked, any user can control the LIBRA locally.

6.3.5 Operational Soft Key Definitions cont.

To "lock" the Front Panel Control (which blanks the LOAD/UNLOAD and MENU soft key labels and renders them inactive), the user merely presses the Security Status soft key. Once pressed, the "U" character label is changed to an "L", and Front Panel Control becomes locked. System status messages will continue to be updated to the display.

Once control is locked, the Security Status soft key is configured to issue an unlock request. Pressing the soft key will trigger the Password Entry display sequence (Refer to chapter 7, section 7.4.3). If the Password is entered correctly, the Front Panel Control is unlocked and the "U" character label is redisplayed.

NOTE: *FRONT PANEL CONTROL LOCKOUT & the MECHANICAL KEY LOCK are two completely different features and should not be confused.*

- **MENU ACCESS SOFT KEY**

In the OPS display mode the left most soft key is configured for issuing a MENU Access request. The soft key is labeled "MENU", and when depressed will force the Front Panel to switch to the MENU display mode. The MENU display mode features are described in the following section.

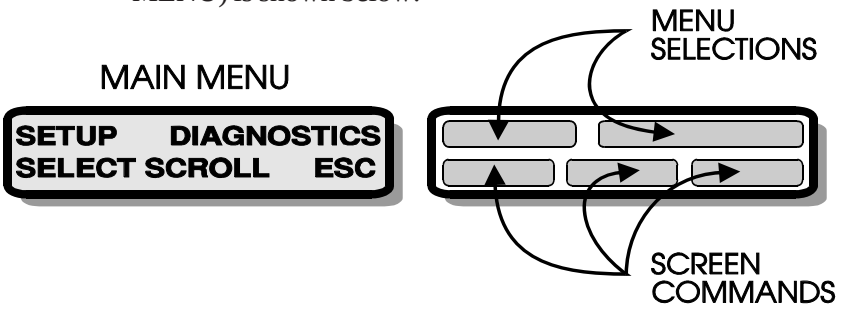
NOTE: *A summary listing of various OPS display screens, is presented in Figure 6-2 at the end of this Chapter.*

6.4 MENU DISPLAY MODE

6.4.1 Understanding the LIBRA Menu System

The LIBRA menu system can be entered from an OPS display screen by pressing the MENU soft key. Once the Front Panel is put into the MENU display mode, the LIBRA LCD and soft keys can be used to access the selectable menu screens and menu functions associated with the LIBRA menu hierarchy (refer to Figures 6-3&6-4). Menu screen and menu function selections are displayed in pairs on the LCD message line and chosen using the three soft keys labeled SELECT, SCROLL, and ESC. ***If the system does not detect any soft key activity for 2 minutes, the Front Panel is switched back to the OPS display mode.***

A typical MENU screen layout, with an example MENU screen (MAIN MENU) is shown below:



6.4.2 Menu Soft Keys

The SCROLL soft key moves the position of a blinking block cursor from one menu selection item to another. Once the cursor is positioned, the SELECT soft key is depressed to choose the corresponding next-level menu selection screen. When the SELECT soft key is used to traverse to the bottom level of the menu hierarchy, actual menu functions are displayed on the message line.

Selection of menu functions causes the LIBRA Front Panel to switch to the KEYPAD ENTRY display mode. The ESC soft key allows for stepping back up thru the menu selection screens, eventually exiting out of the LIBRA menu system and back to the current OPS screen.

6.4.3 Menu Selection Screens

There are four menu selection screens to traverse between in the LIBRA menu system.

- **Main Menu Selection Screen**

Except for during diagnostics, the LIBRA will always enter the menu system at the top of the menu hierarchy. The LCD will display the MAIN menu selection screen as follows:

From this screen the user may select either the SETUP menu selection screen or the DIAGNOSTICS menu selection screen. To access the SETUP menu selection screen, press the SELECT soft key. To access the DIAGNOSTICS menu selection screen, press the SCROLL soft key and then press the SELECT soft key. Pressing the ESC soft key will transfer the Front Panel back to the OPS display mode.

- **SETUP Menu Selection Screen**

From the SETUP menu selection screen, shown below, the user may select either the SETUP SECURITY menu selection screen or the SETUP CONFIGURATION menu selection screen.

SETUP MENU

To access the SETUP SECURITY menu selection screen, press the SELECT soft key. To access the SETUP CONFIGURATION menu selection screen, press the SCROLL soft key and then press the SELECT soft key. Pressing the ESC soft key will access the MAIN menu selection screen.

- **DIAGNOSTICS Menu Selection Screen**

From the DIAGNOSTICS menu selection screen, shown below, the user may select either the RESET function or the MANUAL-KEY function.

DIAGNOSTICS MENU

To access the RESET function press the SELECT soft key. To access the MANUAL-KEY function press the SCROLL soft key and then press the SELECT soft key. Pressing the ESC soft key will access the MAIN menu selection screen.

- **SETUP CONFIGURATION Menu Selection Screen**

From the SETUP CONFIGURATION menu selection screen, shown below, the user may select the CONFIGURE MODE function.

CONFIGN MENU

To access the CONFIGURE MODE function press the SELECT soft key. Pressing the ESC soft key will access the SETUP menu selection screen.

- **SETUP SECURITY Menu Selection Screen**

Depending on the current Security Status, the SETUP SECURITY menu selection screen will either allow the user to select between the SECURITY ENABLE function and the PASSWORD CHANGE function (shown below as MENU-A) or between the SECURITY DISABLE function and the PASSWORD CHANGE function (shown below as MENU-B).

SECURITY MENU-A

SECURITY MENU-B

To access the SECURITY ENABLE function (or the SECURITY DISABLE function) press the SELECT soft key. To access the PASSWORD CHANGE function press the SCROLL soft key and then press the SELECT soft key. Pressing the ESC soft key will access the SETUP menu selection screen.

NOTE: *An access tree of the LIBRA MENU SYSTEM is given in (Figure 6-3).*

6.4.4 Menu Functions

Selection of any of the menu functions (as described above) will transfer the Front Panel to the Keypad Entry display mode. In this mode inquiries are displayed on the message line and special soft key labels pertaining to the specific function are displayed on the command line. Typically, special soft key sequences are required to be entered by the user. If the keypad sequences are entered successfully, the Front Panel will either toggle back to the OPS display mode or the MENU display mode. Each of these functions is described in more detail in Chapter 7, LIBRA System Operation.

6.5 *DISPLAY SCREEN FLOW CHARTS*

The following three pages contain figures that illustrate the basic flow of the (OPS) display screens (figure 6-2), and an access tree for the Main Menu display screens (figures 6-3&6-4). The system user should refer to these charts when performing any Front Panel command.

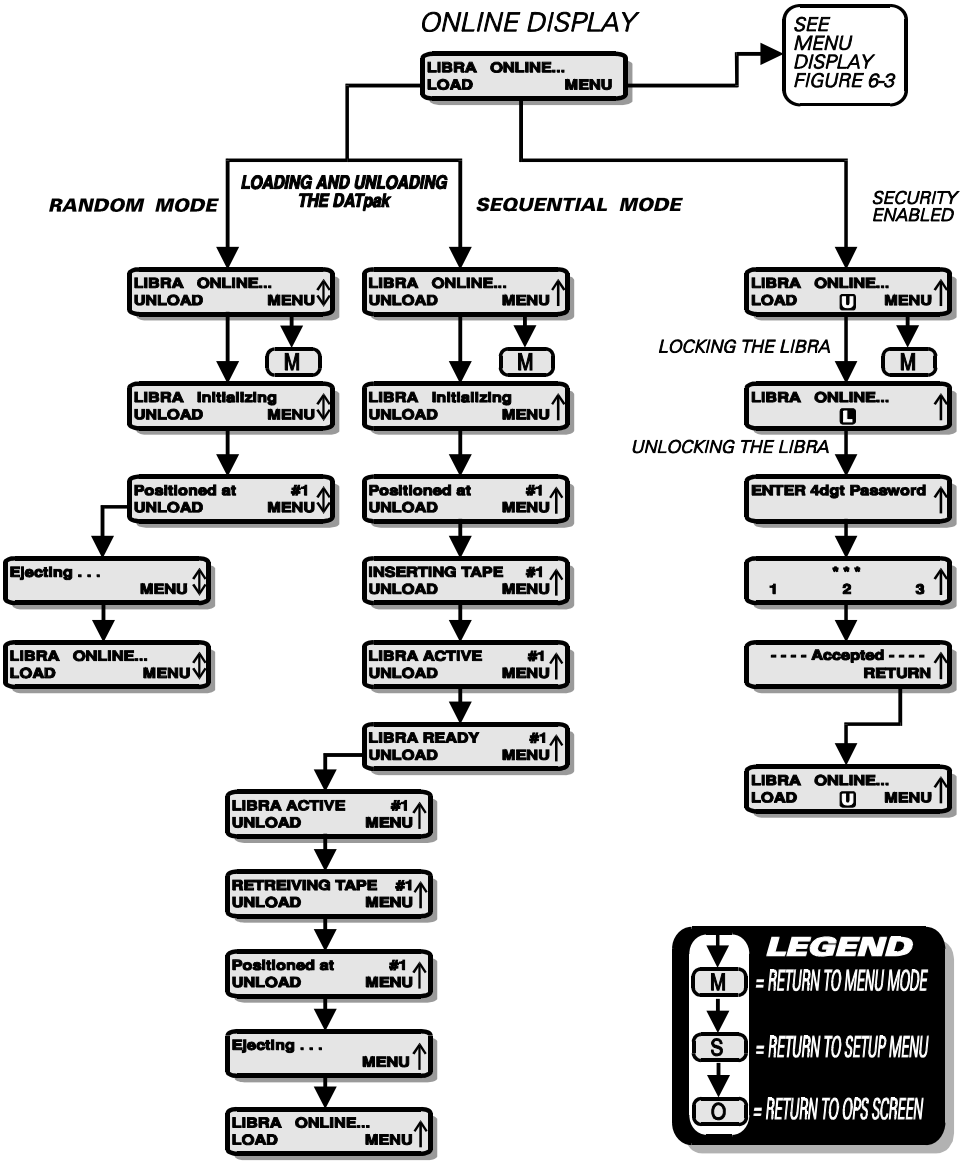


FIGURE 6-2 (OPS) DISPLAY SCREENS

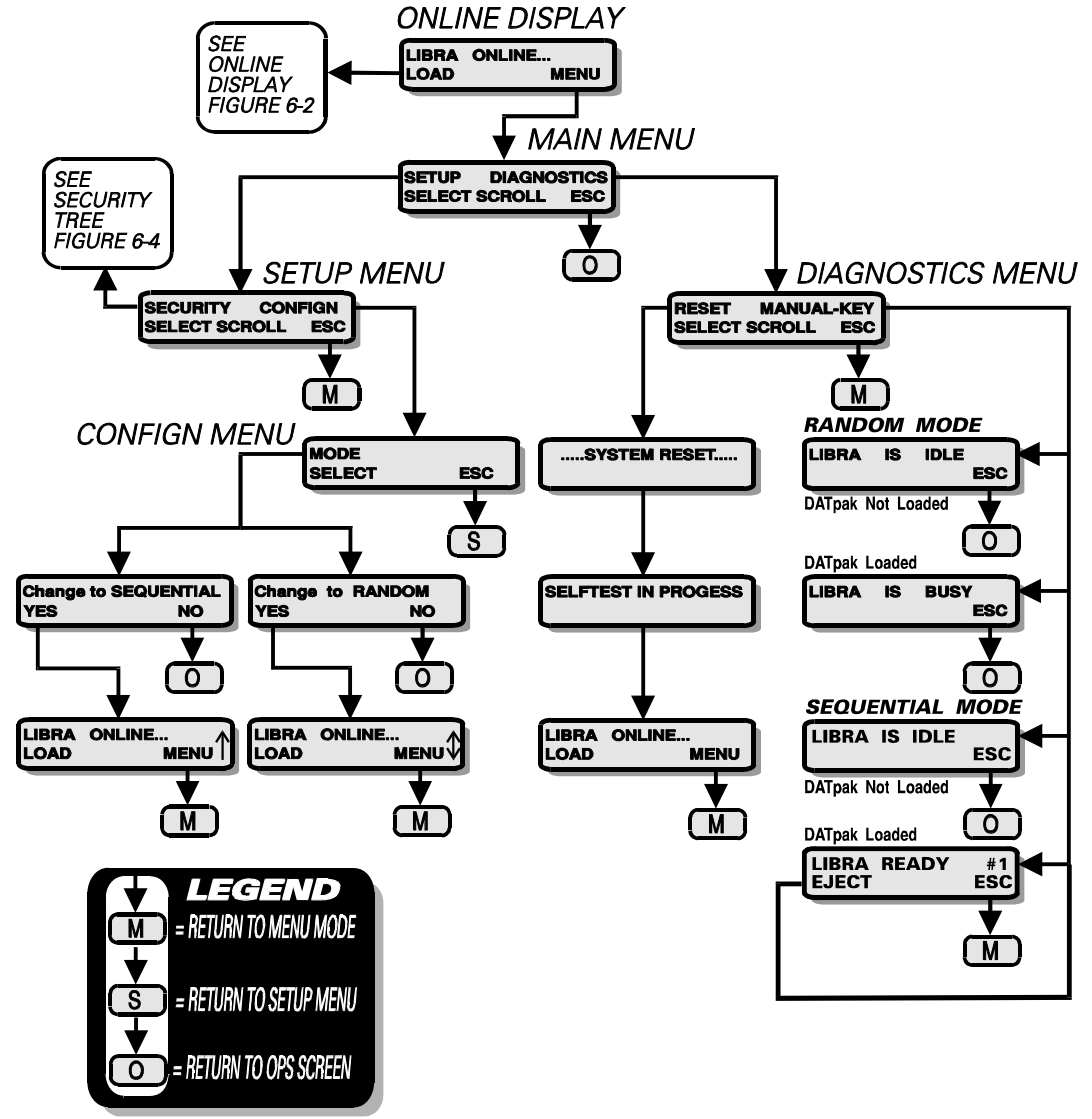


FIGURE 6-3 CONFIGN & DIAGNOSTICS MENU ,ACCESS TREE

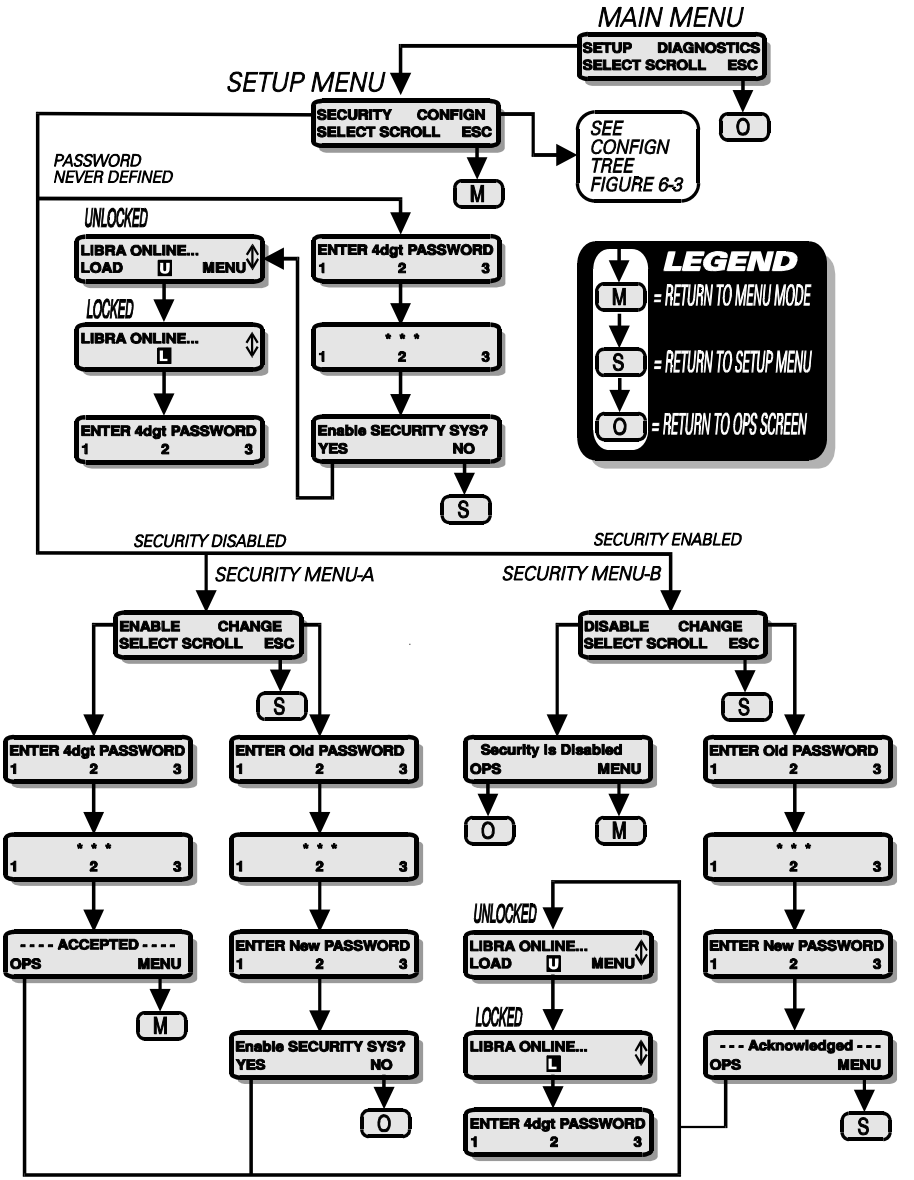


FIGURE 6-4 SECURITY MENU, ACCESS TREE

CHAPTER 7
LIBRA SYSTEM OPERATION

7.1 CONFIGURING THE OPERATIONAL MODE

NOTE: *Operational mode selection should be performed according to the intended use of the LIBRA DAT Library and the capabilities of the chosen controlling software package (Refer to chapter 5, section 5.1).*

NOTE: *Host communication with the SCSI Medium Changer will be unsuccessful while the LIBRA is operating in the Sequential mode. Attempts to communicate may cause SCSI bus errors that could hang the bus, possibly requiring a SCSI reset or other inconveniences. If your application supports Random operation, it is recommended that you consider possible conflicts (such as unattended job schedules) before changing to the Sequential operational mode.*

7.1.1 Changing from Random to Sequential

To change the operational mode from Random to Sequential, follow steps 1 thru 7 below:

1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: *If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)*

2. Ensure that the system is idle and the DATpak is unloaded. To verify this, inspect the DATpak position behind the smoke glass door and check for the "LIBRA ONLINE..." message on the Front Panel display.

NOTE: *If the DATpak is not unloaded, you will have to unload it before a mode change can be performed. (Refer to chapter 7, section 7.2.2)*

NOTE: *If an attempt to select the CONFIGURE MODE function is performed while the DATpak is loaded, the following message will be displayed:*

Should this situation arise, merely press the ESC soft key to transfer back to the current OPS display screen.

3. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

The Main menu selection screen should now be displayed:

4. With the blinking cursor positioned at the "S" in SETUP, press the SELECT soft key. This will access the SETUP menu selection screen, shown below:

5. Position the blinking cursor to the "C" in CONFIGN using the SCROLL soft key as necessary. Press the SELECT soft key to access the SETUP CONFIGURATION menu selection screen, shown below:

6. With the blinking cursor positioned at the "M" in MODE, press the SELECT soft key. If the DATpak is indeed unloaded, the following inquiry will be displayed:

7. Perform one of the following:

a) To cancel the mode change and quit back to the current OPS screen, press the "NO" soft key. The Mode Status Arrow should indicate that no mode change was performed.

b) To perform the mode change to Sequential and return to the current OPS screen, press the "YES" soft key. The Mode Status Arrow should indicate the successful mode change. Keep in mind that the LIBRA will default back to the Random operational mode in the event of a system reset or power loss.

7.1.2 Changing From Sequential To Random

To restore the LIBRA back to Random operational mode complete the following 7 steps (for screen referance see changing from Random to Sequential).

1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

2. Ensure that the system is idle and the DATpak is unloaded. To verify this, inspect the DATpak position behind the smoke glass door and check for the "LIBRA ONLINE..." message on the Front Panel display.

3. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

4. With the blinking cursor positioned at the "S" in SETUP, press the SELECT soft key. This will access the SETUP menu selection screen.

5. Position the blinking cursor to the "C" in CONFIGN using the SCROLL soft key as necessary. Press the SELECT soft key to access the SETUP CONFIGURATION menu selection screen.

NOTE: If the DATpak is loaded, you will have to unload it before a mode change can be performed. (Refer to chapter 7, section 7.3.2)

6. With the blinking cursor positioned at the "M" in MODE, press the SELECT soft key. If the DATpak is indeed unloaded, the following inquiry will be displayed:

7. Perform one of the following:

a) To cancel the mode change and quit back to the current OPS screen, press the "NO" soft key. The Mode Status Arrow should indicate that no mode change was performed.

b) To perform the mode change to Random and return to the current OPS screen, press the "YES" soft key. The Mode Status Arrow should indicate the successful mode change.

NOTE: Host communication with the SCSI Medium Changer will be unsuccessful while the LIBRA is operating in the Sequential mode. SCSI bus inquiries performed while operating in the Sequential mode may have caused the LIBRA Medium Changer to break communication with the Front Panel. As a result, you may find it necessary to cycle power on the LIBRA before reestablishing successful communication between the host and the Medium Changer following a mode change from Sequential to Random.

7.2 OPERATING IN RANDOM MODE

NOTE: *Depending on the software package you have chosen, manual loading of the DATpak from the Front Panel may or may not be necessary. Several backup packages support software controlled DATpak loading and only require that the DATpak already be inserted correctly in the Data Elevator Area. Please consult your software users manual for specific requirements pertaining to your application.*

NOTE: *It is not possible to manually insert cassettes into the DAT drive from the Front Panel if you are operating in the Random Mode. Cassette insertion is controlled by the host software. If you find it necessary to manually insert cassettes you will have to change the operating mode to Sequential, (Refer to chapter 7, section 7.1.1). Manual cassette insertion for the Sequential mode of operation is described in the "Operating in Sequential Mode" section 7.3.3 of this chapter.*

7.2.1 Loading The DATpak

1. Place the DATpak in the Data Elevator Area (refer to Figure 3-5, Inserting the DATpak Into the Cassette Insertion/Retrieval Assembly).

NOTE: *Ensure that all of the cassettes are installed properly in the DATpak.*

2. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: *If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)*

3. Press the LOAD soft key to load the DATpak. Allow approximately 1 second for LIBRA to verify DAT tape drive status prior to DATpak initialization. The following screen should be displayed:

4. The DATpak will travel its full length while the LIBRA determines cassette population. After initialization, the DATpak will travel back up until it is positioned at the top most slot (slot 1). The DATpak will stop at slot 1 and the following message will be displayed:

5. Once positioned, no further control is necessary from the Front Panel. The LIBRA is ready to receive Medium Changer commands from the host, or to be manually unloaded from the Front Panel.

7.2.2 Unloading The DATpak

NOTE: *DATpak unloading can generally be performed any time the DATpak is in a loaded position. Because the LIBRA is controlled by host software, however, care should be taken not to unload the DATpak if this may conflict with software commands being sent from the host.*

1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)

2. Press the UNLOAD soft key to unload the DATpak.

If there is a cassette loaded in the DAT drive, the cassette will be ejected first. While the tape is being ejected from the drive, the UNLOAD soft key label will blink to acknowledge the unload request.

After all cassettes are back in the DATpak, the unload will occur and the following screen will be displayed:

3. After the unload has occurred, the following screen will be displayed:

7.3 OPERATING IN SEQUENTIAL MODE

NOTE: The DATpak will always be required to be loaded manually while operating in Sequential mode. When the DATpak is loaded in Sequential mode, the LIBRA will automatically load the top most cassette installed in the DATpak.

7.3.1 Loading the DATpak

1. Place the DATpak in the Data Elevator Area (refer to Figure 3-5, Inserting the DATpak Into the Cassette Insertion/Retrieval Assembly).

2. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: *If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)*

3. Press the LOAD soft key to load the DATpak. Allow approximately 1 second for LIBRA to verify DAT tape drive status prior to DATpak initialization. The following screen should be displayed:

4. The DATpak will travel its full length while the LIBRA determines cassette population. After initialization, the DATpak will travel back up until it is positioned at the top most occupied slot. If there is a cassette in slot 1, the following message will be displayed:

5. After positioning at an occupied slot, the LIBRA will automatically insert the cassette into the DAT drive. If there is a cassette in slot 1, the following message will be displayed:

6. After the tape is inserted into the DAT drive, the drive will initialize the tape. The following screen will be displayed while the drive is active:

7. When the drive becomes ready, the following screen will be displayed:

8. The LIBRA is ready to receive DAT drive commands from the host, an UNLOAD command from the Front Panel, or a manual eject command using the Manual-Key function (Refer to chapter 7, section 7.3.3).

7.3.2 Unloading The DATpak

NOTE: *DATpak unloading can generally be performed any time the DATpak is in a loaded position. Because the LIBRA is controlled by host software, however, care should be taken not to unload the DATpak if this may conflict with software commands being sent from the host.*

1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

2. Press the UNLOAD soft key to unload the DATpak.

If there is a cassette loaded in the DAT drive, the cassette will be ejected first. While the tape is being ejected from the drive, the UNLOAD soft key label will blink to acknowledge the unload request.

Afterall cassettes are back in the DATpak, the unload will occur and the following screen will be displayed:

3. After the unload has occurred, the following screen will be displayed:

7.3.3 Manual Cassette Control

NOTE: *If the user wishes to eject a cassette from the DAT drive and then insert another manually, the following procedure should be followed. Manual cassette control is only available in the Sequential mode of operation, so only consecutive cassettes may be inserted into the drive. For example, if the cassette from slot 1 is currently installed in the drive and the cassette in slot 3 is desired to be installed, the user must eject cassette #1, wait for cassette #2 to be inserted, eject cassette #2, and wait for cassette #3 to be inserted. This function is also useful for manually testing the LIBRA robotics. The user can quickly cycle through the insertion and retrieval of each of the cassettes installed in the DATpak.*

1. Using the Mode Arrow, verify that the LIBRA is in Sequential mode. Manual cassette control is only supported in the Sequential mode.

If the LIBRA is not in the Sequential mode, you will have to configure the mode before selecting the Manual-Key function. (Refer to chapter 7, section 7.1.1)

NOTE: *If an attempt to select the Manual-Key function is performed while the LIBRA is in Random mode, the following message will be displayed:*

Should this situation arise, merely press the ESC soft key to transfer back to the current OPS display screen.

2. Check to verify that the DATpak is loaded and a cassette is currently inserted into the drive. The Manual-Key function is only supported when there is already a DATpak loaded and a cassette inserted in the drive.

If the DATpak is not loaded, you will have to load the DATpak before selecting the Manual-Key function. (Refer to chapter 7, section 7.3.1)

NOTE: *If an attempt to select the Manual-Key function is performed while the DATpak is not loaded, the following message will be displayed:*

Should this situation arise, merely press the ESC soft key to transfer back to the current OPS display screen.

3. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: *If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)*

4. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

The Main menu selection screen should now be displayed:

```
SETUP     DIAGNOSTICS
SELECT SCROLL    ESC
```

5. Position the blinking cursor to the "D" in DIAGNOSTICS using the SCROLL soft key as necessary. Press the SELECT soft key to access the DIAGNOSTICS menu selection screen, shown below:

```
RESET     MANUAL-KEY
SELECT SCROLL    ESC
```

6. Position the blinking cursor to the "M" in MANUAL-KEY using the SCROLL soft key as necessary. When the SELECT soft key is pressed, the current (OPS) message will be displayed with modified soft key labels. An example is shown below:

```
LIBRA READY      #1
EJECT            ESC
```

7. If the EJECT command was selected, the cassette will be ejected and retrieved and the corresponding OPS status messages will be displayed on the LCD message line.

8. Perform one of the following:

a) To end the Manual-Key function and escape back to the Main menu selection screen, press the ESC soft key.

b) To continue with the Manual-Key function to insert the next consecutive cassette, press the EJECT soft key.

7.3.4 Inserting a Cleaning Cassette

NOTE: *You can use the manual cassette control procedure to insert a cleaning cassette from any available slot while operating in the Sequential mode. It should be noted, though, that since the DAT drive automatically ejects cleaning cassettes after the head has been cleaned, the next consecutive cassette will be inserted into the drive. For this reason, it may be more convenient to remove all other cassettes and make the cleaning cassette the only cassette in the DATpak. This allows for a simple alternative to the Manual-Key function for inserting cleaning cassettes. Merely pressing the Load soft key will result in the DATpak being loaded, the cassette being inserted into the drive, the head being cleaned, the cassette being ejected, and the DATpak being unloaded.*

7.4 USING THE SECURITY SYSTEM

NOTE: *The first time the user attempts to access the Setup Security menu selection screen, the LIBRA will require an initial 4-digit password to be defined. Once defined, this password will be recorded in non-volatile memory (that is, it will be retained even when power has been turned off) and will be expected to be reproduced by the user as required. It is recommended that the user choose a simple and meaningful password and then record and store the chosen password in a safe and secure location. In the event that the user forgets the chosen password, a maintenance password has been defined and is provided on a tear-away card at the back of the users manual.*

1. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

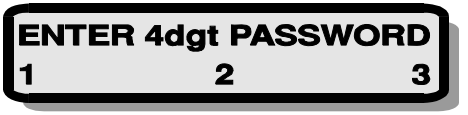
The Main menu selection screen should now be displayed:

```
SETUP     DIAGNOSTICS
SELECT SCROLL    ESC
```

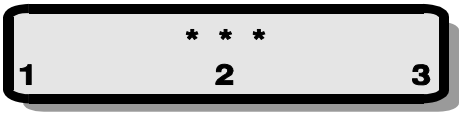
2. With the blinking cursor positioned at the "S" in SETUP, press the SELECT soft key. This will access the SETUP menu selection screen, shown below:

```
SECURITY     CONFIGN
SELECT SCROLL    ESC
```

3. With the blinking cursor positioned at the "S" in SECURITY, press the SELECT soft key. The following message will be displayed:



4. Enter your chosen 4-digit password by pressing the appropriate sequence of soft keys. As each digit is pressed, an asterisk will be displayed on the LCD message line to acknowledge the switch depression:



5. After the fourth digit has been entered, the following message will be displayed:

6. Perform one of the following:

a) To exit back to the current OPS screen without enabling the Security System, press the NO soft key.

b) To exit back to the current OPS screen with the Security System enabled, press the YES soft key.

7. Verify that the correct Security Status label is displayed on the OPS display.

Security ENABLED & UNLOCKED:

Security NOT ENABLED:

7.4.1 Enabling The Security

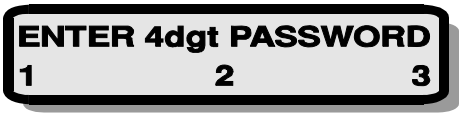
1. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

The Main menu selection screen should now be displayed:

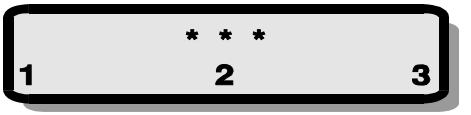
2. With the blinking cursor positioned at the "S" in SETUP, press the SELECT soft key. This will access the SETUP menu selection screen, shown below:

3. With the blinking cursor positioned at the "S" in SECURITY, press the SELECT soft key. This will access the SETUP SECURITY menu selection screen, shown below:

4. With the blinking cursor positioned at the "E" in ENABLE, press the SELECT soft key. The following message will be displayed:



5. Enter your chosen 4-digit password by pressing the appropriate sequence of soft keys. As each digit is pressed, an asterisk will be displayed on the LCD message line to acknowledge the switch depression:



6. After the fourth digit has been entered, one of the following situations will occur:

a) If the password has been entered incorrectly, the following message will be displayed:

b) If the password has been entered correctly, the following message will be displayed:

7. Perform one of the following:

a) To return back to the Setup menu selection screen press the MENU soft key.

b) To exit back to the current OPS screen, press the OPS soft key. Verify that the correct Security Status label is displayed on the LCD command line.

7.4.2 Locking The Front Panel Control

1. From the current OPS screen, verify that a "U" is displayed for the Security Status soft key label. An example screen is shown below:

2. Press the Security Status soft key. The Security Status soft key label will change to an "L" and the other soft key labels will be blanked as shown:

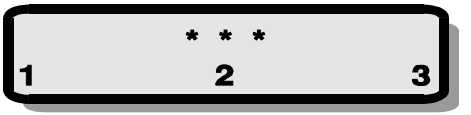
Front Panel control is now locked.

7.4.3 Unlocking The Front Panel Control

1. From the current OPS screen, verify that a "L" is displayed for the Security Status soft key label. An example screen is shown below:

2. Press the Security Status soft key. The following message will be displayed:

3. Enter your chosen 4-digit password by pressing the appropriate sequence of soft keys. As each digit is pressed, an asterisk will be displayed on the LCD message line to acknowledge the switch depression:



4. After the fourth digit has been entered, one of the following situations will occur:

a) If the password has been entered incorrectly, the following message will be displayed:

b) If the password has been entered correctly, the following message will be displayed:

3. Press the RETURN soft key to exit back to the current OPS screen. Verify that the correct Security Status label is displayed on the LCD command line.

7.4.4 Changing your Password

1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: *If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)*

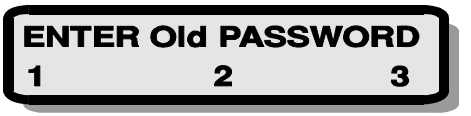
2. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

The Main menu selection screen should now be displayed:

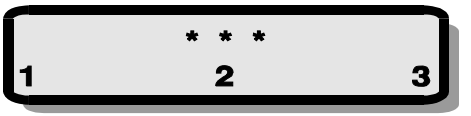
3. With the blinking cursor positioned at the "S" in SETUP, press the SELECT soft key. This will access the SETUP menu selection screen, shown below:

4. With the blinking cursor positioned at the "S" in SECURITY, press the SELECT soft key. This will access the SETUP SECURITY menu selection screen, shown below:

5. Position the blinking cursor at the "C" in CHANGE using the SCROLL soft key as necessary. Press the SELECT soft key and the following message will be displayed:



6. Enter your previously defined 4-digit password by pressing the appropriate sequence of soft keys. As each digit is pressed, an asterisk will be displayed on the LCD message line to acknowledge the switch depression:



7. After the fourth digit has been entered, one of the following situations will occur:

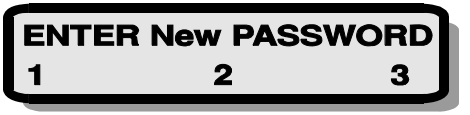
a) If the password has been entered incorrectly, the following message will be displayed:

Perform one of the following:

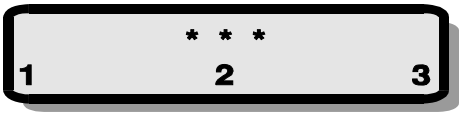
1) Press the OPS soft key to exit back to the current OPS screen. The user password will remain the same.

2) Press the MENU soft key to return to the Setup menu selection screen. The user password will remain the same.

b) If the password has been entered correctly, the following message will be displayed:



6. Enter your newly defined 4-digit password by pressing the appropriate sequence of soft keys. As each digit is pressed, an asterisk will be displayed on the LCD message line to acknowledge the switch depression:



7. After the fourth digit has been entered, the following message will be displayed:

8. Perform one of the following:

a) To return back to the Setup menu selection screen press the MENU soft key.

b) To exit back to the current OPS screen, press the OPS soft key.

7.4.5 Disabling The Security System

1. Verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

NOTE: If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)

2. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

The Main menu selection screen should now be displayed:

3. With the blinking cursor positioned at the "S" in SETUP, press the SELECT soft key. This will access the SETUP menu selection screen, shown below:

4. With the blinking cursor positioned at the "S" in SECURITY, press the SELECT soft key. This will access the SETUP SECURITY menu selection screen, shown below:

5. With the blinking cursor positioned at the "D" in DISABLE, press the SELECT soft key. The following message will be displayed:

6. Perform one of the following:

a) To return back to the Setup menu selection screen press the MENU soft key.

b) To exit back to the current OPS screen, press the OPS soft key. Verify that the correct Security Status label is displayed on the LCD command line.

7.5 RESETTING THE LIBRA

NOTE: If Front Panel control is locked, you will have to unlock it before accessing the menu system. (Refer to chapter 7, section 7.4.3)

7.5.1 Issuing a Soft Reset

1. If the Security System is enabled, verify that a "U" is displayed for the Security Status soft key label, indicating that Front Panel control is unlocked.

2. Enter the LIBRA menu system by pressing the MENU ACCESS soft key.

The Main menu selection screen should now be displayed:

3. Position the blinking cursor to the "D" in DIAGNOSTICS using the SCROLL soft key as necessary. Press the SELECT soft key to access the DIAGNOSTICS menu selection screen, shown below:

4. With the blinking cursor positioned to the "R" in RESET, press the SELECT soft key. The following sequence of messages will be displayed:

CHAPTER 8
PREVENTATIVE MAINTENANCE

8.1 *MAINTENANCE OVERVIEW*

Preventative Maintenance consists of two components, as follows:

- **Cleaning**
- **Media care and handling**

8.1.1 Cleaning The LIBRA

Clean the LIBRA Enclosure, Front Panel and Data Elevator Area well with a clean, dry cloth.

NOTE: *Try to keep the LIBRA System away from doors leading outside, open windows, dirty floor areas, or any other area were dirt or dust are present.*

8.1.2 Cleaning The DAT Drive

To clean the tape drive head, use a 4mm head cleaning tape (one is provided with the initial order) once after every 25 hours of tape motion.

The recommended cleaning tapes are as follows:

Sony Model DG-5CL

Maxell HS-4/CL

To clean the tape drive head insert the cleaning cassette into the DAT drive. (Refer to chapter 7, section 7.3.4) Once inserted the DAT drive will sense the presence of the cleaning cartridge, and will start the drive head cleaning process. When finished the drive will automatically eject the cleaning cassette.

NOTE: *Be sure to replace the Cleaning cassette after the recommended tape head cleanings. Over use of the cleaning cassette may cause damage to the tape drive read/write head.*

8.1.3 Media Care and Handling

Media care consists of handling, storage and inspection of cassette and tapes, as follows:

NOTE of CAUTION: *When handling tapes, the tape drive or the stacker mechanism, do not touch the magnetic tape, the tape drive capstan, or the elevator rollers on the stacker. Residue from finger contact can affect the tape or friction on the capstan or stacker mechanism.*

The cassette can withstand storage temperatures ranging from 41° F (5° C) to 113° F (45° C). The cassette should be conditioned, by exposure to the operating environment, for a time equal to or greater than the exposure time away from the operating environment (up to 24 hours maximum). When not used, tape cassettes should be stored vertically in cassette cases.

Inspect the cassettes periodically to ensure the tapes are not damaged. Broken or cracked cassettes should be discarded immediately. If damage to the magnetic coating is observed, the tape cassette should be discarded for the following reasons:

- **Data cannot be stored or retrieved from damaged sections on the tape.**
- **Serious damage to the tape drive read/write head may occur when using a damaged tape.**

Replacement tapes may be purchased from your supplier. (Refer to chapter 10, section 10.1-10.9)

8.1.4 Storing Backup Sets

If you have a daily backup routine it is recommended that you leave the tapes in the DATpak and locked in the LIBRA DAT Library until the tape capacity is full.

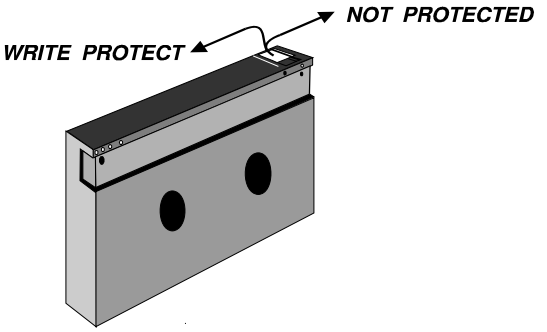
If you have a weekly backup routine it is recommended that two separate backup are ran on the last work day. One tape should be stored in a secure place within the company, and the other tape should be stored in a secure place outside the company. This practice should be implemented with any type of backup routine in case of fire or other disasters that could destroy valuable data.

Dat tapes that are at full capacity can be stored in the DATpak and put in a secure place. This is a clean and organized way to store tapes, and very effective if data needs to be restored quickly.

8.2 WRITE PROTECTING CASSETTES

To write protect a DAT 4mm cassette, slide the switch on the cassette so that the hole is OPEN. If the hole is in the CLOSED position the cassette is NOT write protected. See illustation below:

NOTE: *All cassettes with valuable data stored on them should be write protected.*



CHAPTER 9
TROUBLESHOOTING PROBLEMS

9.1 *LIBRA ERROR RECOVERY*

The LIBRA hardware has been designed to detect and correct most of the problems usually associated with tape autoloading devices. Using optical sensors and sophisticated retry control, the LIBRA robotics can operate to avoid cassette jams, tapes stuck in the drive, and other problems relating to DATpak misalignment. LIBRA motor drives are current limited, ensuring that only gentle forces of insertion, retieval, and elevator motion are used to protect the drive as well as personnel.

9.1.1 Error Messages

If the LIBRA error recovery system cannot avoid or correct a problem, an error message is displayed on the Front Panel LCD. The LIBRA error messages include both those displayed as English explanations, and those displayed as error codes.

Table 9-1 contains a list of error messages that are displayed as English explanations along with the corrective ACTION you should take to alleviate the problem.

9.1.2 English Error Messages

ERROR MESSAGES	CORRECTIVE ACTION
PACK UPSIDE DOWN	You have placed the DATpak upside down in the LIBRA. Remove the DATpak, turn over and re-insert. After reinserting, press the RESET Soft Key.
COMMUNICATIONS ERROR	Check SCSI cables and connections on all SCSI devices Check SCSI host adapter device drivers Check for SCSI address conflicts Correct problem, reset the LIBRA and the SCSI bus
CASSETTE IN WRONG	You have placed a cassette in the DATpak incorrectly. Check the cassettes, and remove and reinsert in the correct orientation. After reinserting, press the RESET Soft Key.

Table 9-1. English-Explained Error Messages

9.1.3 Error-Code Messages

Error-Code messages will appear in the following manner on the LCD:

Where XX = a numeric value. If a particular error code appears frequently, please notify your supplier. These errors are always corrected by pressing the RESET Soft Key which resets the system. A comprehensive list of error codes is provided in table 7-2

ERROR CODE # ON LCD	ERROR CODE DESCRIPTION	ACTION
11	Sissors Motor Overload	TECH. SUPPORT
12	Sissors Motor Timeout	
13	Cassette Not Retrieved By Hook	
14	Cassette In Place - Sensor Failure (missed wait point)	
21	Pack Motor Overload	
22	Pack Motor Timeout	
23	Index Not Detected	
24	DATpak Inserted Upside Down	
25	Cassette Inserted Wrong In DATpak	
31	Cassette Can Not Eject At This Time	
32	Fatal DAT Drive Diagnostics Error	
33	DAT Drive Timeout	
34	DAT Drive Won't Accept Cassette	
35	Cassette Already Loaded In DAT Drive	
41	Command Overlap: "LIBRA Is Busy"	
42	Not A Valid DATpak Slot	
43	Requested DATpak Slot Is Empty	
44	Wrong Mode	
45	Eject Timeout	
46	Eject Denied	
51	RAM Test Failure	
52	ROM Checksum Failure	
53	Illegal SPI Interrupt	
54	Illegal IRQ Interrupt	
61	Communication Error	
62	Illegal Error Code	

TABLE 9-2 List of Error Codes

9.2 TROUBLESHOOTING GUIDE

Table 9-3 contains a list of possible System and Software problems that may occur when you are operating the LIBRA. The list on the next page describes the symptom, possible cause and corrective action that you should take to alleviate the problem.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Can not Unlock the Front Panel Control	Forgot your Security Password to access the Front Pannel Control	Contact your supplier to obtain a special “bypass” password.
Can not change from Random to Sequential mode	The Front Panel Control is locked The DATpak is loaded	See unlocking the Front Panel in chapter 7 See unloading the DATpak in chapter 7
Can not access the Main Menu screen	The Front Panel Control is locked	See unlocking the Front Panel in chapter 7
Can not load or unload the DATpak	The Front Panel Control is locked	See unlocking the Front Panel in chapter 7
Software is not communicating with the LIBRA	The LIBRA is in Sequential mode Medium Changer driver not installed	See change to Random mode of operation in chapter 7 Refer to the Software installation instruction.
SCSI Host Adapter is not communicating with the LIBRA	SCSI cable connections SCSI Host Adapter driver is not installed SCSI Address conflict	Check SCSI cables connections and terminators Refer to the SCSI Host Adapter software installation Change SCSI Address on the LIBRA System
LIBRA can't manually insert or eject a tape	LIBRA is in Random mode	See changing to Sequential mode in chapter 7
Can not Lock Front Panel Control	Security System is disabled	See enabling the Security System
Can not change your Password	Front Panel Control is locked	See unlock Front Panel Control in chapter 7
Front Panel lock-up	Various	Press soft keys "1" & "3" simultaneously to issue soft reset

Table 9-3 Troubleshooting command errors

9.2.1 Mechanical & Electrical Problems

Table 9-4 contains a list of possible Mechanical and Electrical problems that may occur when you are operating the LIBRA. The list that follows describes the symptom, possible cause and corrective action that you should take to alleviate the problem.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
LCD display is not lighted	LCD display faulty	Replaced on-site by authorized personnel
Power failure	Fuse in AC power supply blown AC Power Supply faulty	Check for blown fuse and replace fuse Replaced on-site by authorized personnel
Key Lock is stuck	Mechanical Key Lock is jammed	Replaced on-site by authorized personnel
DATpak is stuck in loaded position	Media is jammed Elevator motor faulty	cycle power to retry error recovery Replaced on-site by authorized personnel
Cassette stuck in drive	Media is jammed DAT drive is faulty	cycle power to retry error recovery Replaced on-site by authorized personnel

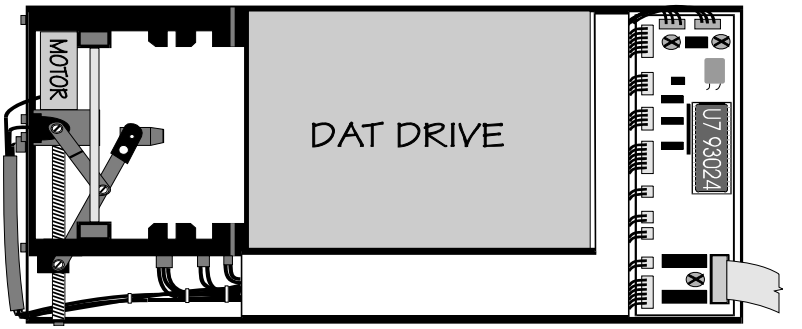
Table 9-4Troubleshooting Mechanical/Electrical problems

CHAPTER 10 ACCESSORIES/REPLACEMENT PARTS

10.1 ORDERING INFORMATION

Accessories and replacement parts can be ordered directly from your supplier. Ask your supplier for a detailed list of available Parts and Accessories for the LIBRA DAT Library System.

10.2 DRIVE/ROBOTICS ASSEMBLIES



4mm DAT Drive, ARCHIVE Model #4320

4mm DAT Drive, w/Data Compression, ARCHIVE Model # 4324

4mm Turbo DAT Drive, Archive Model #4324

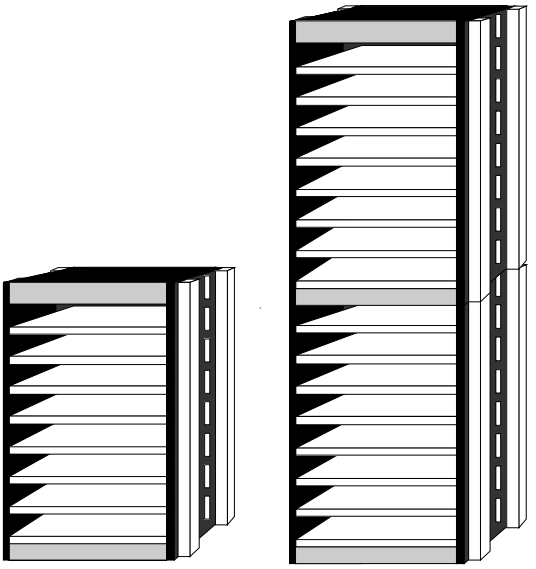
4mm DAT Drive, Hewlett-Packard, Model # 35470

4mm DAT Drive, w/Data Compression, Hewlett-Packard Model # 35480

4mm DAT Drive, DDS2, w/Data Compression, Wangdat Model # 3400

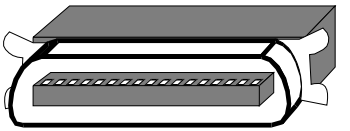
4mm DAT Drive, DDS2, w/Data Compression, ARCHIVE Model # 4326

10.3 DATpak's



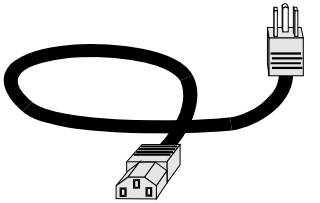
DP8-0	**8-slot DATpak without tapes**
DP-8L	**8-slot DATpak with 8, 90m 4mm tapes**
DP8-8	**8-slot DATpak with 8, 120m 4mm tapes**
DP16-0	**16-slot DATpak without tapes**
DP16-01	**16-slot DATpak with 16, 90m 4mm tapes**
DP16-16	**16-slot DATpak with 16, 120m 4mm tapes**

10.4 TERMINATORS



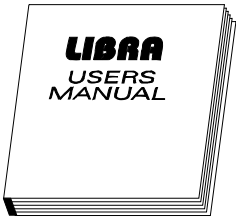
SCSI Centronics Single-Ended Extended Terminator

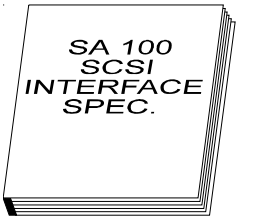
10.5 POWER CORDS



Line Cord, AC Power 115V 6-8'

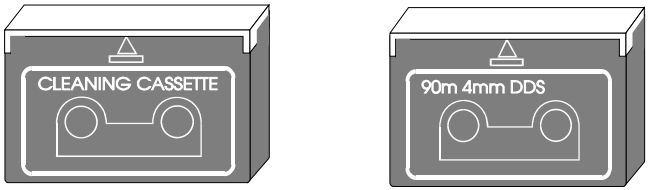
10.6 MANUALS





LIBRA User's Manual & Technical Reference Manuals

10.7 TAPE CARTRIDGES



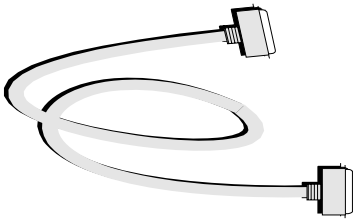
120m 4mm DAT DDS2 Tape Cartridge

90m 4mm DAT Tape Cartridge

60m 4mm DAT Tape Cartridge

4mm DAT Cleaning Cartridge (tape)

10.8 INPUT/OUTPUT CABLES



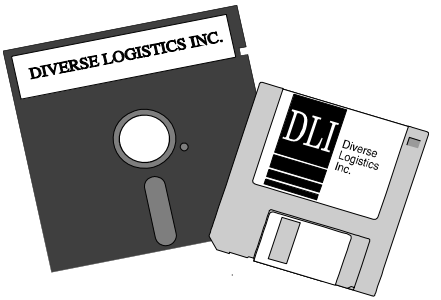
6' SCSI cable, Centronics 50 male to Centronics 50 male

6' SCSI cable, Centronics 50 male to half pitch DB-50 male

6' SCSI cable, Centronics 50 male to DB-50 male

6' SCSI cable, Centronics 50 male to half pitch DB-68 male

10.10 SUPPORTED SOFTWARE PACKAGES



Software Driver, DLI Back-it 4

Software Driver, Cheyenne ARCserve (NLM)

Software Driver, Cheyenne ARCserve (Windows NLM)

Software Driver, SGL DATTOOL PLUS

Software Package, SGL DATTOOL PLUS, 5 - Unlimt. Nodes

Software Package, ACORN BRANCHES

Software Package, CHEYENNE ARCserve 4.0, 5 - 100 Users

Software Package, CHEYENNE ARCserve 5.0, 5 - 1000 Users

Software Package, GAZELLE Back-it 4DOS

Software Package, GAZELLE Back-it 4Windows