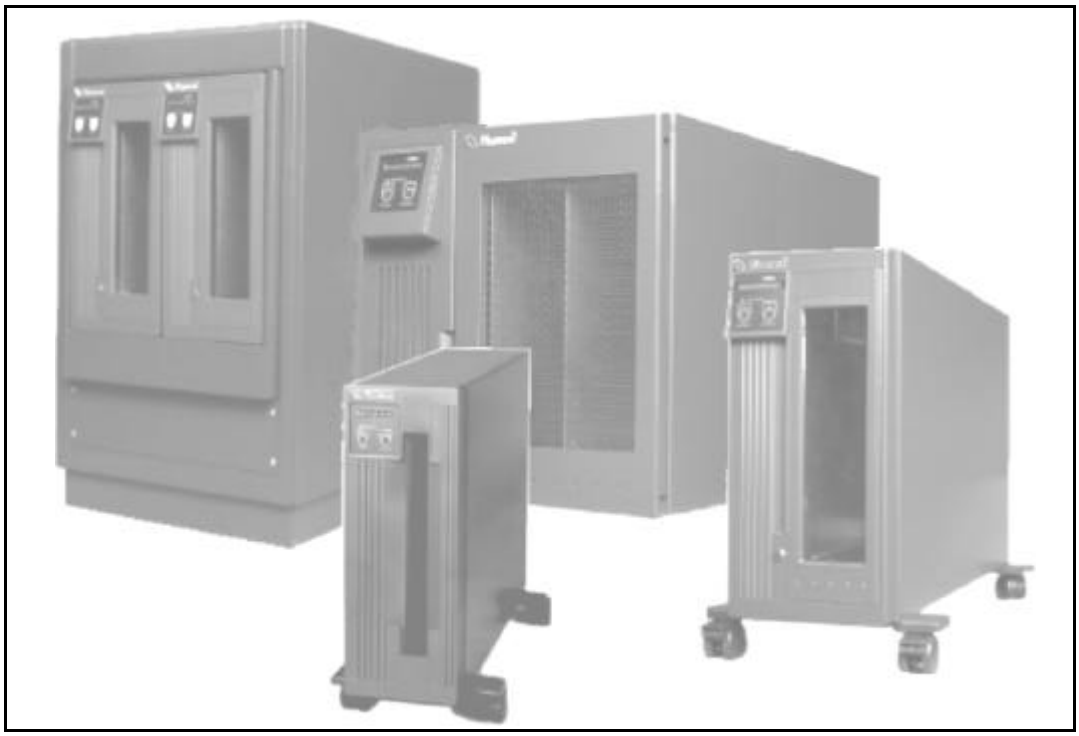

THE PLASMON 8000 SERIES

LASERDRIVE LD 8100 ®
AUTOLOADER LF 8120
AUTOLOADER LF 8600
AUTOLOADER LF 8602

HIGH PERFORMANCE DISK DRIVE AND AUTOCHANGERS

PRODUCT SPECIFICATION

P/N 97663035 B

Plasmon

Storing More Of Your Digital World ™. Permanently.

New features and changes to information in this document are indicated by change bars. Revision level is indicated by the letter following the eight-digit document number. If a document has undergone major modifications, change bars will not be inserted in the document.

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TABLE OF CONTENTS

SCOPE

This document describes the physical and functional characteristics of the LD 8100, the LF 8120, the LF 8600, and the LF 8602, their accessories and configuration options. The specification is provided for system integrators, engineers, and managers and users of information systems.

NOTE

The term "LaserDrive" or "Drive" as used in this document, refers to the LD 8100, LF 8120, LF 8600 and the LF 8602. If a feature applies specifically to the LD 8100, LF 8120, LF 8600 or LF 8602, then the appropriate model number is used.

RELATED PUBLICATIONS

The following Plasmon LMS publications pertain to this document:

PUBLICATION	PART NUMBER
LD 8100/LF 8120/LF 8600/LF 8602 SCSI Interface Specification	97662164
LD 8100 User Manual	97662915
LF 8120 User Manual	97664106
LF 8600 User Manual	97663032
LF 8602 User Manual	97663083
LD 8100 Hardware Maintenance Manual	97663081
LF 8120/LF 8600/LF 8602 Hardware Maintenance Manual	97663082

WARRANTY STATEMENT

The LD 8100, LF 8120, LF 8600, and the LF 8602 is warranted as stated in the purchase agreement between Plasmon and it's customer, or the Plasmon sales order acknowledgment, whichever is applicable.

The Plasmon LMS quality system is in compliance and registered to ISO 9001. The LD 8100, LF 8120/LF 8600, and the LF 8602 is manufactured from new parts, or remanufactured parts.

The LaserDrive warranty does not cover defects or damage caused by the use of unauthorized parts or repairs or improper use or maintenance. Repairs or replacements not covered by the warranty will be invoiced at LMS' current prices.

The warranty is void when installation, service or repairs are performed by unauthorized personnel; when the product is affected by unauthorized alterations, modifications or other tampering or misuse; when the product is incorporated into a system which causes or involves any changes in the physical, mechanical or electrical arrangement of the product; or when the product is not used in accordance with its applicable specifications.

The term, authorized personnel, is defined as those persons who have been trained by Plasmon LMS Technical Services or other authorized training providers.

GENERAL DESCRIPTION

The LD 8100 LaserDrive®, LF 8120 Autoloader, LF 8600 Autoloader and LF 8602 Autoloader are Write Once Read Many (WORM), high-capacity, random-access optical disk drives. All four 8000 model drives store data on LM 8000 media which is 300-mm (12-in.) diameter double-sided optical media with a capacity of 30 GBytes. Media is interchangeable between the LD 8100 LaserDrive, the LF 8120 Autoloader, the LF 8600 Autoloader and the LF 8602 Autoloader.

The LD 8100, LF 8120, LF 8600 and LF 8602 use the same drive mechanisms and optical systems. Dual actuators provide online access to the total media capacity of 30 GBytes.

The LF 8120 Autoloader includes an integral shuttle which can hold up to 12 media cartridges. The shuttle moves laterally to position individual media cartridges for loading and unloading into the optical drive. The LF 8120 shuttle provides automatic cartridge exchange and nearline access up to 360 GBytes with 30 GBytes online.

The LF 8600 Autoloader includes an integral shuttle which can hold up to six media cartridges. The shuttle moves laterally to position individual media cartridges for loading and unloading into the optical drive. The LF 8600 shuttle provides automatic cartridge exchange and nearline access up to 180 GBytes with 30 GBytes online.

The LF 8602 is a cabinet configuration, housing two LF 8600 drives side-by-side.

The 8000 Drives support a maximum sustained read and write transfer rate of 6.0 MBytes/sec without data verification. The drive will also support a 2.9 MBytes/sec write transfer rate with error correction and defect management to maintain data integrity and manage media flaws.

The LD 8100 LaserDrive and the 8000 Autoloaders have a common Drive Operator Console (DOC) on the front panel to allow user control of normal drive operations and diagnostic information.

The LD 8100's single slot opening accepts one cartridge, inserted manually or via a library.
The LF 8120's (LF 8600) media access door provides operator access to all 12 (six) media cartridges. The door key lock helps prevent cartridge removal. The LM 6000 media may inserted into the drive in either direction. The LM 8000 media must always be inserted into drive Side A facing to the right. Inserting the media Side A left will result in an RCBM fault on spin-up, resulting in a SCSI Check Condition.

The Small Computer System Interface (SCSI-3) allows up to 16 devices to be interconnected on a common bus. The SCSI-3 interface standard is supported with two micro-style connectors (68 pins) for daisy chaining multiple SCSI-3 devices. The drives are configured with either a single-ended or differential interface (wide, 16 bit) which can be re-configured in the field by moving the SCSI cable on the WOODI PCA. Both the single-ended and differential embedded controllers support asynchronous and synchronous data transfer operations. The drives support Fast SCSI-2 within the guidelines of ANSI X3.131-1994.

Preventive maintenance of the 8000 Drives is minimal. Corrective maintenance is simplified by internal diagnostic firmware which detects and isolates malfunctioning Field Replaceable Units (FRU's) for easy removal and replacement.

The LM 8000 media is interchangeable between the Drives and all Drives will be able to read LM 6000 media.

An Auxiliary Diagnostic Port (ADP) incorporated into each drive supports firmware upgrades which can be downloaded from an IBM compatible PC serial port. The drives also allow firmware upgrades to be downloaded from the SCSI port.

LD 8100 CONFIGURATION

The LD 8100 LaserDrive is available in a Rack Mount, Desktop, Tower, FileNet Library and Plasmon Library configuration (refer to the next figure). All five configurations have identical internal assemblies and chassis. The two library configurations include a Mechanized Cartridge Loading Interface (MCLI).

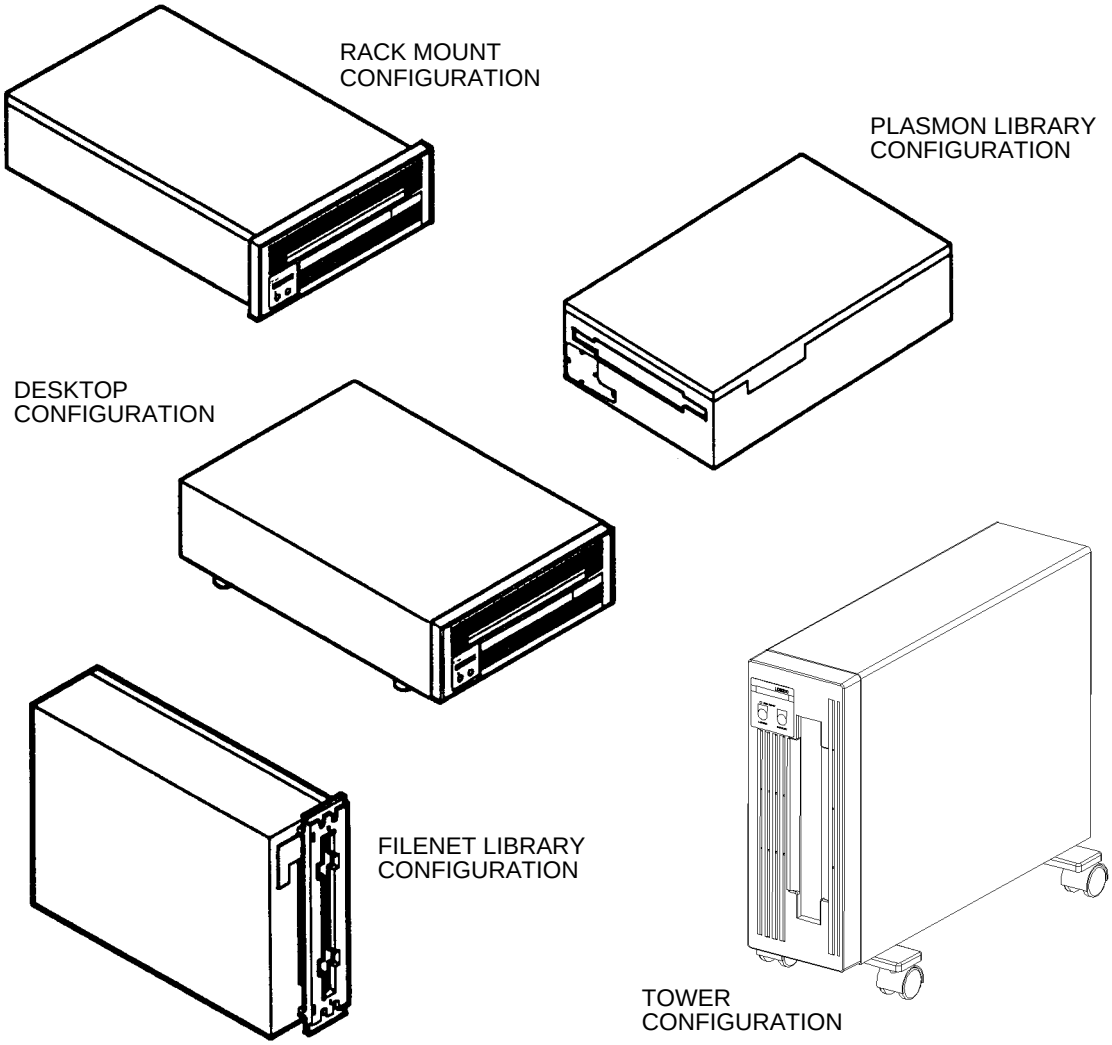


Figure 1. LD 8100 Configurations

LF 8120 COINFIGURATIONS

The LF 8120 Autoloader is available in either a Rack Mount or Tower configuration (refer to the figure below). These two configurations have identical internal assemblies and chassis. The Tower configuration is a stand-alone device suitable for deskside operation.

Two LF 8120 Rack Mount drive may be mounted in an EIA standard 19-in rack.

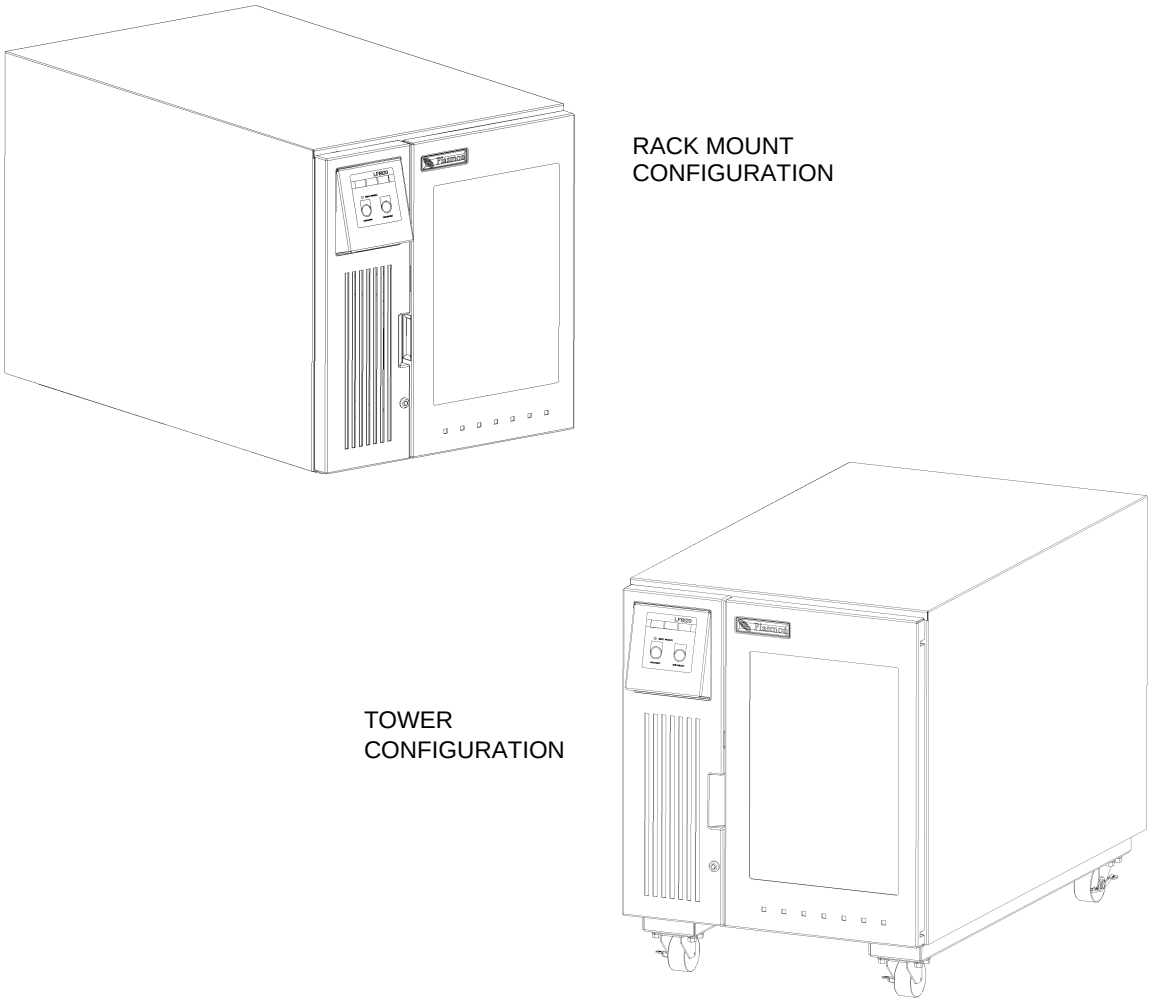


Figure 2. LF 8120 Configurations

LF 8600/LF 8602 CONFIGURATIONS

The LF 8600 Autoloader is available in either a Rack Mount or Tower configuration (refer to the figure below). These two configurations have identical internal assemblies and chassis. The Tower configuration is a stand-alone device suitable for deskside operation.

Two LF 8600 Rack Mount drives can be mounted side-by-side in an EIA standard 19-in. rack. This product is also available in a one meter-high cabinet and is referred to as the LF 8602 (refer to the next figure).

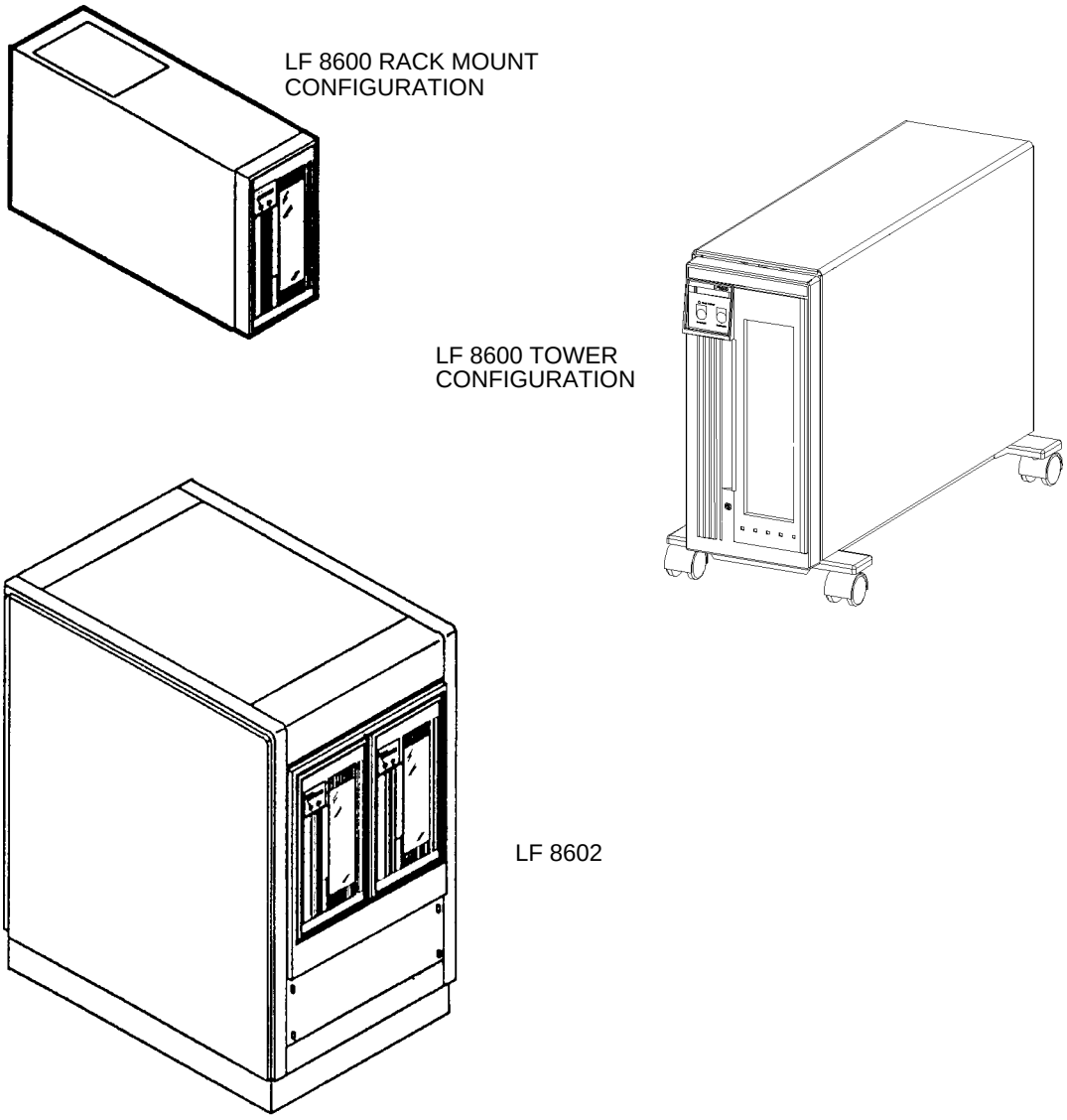


Figure 3. LF 8600 / LF 8602 Configurations

PHYSICAL CHARACTERISTICS

This section describes the LD 8100 LaserDrive in Rack Mount, Desktop and Tower configurations, the LF 8120 Rack Mount and Tower configurations, the LF 8600 in Rack Mount and Tower configurations, and the cabinet version of the LF 8602. Refer to Appendix B. for physical descriptions of the FileNet Library and Plasmon Library configurations.

The operator interface for the LD 8100, LF 8120, LF 8600 and LF 8602 is the Drive Operator Console (DOC) which consists of a 12-character alphanumeric display, a WRITE PROTECT indicator and two push button switches.

LD 8100 RACK MOUNT AND DESKTOP CONFIGURATIONS

The LD 8100 Rack Mount configuration (see figure below) is designed for horizontal operation and slide mounting in an EIA standard 19-in. rack. The Rack Mount configuration requires a slide kit.

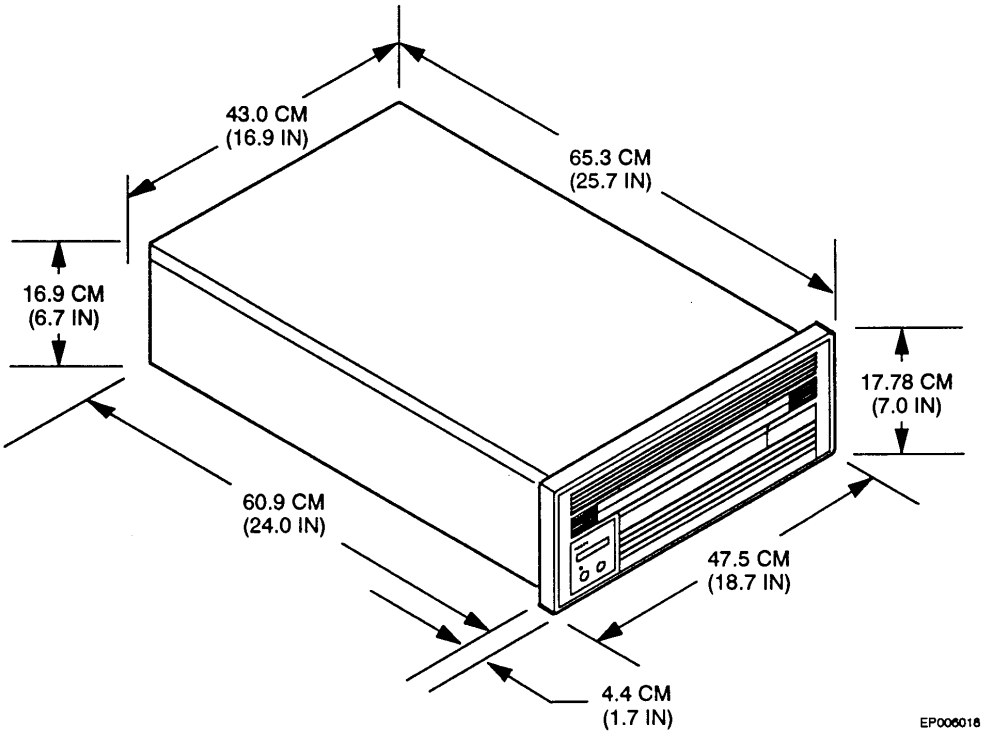


Figure 4. LD 8100 Rack Mount Drive

The LD 8100 Desktop configuration (see next figure) is designed for horizontal operation as a stand-alone device on a table top. The Desktop configuration includes an enclosure and rubber feet.

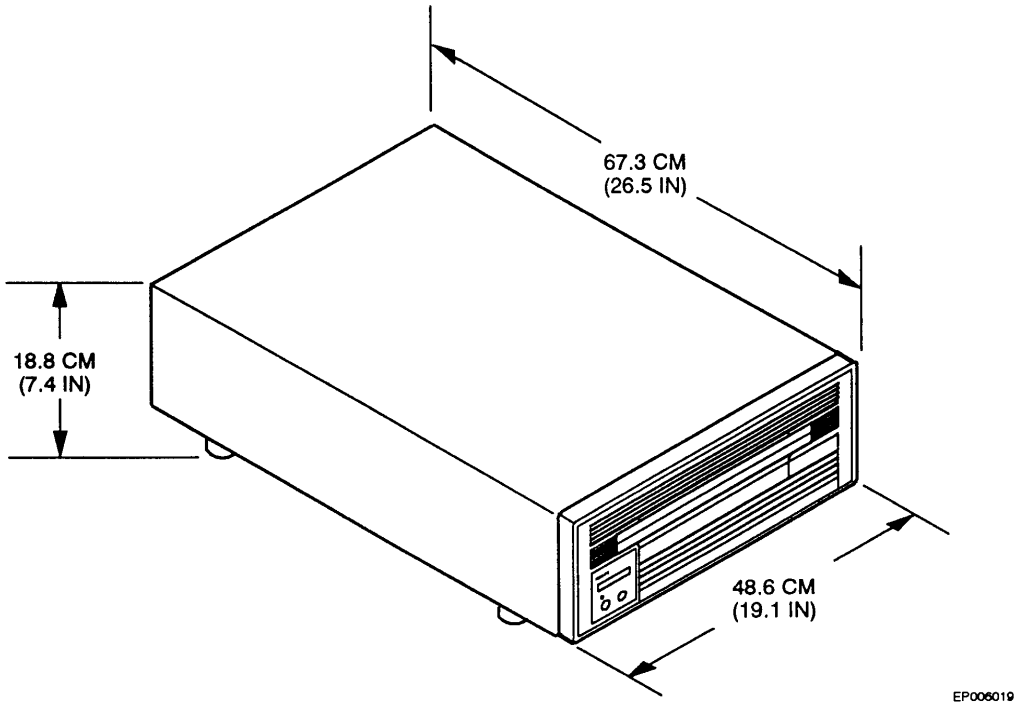


Figure 5. LD 8100 Desktop Drive

The figure below illustrates the front panel layout. The ADP connector is located beside the DOC but is concealed by the bezel.

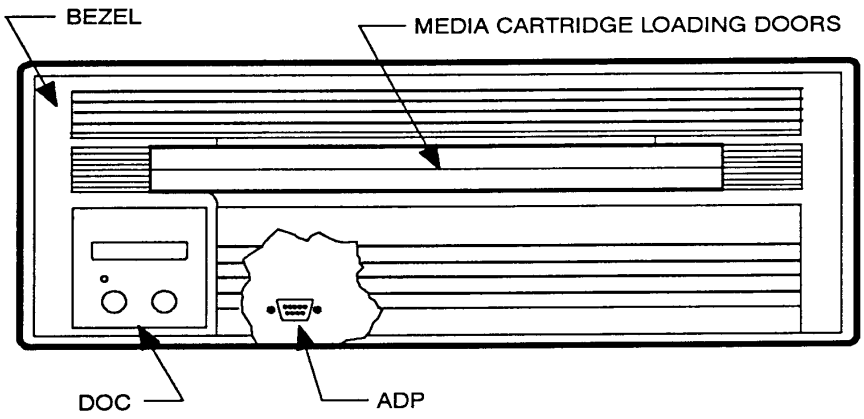


Figure 6. LD 8100 Rack Mount and Desktop Front Panel Layout (Rack Mount Configuration)

The LD 8100 Rack Mount and Desktop rear panel layout includes a DOC/ADP Blank Panel, MCLI Blank Panel, AC Power Switch, Fuse and Receptacle, SCSI-3 I/O Panel Assembly and a ground connector. The next figure illustrates the LD 8100 rear panel layout.

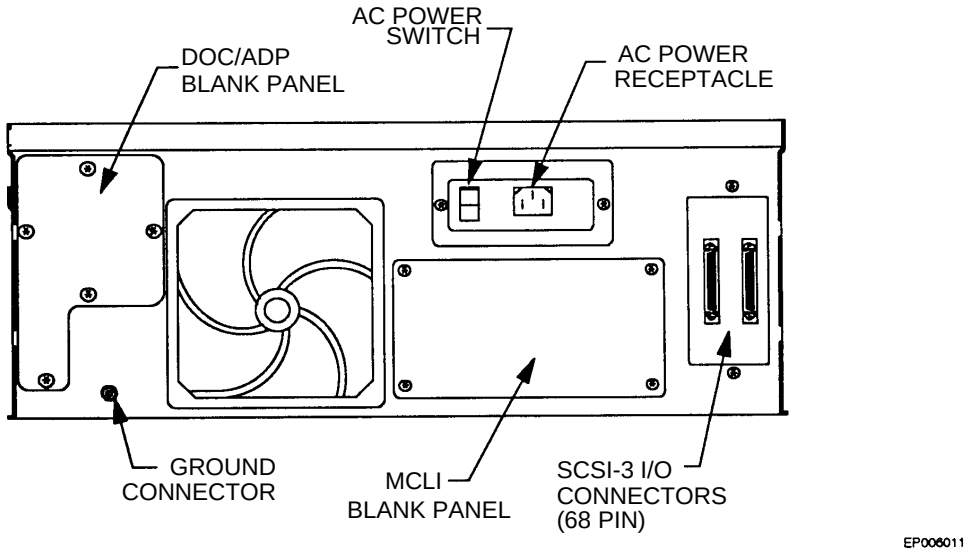


Figure 7. LD 8100 Rack Mount Rear Panel

LD 8100 TOWER CONFIGURATION

The Tower configuration (see the next figure) is designed for vertical operation as a stand-alone device on an open floor or beside a desk. The Tower configuration includes an enclosure for both the LD 8100 drive and the pedestal. The pedestal is supported by four casters which can be locked to prevent unintentional movement.

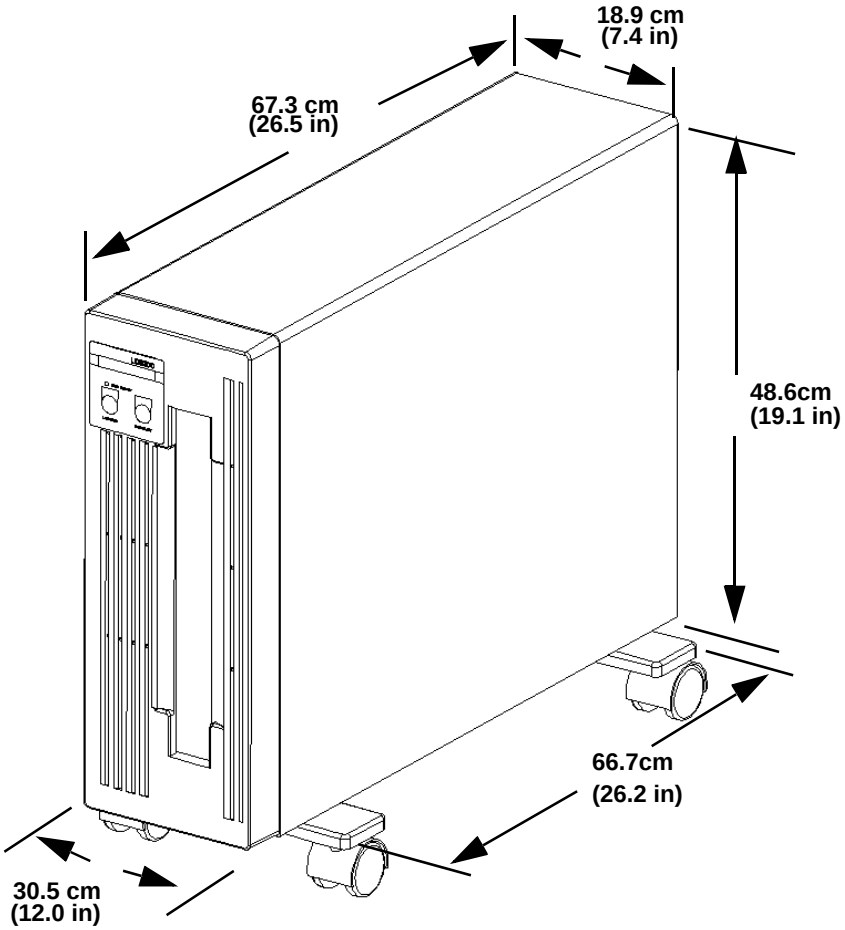
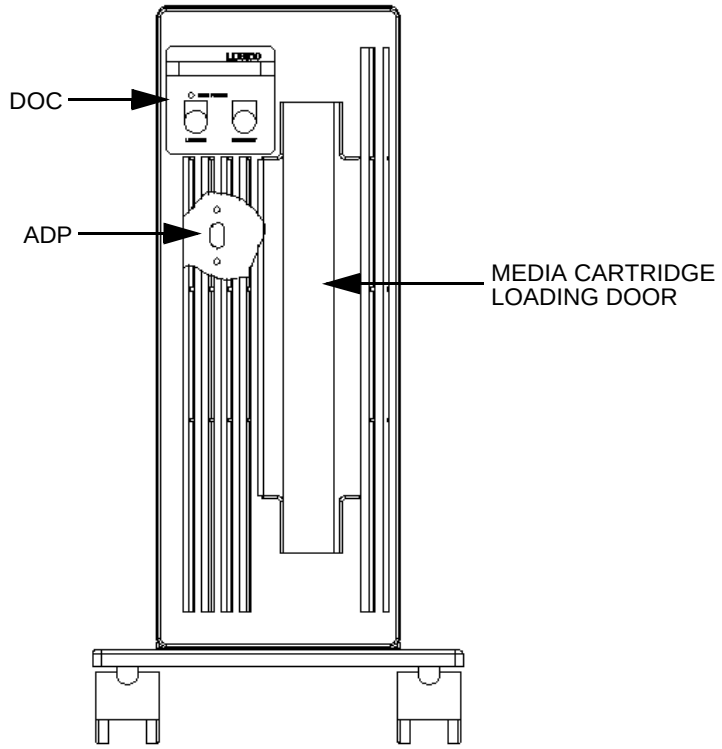
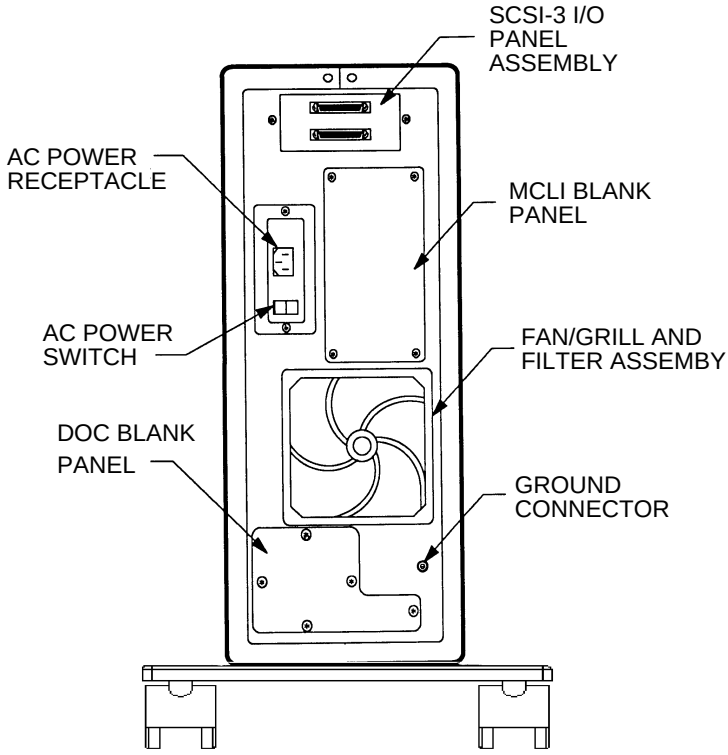


Figure 8. LD 8100 Tower Configuration



The figure on the left illustrates the front panel of the LD 8100 Tower and identifies the location of the DOC and ADP connector. The ADP connector is located below the DOC and is concealed by the bezel.

Figure 9. LD 8100 Tower Configuration
Front Panel Layout



The figure on the right illustrates the rear panel of the LD 8100 Tower configuration and identifies the location of the AC Power Switch, Fuse and Receptacle, ground connector, SCSI-3 I/O connectors, DOC/ADP Blank Panel and MCLI Blank Panel.

Figure 10. Rear View of
LD 8100 Tower Configuration

LF 8120 CONFIGURATIONS

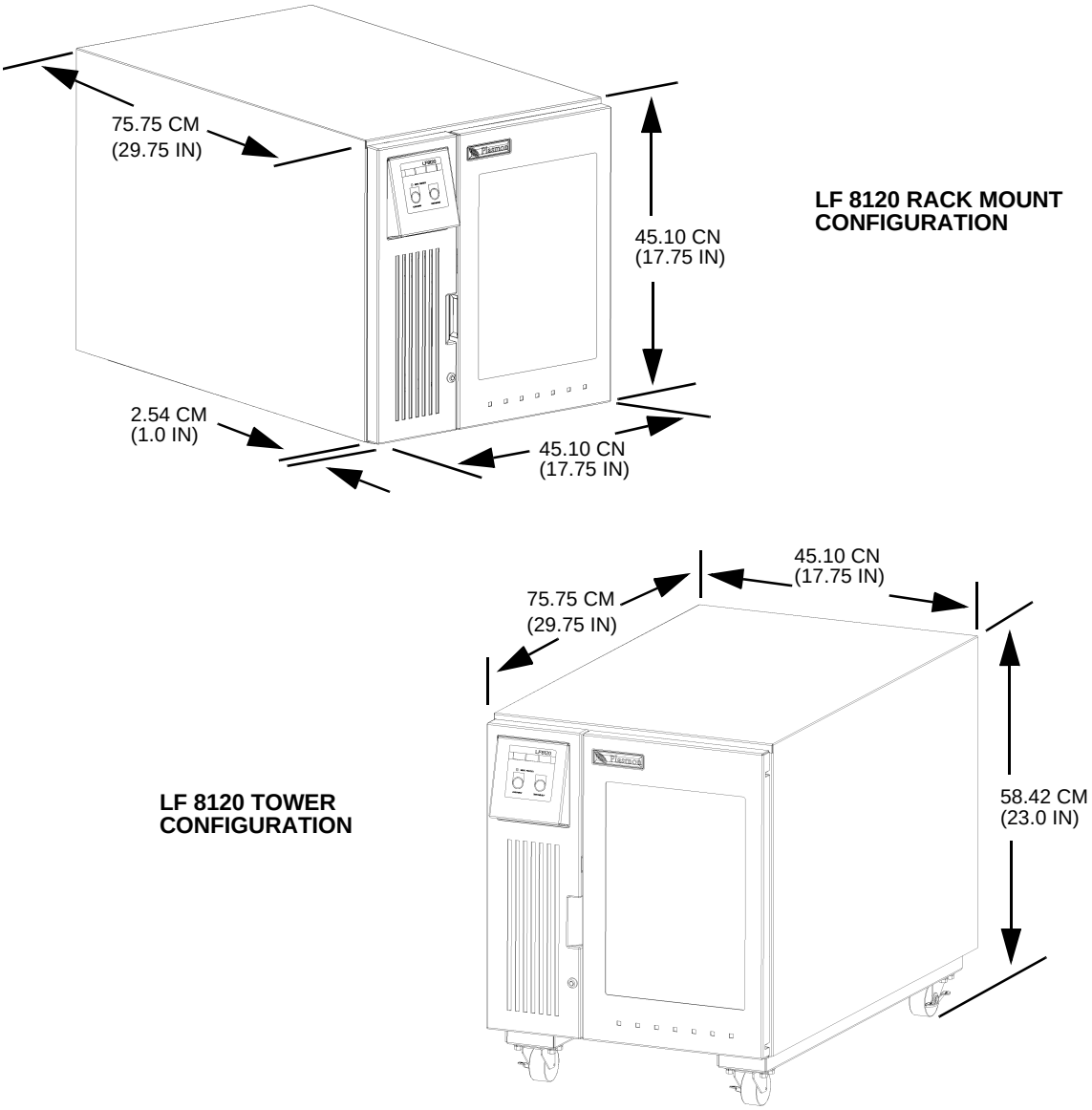


Figure 11. LF 8120 Configurations

FRONT PANEL

The LF 8120 front panel (see figure on the right) includes a Drive Operator Console (DOC), media access door, and door lock within a bezel assembly. Refer to the Operating Instruction section of this manual for a detailed description of the DOC.

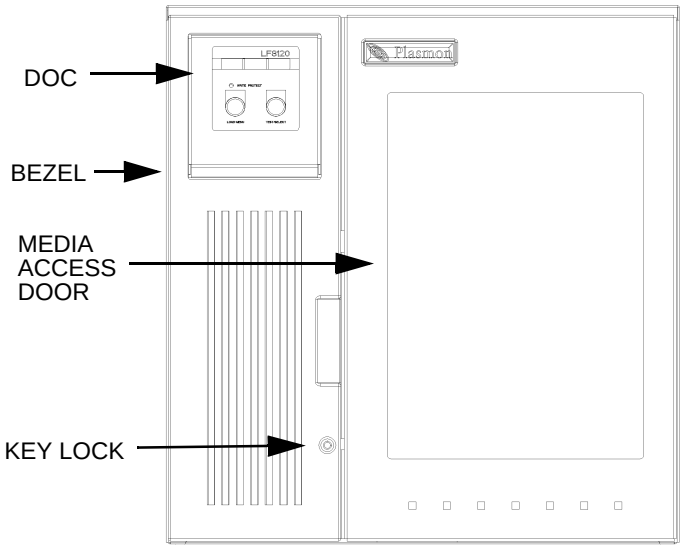


Figure 12. LF 8120 Front Panel

REAR PANEL

The LF 8120 rear panel contains the power switch along with AC power connector and fuses, the ground connector, and external interface connectors.

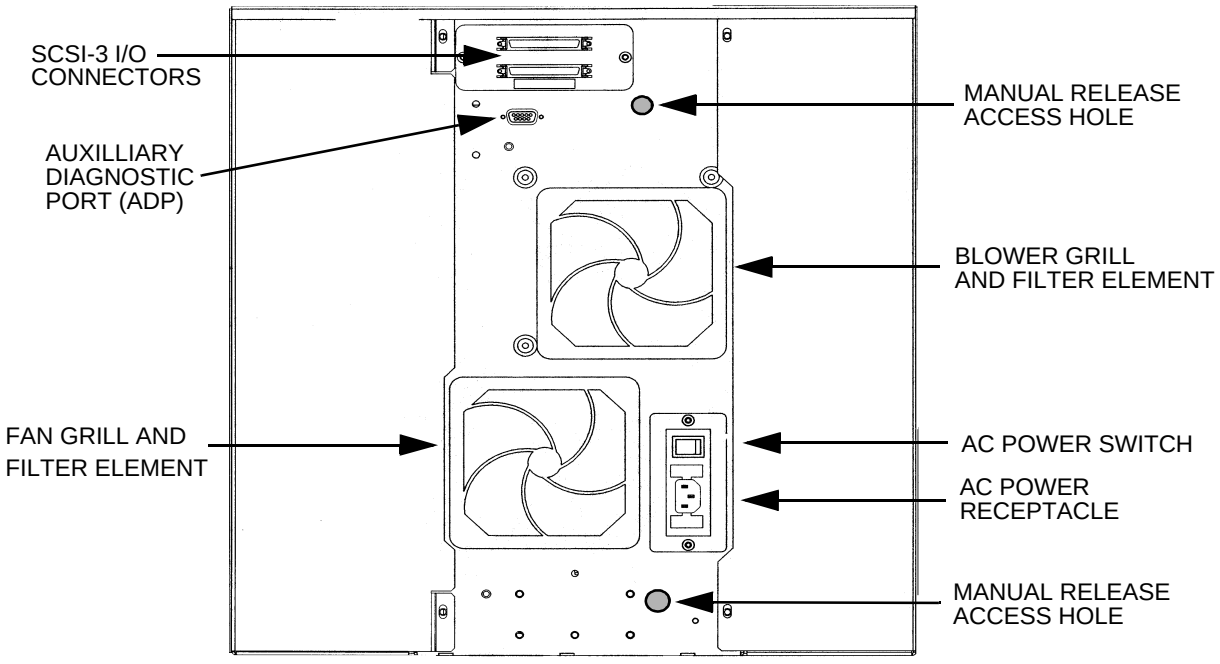
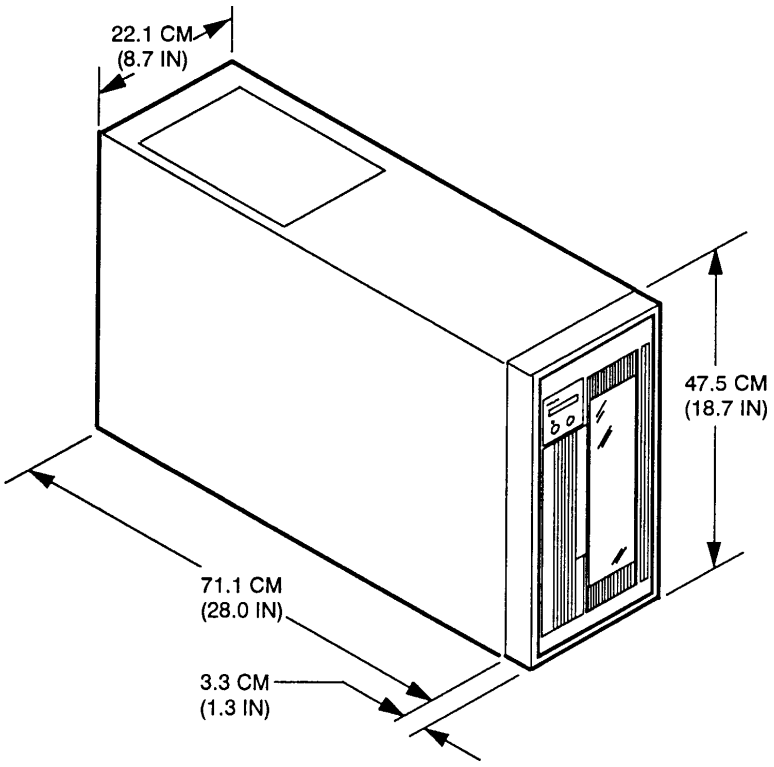


Figure 13. LF 8120 Rear Panel

LF 8600 RACK MOUNT AND TOWER CONFIGURATIONS

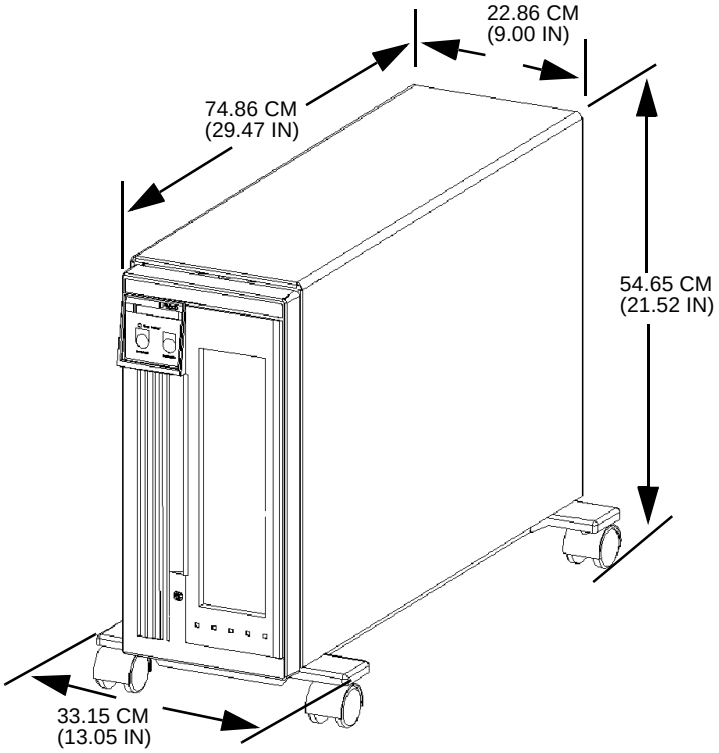


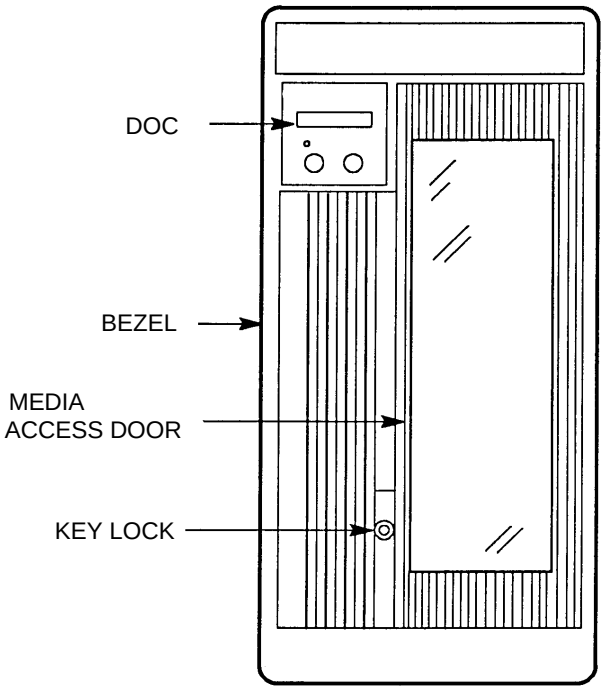
The LF 8600 Rack Mount configuration is designed for vertical operation and mounting in an EIA standard 19-in. rack (see figure on the left). The Rack Mount configuration requires a slide kit.

Figure 14. LF 8600 Rack Mount Configuration

The LF 8600 Tower configuration (see figure to the right) is designed for stand alone operation on an open floor or beside a desk. It includes an enclosure to cover the chassis and support pedestal. The pedestal features a wide footprint to provide stability. Casters, which allow the LF 8600 to be easily moved, can be locked to prevent unintentional movement.

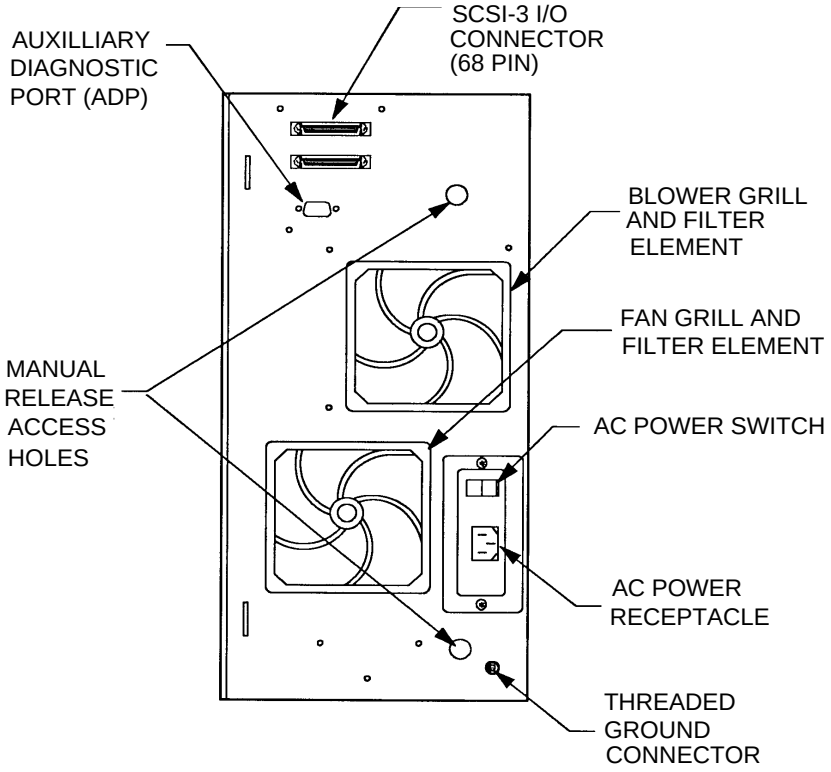
Figure 15. LF 8600 Tower Configuration





The LF 8600 front panel layout consists of the DOC, a bezel, and a media access door with a key lock (see figure at the left). The media access door provides access to the cartridges and may be locked with a key to prevent unauthorized media removal. When unlocked, the media access door opens to the right, providing access to the six media cartridges.

Figure 16. LF 8600 Front Panel



The rear panel of the LF 8600 contains the power switch, the AC power connector, ground connector, and external interface connectors (refer to figure at the right).

Figure 17. LF 8600 Rear Panel

LF 8602 CONFIGURATION

The LF 8602 consists of two LF 8600 drives enclosed in one cabinet (see figure below). The LF 8602 front panel layout includes each drive's DOC, bezel assembly, media access door and door lock. Each drive's bezel assembly can be removed to gain access to the drive.

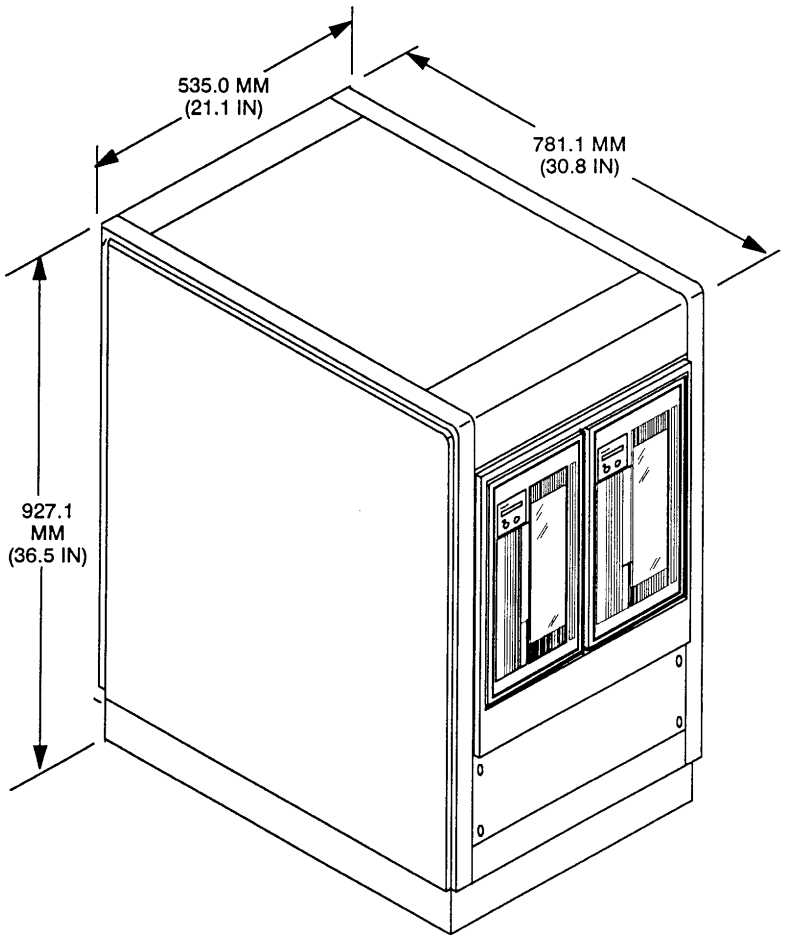
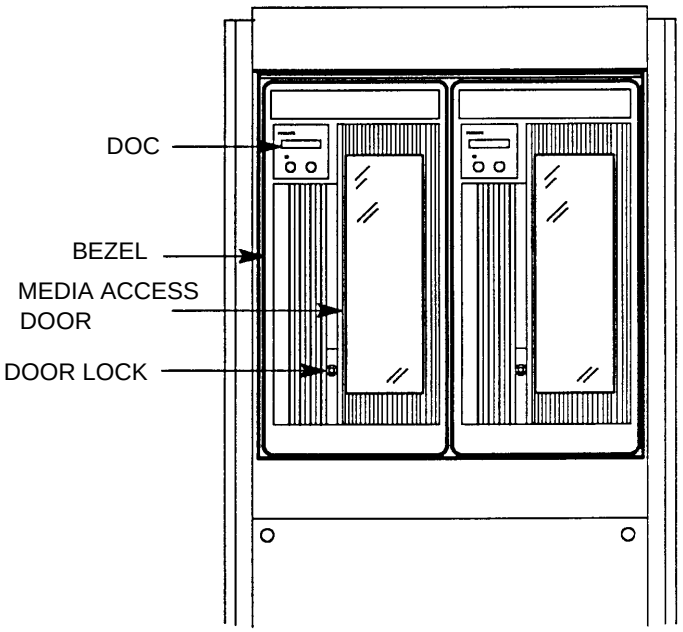


Figure 18. LF 8602 Configuration



The LF 8602 front panel layout includes each drive's DOC, bezel assembly, media access door and door lock. Each drive's bezel assembly can be removed to gain access to the drive.

Figure 19. LF 8602 Front Panel

On the rear panel of the LF 8602 cabinet, a hinged, louvered door, with a latch and a key lock, covers the rear access to the drives (refer to the figure below.)

The drives' AC power source is provided by the power socket strip, located on the bottom of the rear panel. The LF 8602's primary AC cord is connected to the power socket strip.

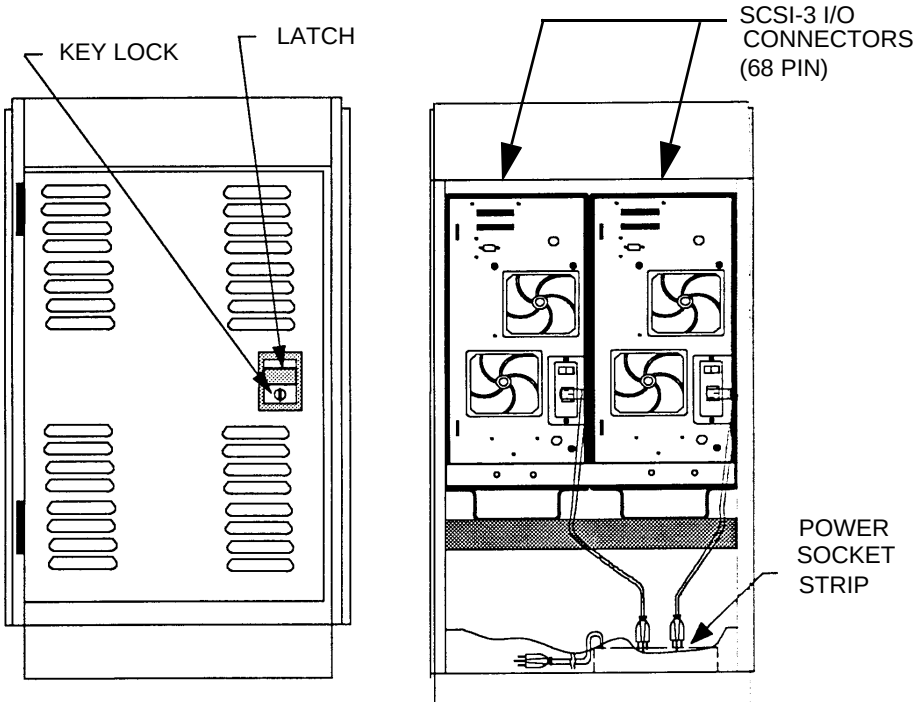


Figure 20. LF 8602 Rear Panel

LD 8100 SUBASSEMBLIES

The LD 8100 subassemblies common to the Rack Mount, Desktop and Tower configurations are listed here and illustrated in the next figure.

- Chassis Cover
- Chassis
- Frame Assembly
- Power Supply
- Write Once Optical Drive Interface Controller (WOODI) Printed Circuit Assembly (PCA)
- Drive Power Control (DPC) PCA
- Read/Write/Servo (RWS) PCA's
- DOC PCA
- DOC Bezel
- Fan
- Power Switch Assembly
- SCSI-3 I/O Panel Assembly
- Blank MCLI Panel
- DOC/ADP Blank Panel
- Opto Mechanical Assembly

Assemblies previously listed and illustrated in the next figure, with the exception of the Blank MCLI Panel, are also common to the FileNet Library and Plasmon Library configurations.

For detailed explanations of the assemblies, refer to the LD 8100 Hardware Maintenance Manual (P/N 97653081).

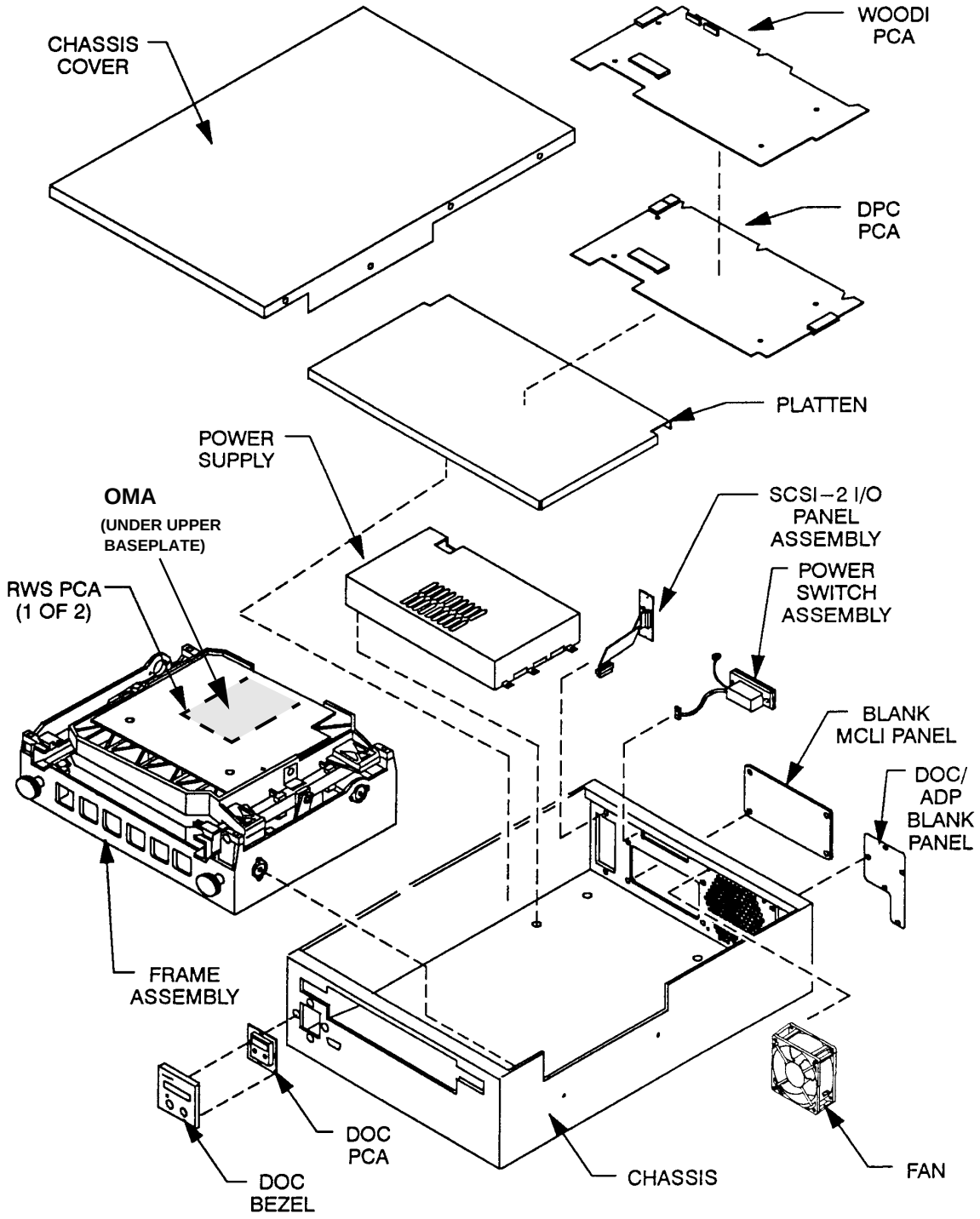


Figure 21. Major Assemblies of the LD 8100

LF8120/LF 8600/LF 8602 Subassemblies

The LF 8600/LF 8602 subassemblies common to the Rack Mount and Tower configurations are listed here and illustrated in the next figure.

- Chassis
- Frame assembly
- Write Once Optical Drive Interface Controller (WOODI) Printed Circuit Assembly (PCA)
- Drive Power Control (DPC) PCA
- Read/Write/Servo (RWS) PCA's
- DOC PCA
- DOC Bezel
- Power Switch Assembly
- SCSI-3 I/O Panel Assembly
- Shuttle Assembly
- Power Supply
- Blower
- Fan
- Opto Mechanical Assembly

For detailed explanations of the assemblies, refer to the LF 8120/LF 8600/LF 8602 Hardware Maintenance Manual (P/N 97663082).

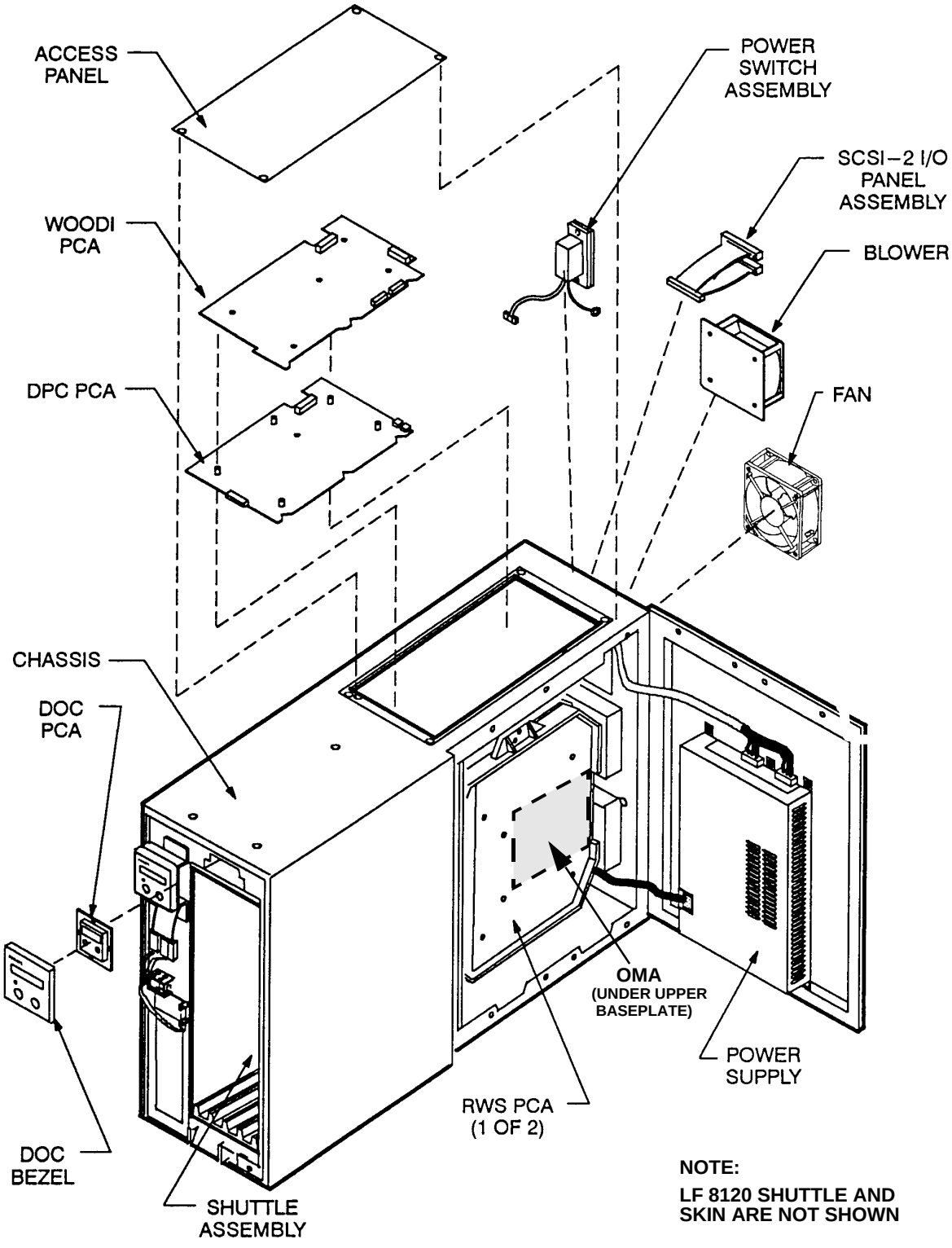


Figure 22. Major Assemblies of the LF 8120/LF 8600/LF8602

DIMENSIONS

Dimensions listed in the tables below are provided for reference only and should not be used for design purposes. Refer to Appendix B. for the dimensions of the LD 8100 Library configurations.

LD 8100 DIMENSIONS

Table 1. LD 8100 Dimensions

DIMENSION	LD 8100 RACKMOUNT	LD 8100 DESKTOP	LD 8100 TOWER
Chassis Length:	60.9 cm (24.0 in)	64.3 cm (25.3 in)	64.3 cm (25.3 in)
With Mounting Kit:	65.3 cm (25.7 in)(1)	67.3 cm (26.5 in)(2)	67.3 cm (26.5 in)(2)
			66.6 cm (26.2 in)(3)
Chassis Width:	43.0 cm (16.9 in)	43.0 cm (16.9 in)	16.9 cm (6.7 in)
With Mounting Kit:	47.5 cm (18.7 in)(1)	48.6 cm (19.1 in)(2)	18.9 cm (7.4 in)(2)
			30.5 cm (12.0 in)(3)
Chassis Height:	16.9 cm (6.7 in)	16.9 cm (6.7 in)	48.6 cm (19.1 in)
With Mounting Kit:	17.8 cm (7.0 in)	18.8 cm (7.4 in)(4)	63.2 cm (24.9 in)(5)
Mounting Depth:	60.9 cm (24.0 in)(6)		

LF 8120 DIMENSIONS

The table below lists the reference dimensions of the LF 8120 configurations.

Table 2. Dimensions of the LF 8120 Configurations

DIMENTION	RACK MOUNT	TOWER
Length	75.57 CM (29.75 IN)	75.57 CM (29.75 IN)
Width	45.10 CM (17.75 IN)	45.10 CM (17.75 IN)
Height	47.0 CM (18.5 IN)	58.42 CM (23.0 IN)

LF 8600 DIMENSIONS

Table 3. LF 8600 Dimensions

DIMENSION	LF 8600 RACKMOUNT	LF 8600 TOWER
Chassis Length:	71.1 cm (28.0 in)	77.6 cm (30.6 in)
With Mounting Kit:	74.4 cm (29.3 in)(1)	
Chassis Width:	22.1 cm (8.7 in)(7)	23.7 cm (9.3 in)(7)
With Mounting Kit:		
Chassis Height:	47.5 cm (18.7 in)(7)	63.6 cm (25.0 in)(5)
With Mounting Kit:		
Mounting Depth:	71.1 cm (28.0 in)(6)	

LF 8602 DIMENSIONS

Table 4. LF 8602 Dimensions

DIMENTION	LF 8600
Height	92.7 mm (36.5 in.)
Width	53.5 mm (21.1 in.)
Depth	78.1 mm (30.7 in.)

(1) Includes the bezel.

(2) Includes the bezel and chassis skin.

(3) The pedestal and pedestal skin.

(4) Includes the rubber feet.

(5) Includes the chassis skin, pedestal and casters.

(6) Depth to which the drive extends into the mounting rack.

(7) Chassis width and height with bezel

WEIGHT

The following approximate weight specifications do not include the weight of media cartridges. Refer to Appendix B for information concerning the weight of the FileNet and Plasmon Library configurations.

Table 5.

MODEL	WEIGHT
LD 8100 Rack Mount	30.5 kg (67.2 lbs)
LD 8100 Desktop	35.9 kg (79.1 lbs)
LD 8100 Tower	41.8 kg (92.1 lbs)
LF 8120 Rack Mount	71.21 kg (157 lbs)
LF 8120 Tower	75.75 kg (167 lbs)
LF 8600 Rack Mount	44.1 kg (97.2 lbs)
LF 8600 Tower	62.3 kg (137.3 lbs)
LF 8602	204 kg (449.7 lbs)
LM 8000 Optical Cartridge	1.18 kg (2.6 lbs)

The weight of one LM 8000 cartridge is approximately 1.18 kg (2.6 lbs).

SCSI-2 INTERFACE (CONNECTOR AND TERMINATION)

The 8000 Series Drive may be configured in either single-ended or differential wide (16 bit) configuration. The drive may be reconfigured in the field by moving the SCSI connection on the WOODI PCA. Each drive is equipped with two 68 pin SCSI-3 micro connectors for daisy chaining with other SCSI devices.

The SCSI-3 interface is terminated by installing an external terminator. The drive always provides terminator power. Refer to Appendix D for a list of available terminators and refer to the LD 8100/ LF 8120/LF 8600/LF 8602 SCSI Interface Specification for more information concerning SCSI-3 termination and SCSI-3 interfaces.

Any Single Ended configured Drive that is placed on a Low Voltage Differential/Single Ended (LVD/SE) bus must be terminated using a standard SCSI SE terminator on at least one end of the SCSI bus for proper Drive operation.

ELECTRICAL CHARACTERISTICS

AC POWER

The LD 8100/LF 8120/LF 8600 has an AC power switch with an integral grounded power connector and fuses (for Hot and Neutral lines) located on the rear panel. The power supply will operate with the line voltages listed in the table below. The power supply is auto ranging and does not require mechanical switching for input voltage or frequency selection. Since the switch box is double fused, two spare fuses are provided within the AC Power Module (5A slow blow, 2 x 20mm for all drives, hot and neutral).

AC Line Frequency is between 47 to 66 Hz.

Table 6. AC Power Requirements for AC Line Voltage 95.0 VAC to 128 VAC.

Model	READY	SURGE PEAK <1s (SPIN-UP)	READY + 1 SPIN-UP/DN CYCLE EVERY 10 s	MIN SERVICE RATING
LD 8100	1.3A / 101W	10A	2.0A / 160W [1]	15A
LF 8120	1.4A / 110W	10A	2.0A / 160W	15A
LF 8600	1.4A / 110W[2]	10A	2.0A / 160W	15A
LF 8602	2.8A / 220W	20A	4.0A / 320W	15A

Table 7. AC Power Requirements for AC Line Voltage 173.4 VAC to 268 VAC.

Model	READY	SURGE PEAK <1s (SPIN-UP)	READY + 1 SPIN-UP/DN CYCLE EVERY 10 s	MIN SERVICE RATING
LD 8100	0.65A / 101W	5A	1.0A / 160W	15A
LF 8120	0.7A / 110W	5A	1.0A / 160W	15A
LF 8600	0.7A / 110W	5A	1.0A / 160W	15A
LF 8602	1.4A / 220W	5A	2.0A /320W	15A

[1] This current measurement determines the stated power and maximum heat dissipation of the Drive (543 BTU/hr) based on RMS current over the 10S cycle derated by the Power Factor. It also determines the 2.0 A UL plate rating.

[2] This power measurement determines the typical heat dissipation of the LF 8600 drive without periodic cartridge load cycles (379 BTU/hr).

AC POWER CORD

The type of power cord supplied with the LD 8100/LF 8120/LF 8600/LF 8602 is based upon the configuration ordered. For the LF 8602, power cords for the two drives are installed at the factory.

AC GROUND

An AC ground connector, located on the rear panel of the LD 8100/LF 8120/LF 8600, is 6 mm (0.24 in.) in length and uses an M4 thread with a lock washer and hex nut.

The LF 8602 cabinet should be connected to a reliable earth ground for operator safety. The LF 8602's primary AC power cable has an internal grounding conductor which connects the LF 8602 chassis to safety ground through the site AC power system. If the site AC system ties its ground wire connection to earth ground, then the LF 8602 chassis will also be tied to earth ground. All site AC power connections must be maintained on the same safety ground.

POWER SUPPLY OUT-OF-RANGE PROTECTION FEATURES

The LD 8100/LF 8120/LF 8600 power supply provides over and under voltage protection, over current protection, and over temperature protection. Should an out-of-range condition be detected, the 8000 Drive will shut down the DC outputs of the power supply. After the situation is corrected, power can be restored by turning the AC power switch to the off position and then to the on position again.

NOTE

After the drive has been turned off, the operator must wait 5 sec before turning the drive on again.

ENVIRONMENTAL CHARACTERISTICS

The LD 8100/LF 8120/LF 8600/LF 8602 conforms to the limits in this section when installed and operated in accordance with the appropriate User Manual.

TEMPERATURE, HUMIDITY AND ALTITUDE

The table below lists the LD 8100/LF 8120/LF 8600/LF 8602 operating, nonoperating, storage and transit limits for temperature, humidity and altitude.

Table 8. Temperature, Humidity and Altitude Limits

.

CONDITION	OPERATING	NONOPERATING	STORAGE/TRANSIT(1)
Temperature	10 to 42° C(2) (50 to 108° F)	-40 to 66° C (-40 to 151° F)	-40 to 66° C (-40 to 151° F)
Maximum Rate of Change	11° C/hr (20° F/hr)	20° C/hr (36° F/hr)	20° C/hr (36° F/hr)
Humidity (Noncondensing)	10 to 90%	5 to 95%	5 to 95%
Maximum Rate of Change	10%/hr	10%/hr	10%/hr
Maximum Wet Bulb Temperature(3)	28° C (82° F)	46° C (115° F)	46° C (115° F)
Minimum Dew Point	2° C (35.6° F)	2° C (35.6° F)	2° C (35.6° F)
Altitude(4)	-300 to 3,000 m (-984 to 9,840 ft)	-300 to 3,000 m (-984 to 9,840 ft)	**Storage:** -300 to 3,000 m (-984 to 9,840 ft) **Transit:** -300 to 12,000 m (-984 to 40,000 ft)

(1) Storage specifications are for 90 days maximum in Plasmon LMS packaging. No condensation is permitted. Transit specifications are based on a maximum 1-week period in a factory-sealed container.

(2) Maximum operating temperature is 42 ° C for a free-standing drive at sea level unless otherwise stated. Maximum operating temperature is derated linearly above 300 m (984 ft) altitude to 38 ° C at 2,000 m (6561 ft) altitude.

(3) See Appendix B of this specification for more information concerning the temperature and humidity operating range.

(4) The LM 6000 Media is limited to 2,000 m (6,561 ft).

SHOCK AND VIBRATION

The next table lists the conditions and limits for shock and vibration.

Table 9. Shock and Vibration Criteria and Limits

.

CONDITION	OPERATING	NONOPERATING[1]	STORAGE/TRANSIT[2]
LD 8100/LF 8600 **Swept Vibration (Bidirectional)** **1 Octave/Min**	5 to 250 Hz at 0.1 g Peak, 250 to 500 Hz 0.25 g Peak	5 to 44 Hz, 0.03 in Double Amplitude, 44 to 500 Hz 3.0 g Peak	5 to 44 Hz, 0.03 in Double Amplitude, 44 to 500 Hz 3.0 g Peak
LF 8120 **Swept Vibration (Bidirectional)** **1 Octave/Min**	10 to 250 Hz at 0.1 g Peak, 250 to 500 Hz 0.25 g Peak	5 to 44 Hz, 0.03 in Double Amplitude, 44 to 500 Hz 3.0 g Peak	5 to 44 Hz, 0.03 in Double Amplitude, 44 to 500 Hz 3.0 g Peak
LD 8100/LF 8600 **Shock [3]** **(Host Retries May Be Required and Drive Performance May Degrade During Test**	10 - msec Half Sine Pulse of 2.5 g Peak, with pulses applied every 3 sec		
LF 8120 **Shock [3]** **(Host Retries May Be Required and Drive Performance May Degrade During Test**	10 - msec Half Sine Pulse of 1.0 g Peak, with pulses applied every 3 sec		
Unpacked (3 Axis)		5 - msec Half Sine Pulse of 20 g Peak	
Packed on Pallet			46 - cm (18 - in) Drop Test Flat

1 With media removed.

2 In LMS - approved packaging.

3 Shock repetition rate should be limited to allow mechanical system transients to subside between pulses.

The LD 8100/LF 8120/LF 8600/LF 8602 performance may degrade when the drives are operating within the shock limits listed in the table above. The 8000 Drives will recover with host or manual intervention and without loss of data integrity when operating within specified limits.

Repetitive shocks during transfer of data may reduce the sustained data transfer rate and increase the seek retries, thereby increasing average seek time. Repetitive shocks during writing may invoke additional defect management reallocations. This may reduce sustained read data transfer rates while reading data written during shock.

TILT RANGE

The LD 8100 will operate over a tilt range of 10 degrees. The LD 8100 is not designed for operation under dynamic tilt conditions. The LF 8120/LF 8600/LF 8602 will operate over a tilt range of 3 degrees.

ACOUSTICAL LIMITS (LD 8100/LF 8600)

The acoustical emissions have been measured according to ISO standard 7779: 1988 (E). The following measurements were made by Plasmon LMS and may be used for reference:

The following acoustical measurements apply to the LD 8100:

The LD 8100 emitted 54.5 dB continuous from the front of the unit and 59.3 dB continuous from the rear. Maximum short duration readings were 69.0 dB from the front and 66.0 dB from the rear.

The following acoustical measurements apply to the LD 8600:

The LF 8600 emitted 53.1 dB continuous from the front of the unit and 64.1 dB continuous from the rear. Maximum short duration readings were 75.0 dB from the front and 75.0 dB from the rear. Ambient was 25 dBA during the test.

The following acoustical measurements apply to the LD 8120:

The LF 8120 emitted 55.5 dB continuous from the front of the unit and 63.0 dB continuous from the rear. Maximum short duration readings were 75.5 dB from the front and 75.5 dB from the rear.

HEAT DISSIPATION

The LD 8100/LF 8120/LF 8600 will typically dissipate a heat load of 95 k-calories/hr (376 BTU/hr) during a read/write operation; the LF 8602 cabinet will typically represent a heat load of 190 k-calories/hr (752 BTU/hr).

When media cartridges are inserted, loaded, spun up, spun down, unloaded and removed every 10 seconds, the LD 8100/LF 8120/LF 8600 will typically dissipate a heat load of 138 k-calories/hr (546 BTU/hr); the LF 8602 will typically represent a heat load of 276 k-calories/hr (1092 BTU/hr).

PARTICULATE LIMITS

The LD 8100/LF 8120/LF 8600 is designed for use in an office or computer room. The environment must have a low dust level. Airborne particles in the environment must fall below the limits shown in the next table.

Table 10. . Particulate Limits

PARTICLE SIZE	MAXIMUM NUMBER OF PARTICLES PER CUBIC METER
Less than 1 µm	4×10^7
Greater than 2 µm	6×10^6
Greater than 5 µm	4×10^5

The LD 8100/LF 8120/LF 8600 filters incoming air for cooling to reduce the quantity of particles entering the drive; however, the filters are not effective against small particles (including tobacco smoke) which will become deposited on optical components and media, causing a degradation in drive performance.

FUNCTIONAL CHARACTERISTICS

LD 8100 MEDIA CARTRIDGE INSERTION

The LD 8100 is ready to accept a data cartridge when the "Insert Disk" message is displayed on the DOC.

NOTE

The LM 8000 media must be inserted with side A facing up (or facing to the right for vertical units) at the entrance to the drive. If this requirement is not met, upon the next subsequent attempted spin-up, the drive will open the baseplate and display the message "Invert Disk" on the DOC.
The LM 6000 cartridge may be inserted in either direction.

Media may be inserted until resistance is met and the DOC displays "Inserted". This indicates the media cartridge is fully inserted and the drive is ready to spin up the cartridge. (The rear edge of the media cartridge will extend beyond the bezel with the media fully inserted.)

If the autospin option is enabled, the drive will automatically spin up once the media cartridge is fully inserted into the drive. The DOC will display "Loading" and then "Ready".

If autospin is disabled, the DOC will display "Inserted" and the operator can press the LOAD/MENU switch to spin up the media. The drive will complete the spin up and display "Ready" on the DOC.

If a drive is powered up with a media cartridge inserted, the drive will respond as in the preceding paragraphs, depending on whether autospin is enabled or disabled.

Refer to the appropriate User Manual for instructions on selecting the autospin option.

LD 8100 MEDIA CARTRIDGE REMOVAL

The cartridge is unloaded from the drive when an operator presses the LOAD/MENU switch on the DOC or the host issues the START/STOP command. The drive will not unload the media if the PREVENT MEDIA REMOVAL command has been issued or the DOC has been locked.

The DOC panel will display "Locked" or "Denied" if unloading media has been prohibited by the host. The drive will display "Unloading" on the DOC when the media is unloading and will display "Remove Disk" when the media cartridge can be removed. The bezel doors will close when the media cartridge is removed and the DOC will display the "Insert Disk" message.

If power fails with a cartridge loaded in the drive, the cartridge can be removed by using the manual release procedure described in the appropriate model User Manual.

LX 8000 MEDIA CARTRIDGE INSERTION AND LOADING

Media cartridges are inserted and removed through the drive's front panel media access door shown in the figure below. When fully closed, the door is held by magnetic contacts. A safety switch located behind the bezel prevents shuttle operation unless the door is closed and latched.

NOTE

The LM 8000 cartridge must be inserted with side A facing up (or to the right for vertical units) at the entrance to the drive. If this requirement is not met and the front door is closed, the shuttle will return to the Home position. The drive will then display the message "Invert Disk" on the DOC. A secondary message will be displayed that shows which media needs to be re-oriented, i.e. #1, #2, #3 ect.
The LM 6000 cartridge may be inserted in either orientation.

Arrows on the cartridge must point toward the shuttle before the cartridge is inserted into the slot. The cartridge must be inserted until it is fully seated and its back edge is flush with the edge of the shuttle. After the operator inserts the cartridge, the media access door must be closed.

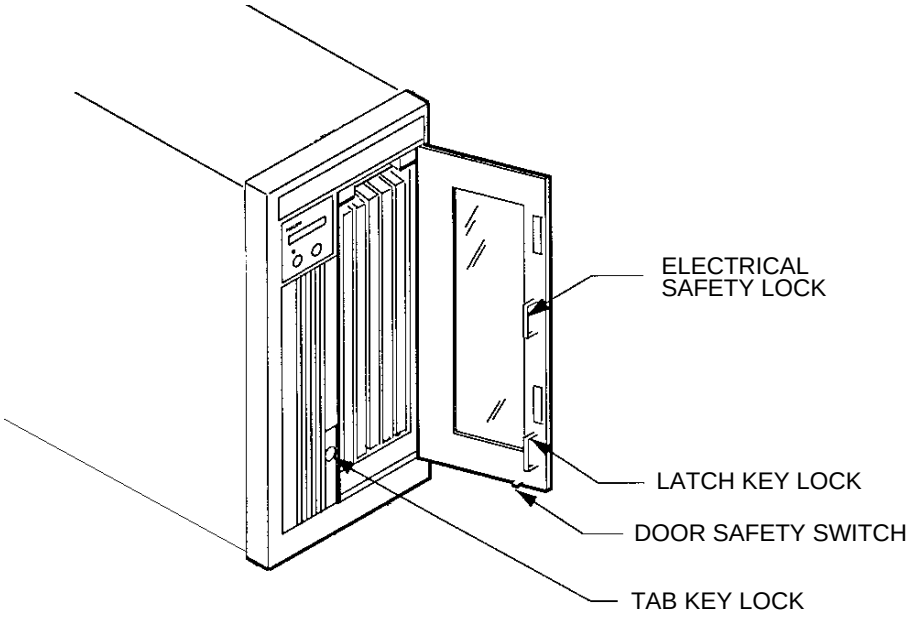


Figure 23. LF 8600 Media Access

The door is automatically locked by an electrical safety lock prior to the shuttle moving from the home position. The door is unlocked when the shuttle returns to the home position.

An independent manual key lock, located in the bezel assembly, provides an additional means of locking the door to prevent unauthorized media access.
Operator access to the media requires the shuttle to be in the home position. The home shuttle position aligns all six cartridge slots with the media access door.

The shuttle can be sent to home by a host command or by the operator pressing the LOAD/MENU switch on the DOC.

If access is authorized, the drive will unload the media, move the shuttle to the home position and unlock the automatic door lock.

If access is denied by the PREVENT MEDIA REMOVAL command from the host, pressing LOAD/MENU will have no effect. The DOC will display the "Denied" message until commanded by the host to execute another operation and then display the appropriate operational messages.

Media cartridges can be selected for loading by host command or by the media autoload option. The host can select and load a media cartridge from any slot by issuing a MOVE MEDIA command.

Media cartridge selection by the media autoload option occurs at initial power up or when the LOAD/MENU switch on the DOC is pressed while the drive is in Operating mode. Depending on the setting of the autoload option, the drive automatically inserts and loads one specified media cartridge or the most recently used media cartridge, or returns to the home position.

If the selected cartridge is not present, the DOC displays the "# Empty" message where # represents the slot number, 1 - 6. For more information regarding the media autoload option, refer to the appropriate User Manual.

LF 8120/LF 8600/LF 8602 MEDIA CARTRIDGE REMOVAL

After the LF 8600/LF 8602 has moved the shuttle to its home position and unlocked the electrical safety-operated door lock, the media access door can be opened and the media cartridges may be removed from the shuttle. In the event of power failure, the cartridges can be removed from the drive by using a manual procedure.
For more information on using the manual release mechanism, refer to the appropriate model User Manual.

DATA PROTECTION

The LD 8100/LF 8120/LF 8602/LF 8600 provides a write inhibit mechanisms for data protection if any of the following conditions occur:

- media write protected
- device write protected
- spindle speed out of tolerance
- laser power out of tolerance
- loss of tracking
- loss of laser focus
- loss of phase lock with servo clock

Data integrity is further ensured by means of these features:

- data path parity error checking
- overwrite protection, which ensures that previously written data will not be overwritten
- monitored limits for laser power, tracking error, focus error, and clock synchronization during write operations
- read verification after write (including read amplitude and ECC verification)

ERROR DETECTION/CORRECTION CAPABILITIES

The drive's embedded controller incorporates an Error Detection and Correction (EDAC) circuit for identifying and correcting data errors during read operations. The EDAC circuit is based on an interleaved Reed-Solomon error correction algorithm that detects and corrects both random byte and multiple burst errors which may occur within a sector. Correction of a sector does not typically impact drive performance. Sectors on LM 8000 media consist of 10 code words. The EDAC code can correct 8 bytes per code word and up to 80 byte errors in 2Kbyte sectors.

DEFECT MANAGEMENT

If a defective sector is detected during a write operation, the LD 8100/LF 8120/LF 8600/LF 8602 relocates the defective sector and logs the relocation in a defect management map. The maps created by the drive are stored on the media in an area reserved for media management. Relocation is not performed on a read operation.

POWER FAILURE SAFEGUARD

The 8000 Drives use nonvolatile RAM (NVRAM) to store controller specific information such as drive serial number, interface parameters and internal performance logs. If a power failure occurs, these parameters are not lost and the host interface is automatically reconfigured when power is restored.

WRITE POWER CALIBRATION

Drive write performance is optimized to individual disks. When a disk is installed which the drive has not seen previously or when a disk is installed that has not been calibrated within the last 24 hours, a Write Power Calibration will be performed in a test area of the disk prior to committing the first host initiated write. The drive will maintain a log of 200 disks to eliminate unnecessary calibration therefore ensuring optimum performance in libraries. After power cycling of the drive, all disks are identified as requiring write power calibration prior to a write operation.

PERFORMANCE CHARACTERISTICS

The LD 8100/LF 8120/LF 8600/LF 8602 operational performance specifications listed in the tables. The LM 8000 Media is also included.

Table 11. LM 8000 Characteristics

CHARACTERISTIC	SPECIFICATION	COMMENTS
LM 8000 (Online Capacity)	30 GBytes	Each media side has 16 user data zones. Each sector is formatted with 2048 user bytes. Use of the zones is transparent to the host.

Table 12. LD 8100/LF 8120/LF 8600/LF 8602 Performance Characteristics (for LM 8000 Media)

CHARACTERISTICS	SPECIFICATION	COMMENTS
LM 8100 (Nearline Capacity)	30 GBytes	The LF 8100 is single drive, available in rack mount, desktop or library configuration. The Drive will accommodate one data cartridge.
LF 8120 Shuttle Capacity (Nearline Capacity)	360 Gbytes with 12 cartridges	The LF 8120 is single drive, rackmountable into a standard 19 in EIA rack. The Drive can accomodate up to 12 data cartridges.
LF 8600 Shuttle Capacity (Nearline Capacity)	180 Gbytes with 6 cartridges	The LF 8600 is single drive, rackmountable into a standard 19 in EIA rack. The Drive can accomodate up to 6 data cartridges.
LF 8602 Shuttle Capacity (Nearline Capacity)	360 Gbytes with 12 cartridges	The LF 8602 is a dual LF 8600 drive in a single cabinet. Up to 12 may be loaded into the LF 8602.
Sustained Transfer Rate Read/Write Operations Write (with Verify)	6.0 MBytes/sec 2.9 MBytes/sec	Transfer rates depend upon the transfer block size and relocation rates.
Burst Rate Asynchronous Synchronous	 10 MBytes/sec 20 MBytes/sec Maximum	Burst rate is dependent on the capability of other devices attached to the SCSI - 2 bus and upon the optimization of the SCSI - 2 installation.
Data Buffer	12.8 MByte	For interim storage of the data transferred between the host and the drive.
Spin-Up Time (Drive Only) Spin Up to 1000 RPM	4.0 sec, Typical	Spin - up time is measured from the time when a cartridge is inserted to the time when the drive displays "Ready" on the DOC.

CHARACTERISTICS	SPECIFICATION	COMMENTS
Spin-Down Time	1.5 sec, Typical	Spin - down time is measured from the time when a command is received to the time when the cartridge is ready for extraction.
Cartridge Exchange Time LF 8600/LF 8602 Only LF 8120 Only	 2.5 sec, Typical 3.0 sec, Max. 2.5 sec, Typical 5.5 sec, Max	Includes cartridge extraction, shuttle and insertion of a new cartridge. Does not include spin-up time or spin-down time.
Average Access Time Random Data Maximum Average	 96 msec 162 msec	Access time includes seek time plus average rotational latency.
Latency Time Average Worst Case	 30.0 msec (1/2 Revolution) 60.0 msec (Full Revolution)	Latency resulting from rotational delays may be incurred during drive transactions.
Average Seek Time Random Maximum	 65 msec 130 msec	Seek time includes actuator positioning time and command overhead for LM 8000.

Performance specifications of the LD 8100/LF 8120/LF 8600/LF 8602 with LM 6000 media are listed in the next table.

Table 13. LD 8100/LF 8120/LF 8600/LF 8602 Performance Characteristics (for LM 6000 Media)

CHARACTERISTICS	SPECIFICATION	COMMENTS
LM 6000(Online Capacity)	11.94 GBytes	Each media side has two user data zones with an equal number of tracks. The inner zone contains 75 sectors per track; the outer zone contains 112 sectors per track. Each sector is formatted with 1,024 user bytes. Use of the inner and outer zones is transparent to the host.
LF 8120 Shuttle Capacity (Nearline Capacity)	144 GBytes with 12 Cartridges	
LF 8600 Shuttle Capacity (Nearline Capacity)	72 GBytes with 6 Cartridges	
LF 8602Shuttle Capacity (Nearline Capacity)	144 GBytes with 12 Cartridges	
Sustained Transfer Rate Read Operations	 3.0 MBytes/sec	Transfer rates are dependent upon the transfer block size and relocation rates.
Burst Rate Asynchronous Synchronous	10 MBytes/sec 20 MBytes/sec, Maximum	Burst rate is dependent on the capability of other devices attached to the SCSI-2 bus and upon the optimization of the SCSI-2 installation.

CHARACTERISTICS	SPECIFICATION	COMMENTS
Data Buffer	12.8 MByte	For interim storage of data transferred between the host and the drive.
Spin-Up Time (Drive Only) Spin Up to 1000 RPM	4.0 sec, Typical	Spin-up time is measured from the time when a cartridge is inserted to the time when the drive displays "Ready" on the DOC.
Spin-Down Time	1.5 sec, Typical	Spin-down time is measured from the time when a command is received to the time when the cartridge is ready for extraction.
Cartridge Exchange Time LF 8600/LF 8602 Only) LF 8120 Only	2.5 sec, Typical 3.0 sec Maximum 2.5 sec, Typical 5.5 sec, Maximum	Includes cartridge extraction, shuttle and insertion of a new cartridge. Does not include spin-up time or spin-down time.
Average Access Time Random Maximum Stroke	 100 msec 165 msec	Access time includes seek time plus average rotational latency.
Latency Time Average Worst Case	 30.0 msec (1/2 Revolution) 60.0 msec (Full Revolution)	Latency resulting from rotational delays may be incurred during drive transactions.
Average Seek Time Random Maximum Stroke	 65 msec 130 msec	Seek time includes actuator positioning time and command overhead for LM 8000 media.

SPIN-UP/SPIN-DOWN TIMES

Spin-up time is 4.0 sec typical for LM 8000 and LM 6000 media.

Spin-up time assumes the media cartridge has been inserted and includes:

- Media Load (Baseplates Closing)
- Spin Media Up to Speed
- Servo Initialization
- Read Media Parameters (Product Specification Information [PSI] and Specific Disk Information [SDI])

Spin-down time is 1.5 sec typical and includes:

- Spin Down Media
- Media Unload (Baseplates Opening)

The spin-down time assumes the media has not been locked (i.e. PREVENT MEDIA REMOVAL command) and that the controller is not processing a current command. The controller may need to complete a pending command prior to completing the spin-down command.

SUSTAINED TRANSFER RATE (LM 8000 Media)

The WRITE AND VERIFY command read verifies the written data. The write/verify transfer rate is 2.9 MBytes/sec. The read transfer rate is 6.0 MBytes/sec. Sustained read and write transfer rates depend on block size and sector relocation rates.

ERROR RATES

Error rates for the LD 8100/LF 8120/ LF 8600/ LF 8602 are shown in the table below. Errors resulting from permanent hardware malfunctions are excluded from these rates. The error rates in the table below assume that the drive was installed per for requirements specified in Appendix B. of this specification and the appropriate model User Manual, and the drive is operating within the environmental limits.

Soft error information is available to the host in performance logs available via the SCSI-3 interface. For more information on accessing the performance logs, refer to the LD 8100/LF 8120/LF 8600/LF 8602 SCSI Interface Specification (P/N 97662164).

The table below lists the LD 8100/LF 8120/LF 8600/LF 8602 error rate specification.

Table 14. LD 8100/ LF 8600/ LF 8602 Error Rate Summary

TYPE	RATE	COMMENTS
Access Error	Less than 1 Error in 10^6 Seeks	The rate at which seek errors will be reported to the host.
Nonrecoverable Read Error	Less than 1 Error in 10^{12} Sectors	The number of unrecoverable read errors after internal error recovery attempts and one host-initiated retry using WRITE WITH VERIFY commands.
Raw Read Error Rate	Less than 1 Error in 5 x 10^3 Bytes	The number of read errors corrected by internal error recovery attempts. These errors may cause command-processing delays but are not reported to the host.
Relocation Rate(1)	0.3% Maximum	The number of sectors that can be relocated due to media flaws or hardware-related conditions.
Write Error	Less than 1 Error in 10^7 Sectors	An unsuccessful write operation using WRITE WITH VERIFY commands.
Undetectable Error (Calculated)	Less than 1 Error in 10^{30} Bytes	The number of errors which are not detected by the error detection and correction code.

(1)Relocations are performed automatically.

CONTROLS AND INDICATORS

This section describes the control switches and indicators on the LD 8100/LF 8120/LF 8600/LF8602 Drive Operator Console (DOC).

The figure below illustrates the DOC which consists of an alphanumeric display, a WRITE PROTECT indicator and two push button switches.

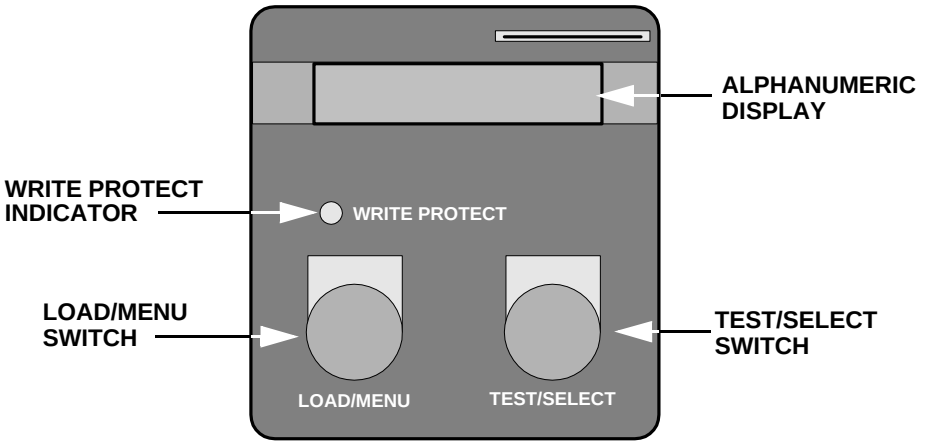


Figure 24. Drive Operator Console (DOC)

Table 15. DOC Controls and Indicators

CONTROL/INDICATOR	PURPOSE/FUNCTION
Alphanumeric Display	Displays operating, configuration and test status messages
LOAD/MENU Switch	In operating mode, the LOAD/MENU switch controls the loading and unloading of media cartridges. In Configuration mode, the LOAD/MENU switch steps through the menu of configurable parameters.
TEST/SELECT Switch	In operating mode, the TEST/SELECT switch invokes the diagnostic self-test. In Configuration mode, the TEST/SELECT switch scrolls through the options available for each configurable parameter.
WRITE PROTECT Indicator	The WRITE PROTECT indicator illuminates when either the Write Protect (WRT PROT) configuration option is enabled or a media cartridge WRITE PROTECT switch is locked (write disabled). The WRITE PROTECT indicator will flash when an RTPM condition occurs. Also, the WRITE PROTECT indicator will flash when the drive or the media is in a read only condition.

The drive has three modes which can be accessed from the DOC:

- **Operating** Permits normal use by a host system, reading or writing data on the media
- **Configuration** Allows inspection and set up of internal drive parameters and functions
- **Test** Invokes selftest diagnostics for routine maintenance or problem isolation

OPERATING MODE

When the drive is in Operating mode, cartridges can be loaded or unloaded, and shuttle operations (in an LF 8600/LF 8602) can be initiated by the operator depressing the LOAD/MENU switch. The alphanumeric display indicates the operating status of the drive by displaying one of the messages listed in the next two tables.

NOTE

The pound symbol #, shown in the following table, designates a slot number.

Table 16. LF 8120/LF 8600/LF 8602 DOC Operating Mode Messages

OPERATING CONDITION	DOC DISPLAY (ENGLISH)	DOC DISPLAY (FRENCH)	DOC DISPLAY (GERMAN)
Inserting Cartridge #	Inserting #	Inserer #	Einfügend #
Loading Media #	Loading #	Charger #	Ladend #
Drive Ready (Cartridge # not Locked)(1)	# Ready	# Prêt	# Bereit
Drive Locked (Cartridge # Locked)(1)	# Locked	# Verrouillé	# Gesperrt
Drive Reading Cartridge #	Reading #	Lecture #	Lesend #
Drive Writing Cartridge #	Writing #	Eriture #	Schreibend #
Unloading Cartridge #	Unloading #	Decharge #	Entladend #
Removing Cartridge #	Removing #	Retir Disk #	Entfernend #
Moving to Cartridge #	Moving to #	Deplace #	Gehe Zu #
Cartridge # Positioned	# Positioned	Positione #	# In Pos
Shuttle at Home Position	Home	Origine	Ruheposition
Drive is in Reset	SCSI Reset	SCSI Reinit	Reinit
Illegal Request (Spin Down Disabled/ Door Locked)	Denied	Refuse	Abgelehnt
Drive is Performing Internal Diagnostics	Selftest	Autotest	Selbsttest
Drive is Seeking	Seeking #	Cherche #	Position #
Drive is Scanning Media #(2)	Scanning #	Scanning #	Media Prüf
Inserted Cartridge #	# Inserted	# Insere	# Eingelert

OPERATING CONDITION	DOC DISPLAY (ENGLISH)	DOC DISPLAY (FRENCH)	DOC DISPLAY (GERMAN)
Shuttle is being Initialized	Init Shuttle	Init Shuttle	Shuttle Init
Slot # in Shuttle is Empty	# Empty	# Vide	# Leer
Door is Open	Door Open	Porte Ouvert	Ture Offen
Shuttle Moving to Home Position	Move to Home	Depl Origine	Zur Ruhepos
Executing SCSI READ BUFFER Command	Reading Buffer	Reading Buffer	Reading Buffer
Executing SCSI WRITE BUFFER Command	Writing Buffer	Writing Buffer	Writing Buffer
Drive in Read-Only Mode	# Read Ready	# Prêt	# Bereit
Media Management Recovery	MM Read #	MM Read #	MM Read #
Drive executing Write Power Calibration	# WPC Write	# WPC Write	# WPC Write
Invert Cartridge	Invert Disk	Invert Disk	Invert Disk

(1) "Locked" means that the host has issued a PREVENT MEDIA REMOVAL command.

(2) Display message flashes during operation.

Table 17. LD 8100 DOC Operating Mode Messages

OPERATING CONDITION	DOC DISPLAY (ENGLISH)	DOC DISPLAY (FRENCH)	DOC DISPLAY (GERMAN)
Insert Cartridge	Insert Disk	Inserer Disq	Einfügen
Loading Media	Loading	Charger	Ladend
Drive Ready	Ready	Prêt	Bereit
Drive Locked	Locked	Verrouillé	Gesperrt
Drive Reading	Reading	Lecture	Lesend
Drive Writing	Writing	Eriture	Schreibend
Unloading Cartridge	Unloading	Dechargement	Entladend
Remove Cartridge	Remove Disk	Retirer Disq	Entfernen
Drive is in Reset	SCSI Reset	SCSI Reinit	Re init
Illegal Request (Spin Down Disabled/ Door Locked)	Denied	Refuse	Abgelehnt
Drive is Performing Internal Diagnostics	Selftest	Autotest	Selbsttest
Drive is Seeking	Seeking	Cherche	Position
Inserted Cartridge	Inserted	Insere	Eingelegt
Disk is being Initialized	Disk Init	Init Disq	Media In

OPERATING CONDITION	DOC DISPLAY (ENGLISH)	DOC DISPLAY (FRENCH)	DOC DISPLAY (GERMAN)
Drive is Scanning Media	Scanning	Scanning	Media Prüf
Executing SCSI READ BUFFER Command	Reading Buffer	Reading Buffer	Reading Buffer
Executing SCSI WRITE BUFFER Command	Writing Buffer	Writing Buffer	Writing Buffer
Drive in Read-Only Mode	Read Ready	Prêt	Bereit
Media Management Recovery	MM Read	MM Read	MM Read
Drive executing Write Power Calibration	# WPC Write	# WPC Write	# WPC Write
Invert Cartridge	Invert Disk	Invert Disk	Invert Disk

CONFIGURATION MODE

This mode is used to view and set external interface (SCSI-2) parameters, defaults and testing submodes. The following is a list of drive conditions that are configurable from the DOC:

- SCSI-2 bus device ID selection
- SCSI-2 parity selection
- language option (English, French or German)
- write protect option
- media autospin option for the LD 8100 or autoload option for the LF 8600/LF 8602
- load switch disable
- read ahead disable
- logging

For the drive to enter or exit the Configuration mode, the operator can depress both DOC switches simultaneously. The LOAD/MENU switch can be used to step through various menu selections which are displayed on the alphanumeric display. The TEST/ENTER switch can be used to enter a displayed selection. In Configuration mode, the alphanumeric display indicates the configuration status of the drive.

Additionally, Configuration mode can be used to display a list of drive firmware revisions, hardware serial numbers and the drive serial number on the DOC panel.

In the Configuration mode, the operator can also access a Diagnostic menu which provides for a Park option. This option positions the drive's baseplates into a state necessary for shipment.

When the drive is in the Diagnostic menu, the Customer Engineer (CE) can access diagnostic tools to display the state of the drive sensors, display error information detected by the controller, and clear the drive initialization variables. For more information about the Configuration mode, refer to the appropriate model User Manual.

DIAGNOSTICS

At power on, the drive executes selftest diagnostic routines to ensure that basic drive functions such as program memory, communications, RAM, Nonvolatile RAM (NVRAM), interrupts, Data Buffer Manager, Error Correction Code (ECC) and the SCSI chip operate properly. In addition to power-on diagnostic tests, diagnostic routines may be initiated from the DOC or from the host. To run the complete diagnostic, an LM 8000 media cartridge must be available and user interaction is required.

A complete set of diagnostic tests will typically take less than 6 minutes to execute. The diagnostics are designed to detect a failure in the laser drive. The failure will be isolated by the diagnostics to a Field Replaceable Unit (FRU) or FRUs. Execution time will vary depending upon intermediate test results. Refer to the LD 8100 Hardware Maintenance Manual (P/N 97663081) or to the LF 8120/LF 8600/LF 8602 Hardware Maintenance Manual (P/N 97663082) for more information about diagnostic testing.

MEDIA OVERVIEW

MEDIA CHARACTERISTICS

The LM 8000 media is an optical disk, approximately 300 mm (12 in.) in diameter. The media's user capacity is 30 GBytes (15 GBytes per side). The user area is divided into sixteen (16) radial zones in order to optimize average real density. The drive spins the media at a constant rate of 1000 RPM (16.67 Hz).

Each side of the optical disk has a recording layer which is "air-sandwiched" between two glass substrates. The substrates are bonded to and separated by an inner and outer spacer ring. The media cartridge physically interfaces to the drive spindle motor through an anti-slip, double-sided hub that is magnetically clamped to the spindle.

MEDIA CARTRIDGE

The LM 8000 media cartridge's thin profile minimizes the space required in the shuttle or in archival racks. A feature to seal the hub and cartridge and the cartridge door assembly minimizes contamination during media storage.

The media cartridge's single write protect switch invokes write protection for both sides of the media. Refer to the next figure for the location of the write protect switch.

MEDIA LIFE AND ENVIRONMENTAL CHARACTERISTICS

The following tables present the LM 8000 media lifetime and media environmental characteristics:

MEDIA LIFETIME CHARACTERISTICS

Table 18. Media Life

MEDIA LIFE	SPECIFICATION
Lifetime for Writing (from manufacturing date)	30 Years
Lifetime for Reading (from recording date)	100 Years

MEDIA ENVIRONMENTAL CHARACTERISTICS

The following table presents the LM 8000 Media environmental characteristics.

Table 19. Media Operation, Storage and Transportation Environments

SPECIFICATION	OPERATION AND SHORT TERM STORAGE (2 years maximum)	TRANSPORTATION (2 weeks maximum)	LONG TERM STORAGE
Temperature	10°C to 47°C 50°F to 116.6°F	-20°C to +55°C -4.0°F to 131.o°F	10°C to 30°C 50°F to 86.0°F
Relative Humidity (no condensation)	5% - 80%	5% - 90%	5% - 80%
Wet Bulb Temperature	26°C max. (78.8°F)	26°C max. (78.8°F)	26°C max. (78.8°F)
Temperature Gradient	10°C/hr max. (18.0°F/hr max.)	31°C/hr max. (55.8°F/hr max.)	5°C/hr max. (9.0°F/hr max.)
Air Pressure	N/A	N/A	N/A
Solar Radiation	N/A	Case to be kept closed	Not to be stored in direct sunlight

NOTE

If the media temperature is more than 10° C (50° F) different from the ambient temperature of the Drive, then the media should be acclimated in the Drive environment for at least 30 minutes before writing to the media. Reading from the media may be done immediately.

MEDIA FORMATTING

The user does not have to format the media before use. An LM 8000 media cartridge is preformatted with servo data which allows the drive to control servo functions such as focus, tracking, seeking and data synchronization.

SAMPLED SERVO

The LD 8100/LF 8120/LF 8600/LF 8602 samples preformatted servo data at regular intervals. Servo data is physically separated from user data and is time multiplexed with data by the drive. Time multiplexing and physical separation of the servo and data regions eliminates the possibility of servo data compromising user data.

MODULATION CODE

The LD 8100/LF 8120/LF 8600/LF 8602 employs a 1,7 run-length-limited (1,7 RLL) modulation code for data encoding to the media. This technique maps 1 byte of user data into a pattern of marks within 12 timing windows (called channel bits).

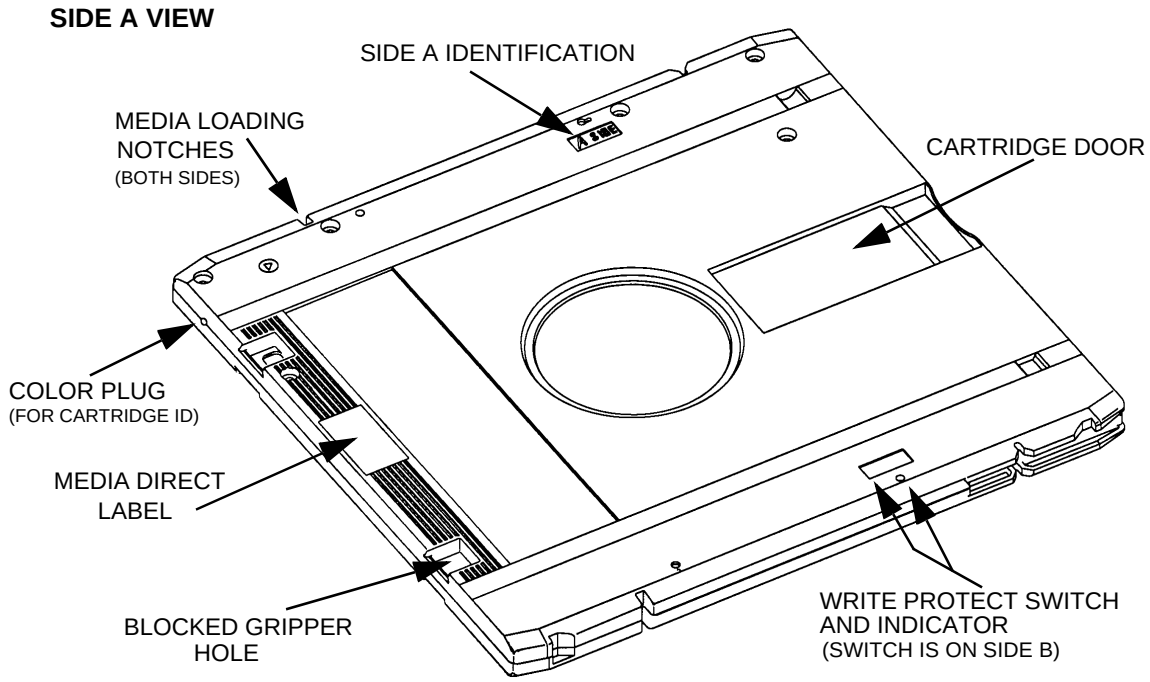


Figure 25. LM 8000 Media Cartridge

SPECIFIC DISK INFORMATION (SDI)

The Specific Disk Information (SDI) recorded on the disk contains information describing unique characteristics of that disk. Such information includes write sensitivity and defect location information. All SDI data is contained in one sector. Each SDI track contains 12 copies of the SDI sector. A copy of the primary SDI track is recorded in one other location outside the user area.

MEDIA CLEANING

Media disk surfaces should be inspected periodically and cleaned on an as-needed basis.

MEDIA CLEANING USING CLEANING KIT P/N 97662550

The Cleaning Kit P/N 97662550 provides a semi-automated cleaning method for cleaning the Plasmon LM 4000, LM 6000 and LM 8000 12 inch optical media. Follow the instructions given in the enclosed Cleaning Instructions.

The Kit contains the following items:

- One 12 inch media cleaning fixture
- Containers of cleaning liquid
- Package of 500 cleaning tissues
- One pair of latex gloves
- Cleaning Instructions

RELIABILITY AND SERVICE

MEAN TIME BETWEEN FAILURES

The Mean Time Between Failures (MTBF) is 30,000 operating hours. The following expression defines MTBF:

MTBF = Operating Hours/Equipment Failures
where:

Operating Hours	defined as power-on hours with a disk spinning or the shuttle in operation (LD 8100/LF 8120/LF 8600/LF 8602 only) less any maintenance time.
Equipment Failures	defined as those failures requiring repairs or field replacements. Equipment failures exclude substandard performance caused by operator error, adverse environment, power failure, host failure, external cable failure or other failures not caused by the drive.

SERVICE LIFE

The LD 8100/LF 8120/LF 8600/LF 8602 is expected to provide a useful life of 5 years. The drive mechanism is rated to withstand 2.5 million cartridge load/unload cycles during normal life. Each media cartridge is rated to withstand 100,000 load/unload cycles during normal life. Repair or replacement of major parts is permitted during the unit's useful life.

The number of load/unload cycles is logged by the drive in nonvolatile RAM and may be retrieved if required. Refer to the LD 8100/LF 8120/LF 8600/LF 8602 SCSI Interface Specification (P/N 97662164).

MEAN TIME TO REPAIR

The Mean Time To Repair (MTTR) is 2 hours. MTTR is defined as the time for a formally trained and properly equipped Customer Engineer to diagnose and correct a malfunction, run a verification test and return the drive to operation.

MAINTENANCE

The LD 8100, LF 8120, LF 8600 and LF 8602 are designed to allow the operator to inspect and clean or replace the air filters and to clean the media, without assistance from Customer Engineers. Refer to the appropriate User Manual for more information concerning those procedures. No other maintenance is required.

SYSTEM PERFORMANCE LOGS

The drive is capable of monitoring and logging internal operating conditions. This logged information is available to the host via the SCSI-3 interface. Refer to the LD 8100/LF 8120/LF 8600/LF 8602 SCSI Interface Specification (P/N 97662164) for more information on accessing the internal performance logs.

COMPLIANCE AND APPROVAL

COMPLIANCE

The LD 8100/LF 8120/LF 8600/LF 8602 are in compliance with the latest standards listed below when properly installed and operated in accordance with the Product Documents:

SAFETY	
Safety of Information Technology, including electrical business equipment	UL1950
Food and Drug Administration Center for Device and Radiological Health	Regulations for the Administration and Enforcement of the Radiation Control for Health and Safety. Act of 1968, (Title 21, Code of Federal Regulations, Subchapter J) pertaining to Laser Products
Public Law 90 - 602	Radiation Control for Health and Safety, Act of 1968
Evaluated by UL to Canadian Standards Association	CSA 22.2 No. 950 Safety of Information Technology Equipment, including electrical business equipment
EUROPEAN SAFETY	
Safety of Information Technology, including electrical business equipment	EN 60950
Safety of Laser products	EN 60825
EMISSIONS	
US Federal Communications Commission	FCC Part 15, Class A
Canadian Department of Commerce (DOC)	FCC Results Accepted
EUROPEAN EMISSIONS	
Limits and Methods of Measurement of Radio Interference Information Technology Equipment	EN 55022, (CISPR 22) Class A
Equipment Product	EN 50081 - 1 Generic Emission Standard for Residential, Commercial and Light Industrial Products. Reference CISPR 22, Class A Emissions
IMMUNITY	
Europe	EN 55024 (CISPR 24) Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement

APPROVAL

The LD 8100/LF 8120/LF 8600/LF 8602 meet the standards set forth by ANSI X3.131-1994. The LF 8600/ LF 8602 meet the MOVE MEDIA command standards set forth by ANSI X3.131-1994.

APPENDIX A

LIBRARY CONFIGURATIONS

This appendix describes the physical characteristics and interface requirements of the LD 8100 Library configurations. Libraries are mechanized media cartridge loading/unloading devices. The LD 8100 is available in configurations compatible with either the FileNet Library or the Plasmon Library.

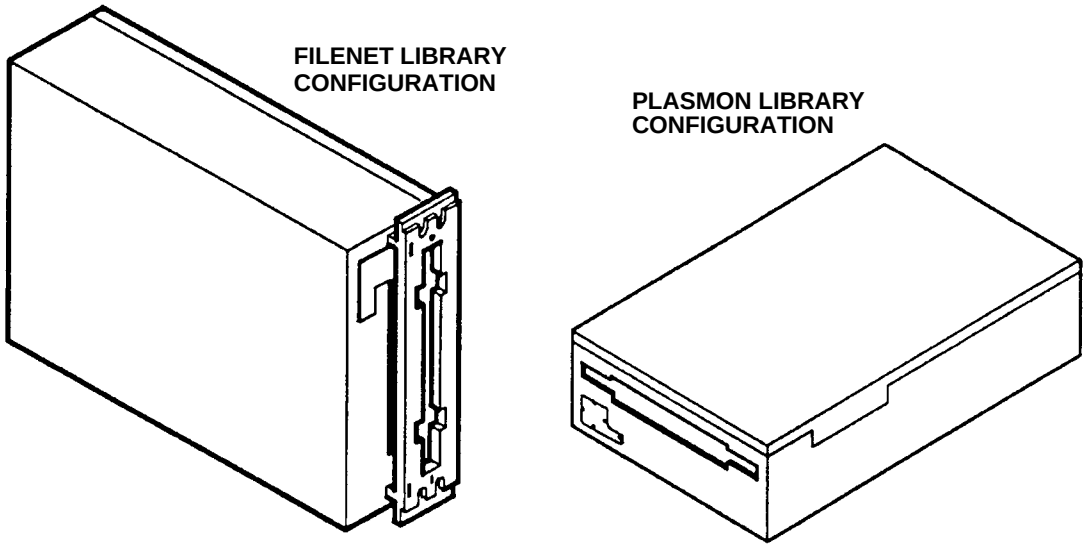


Figure 26. Library Configurations

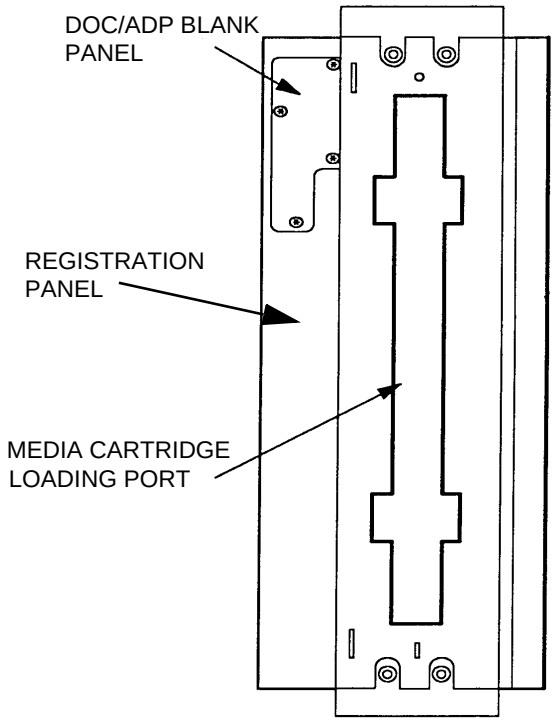
The LD 8100 configured for the FileNet Library includes a Mechanized Cartridge Loading Interface (MCLI) connector and Registration Panel. The Drive Operator Console (DOC) and Auxiliary Diagnostic Port (ADP) are located on the rear panel where the DOC is vertically oriented to correspond with the vertical operating orientation of the drive.

The LD 8100 configured for the Plasmon Library also includes an MCLI connector, the DOC and ADP, all of which are located on the rear panel.

The SCSI interface on the FileNet and Plasmon Library configurations is identical to other LD 8100 configurations. Refer to the LD 8100/LF 8120/LF 8600/LF 8602 SCSI Interface Specification (P/N 97662164) for more information. The environmental specifications in this document also apply to the FileNet and Plasmon Library configurations.

While the host communicates with the FileNet and Plasmon Library configurations via the SCSI interface, the library controller communicates with the LD 8100 via the MCLI connector. This direct interface between the library controller and the LD 8100 enables the library to coordinate loading and unloading media cartridges in the LD 8100.

FILENET FRONT AND REAR PANEL



The LD 8100 FileNet Library configuration is oriented vertically and horizontally. The figure on the left shows the front panel of the FileNet Library configuration and identifies the Registration Panel and the location of the DOC/ADP Blank Panel used to cover the DOC and ADP mounting holes.

Figure 27. LD 8100 FileNet Library Front Panel

The figure on the right illustrates the rear panel of the LD 8100 FileNet Library configuration and identifies the location of the AC power switch, AC power receptacle, ground connector, SCSI-3 I/O connectors, DOC, ADP connector and the MCLI connector. The end of the media cartridge is recessed 5 mm (0.2 in.) from the front surface of the Registration Panel

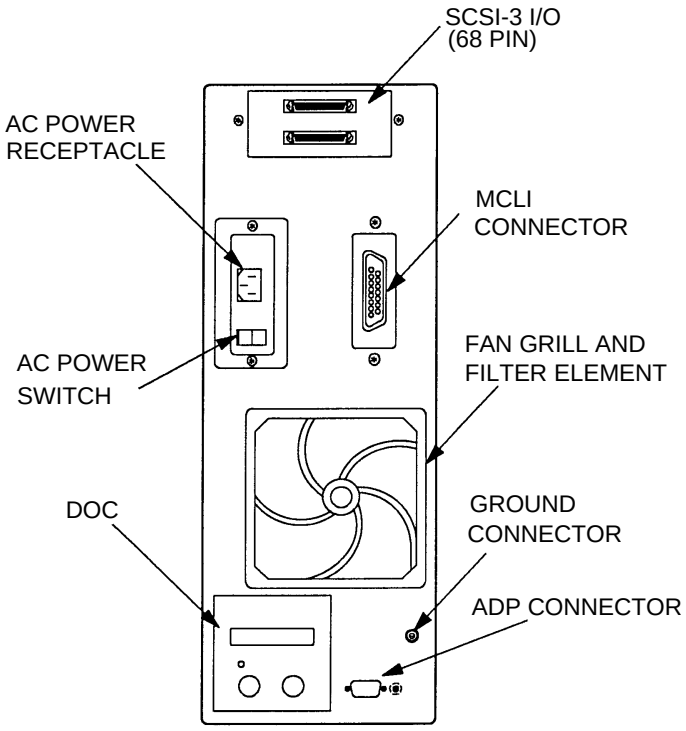


Figure 28. LD 8100 FileNet Library Rear Panel

The figure and table below illustrates the dimensions of the Registration Panel installed on the FileNet Library configuration.

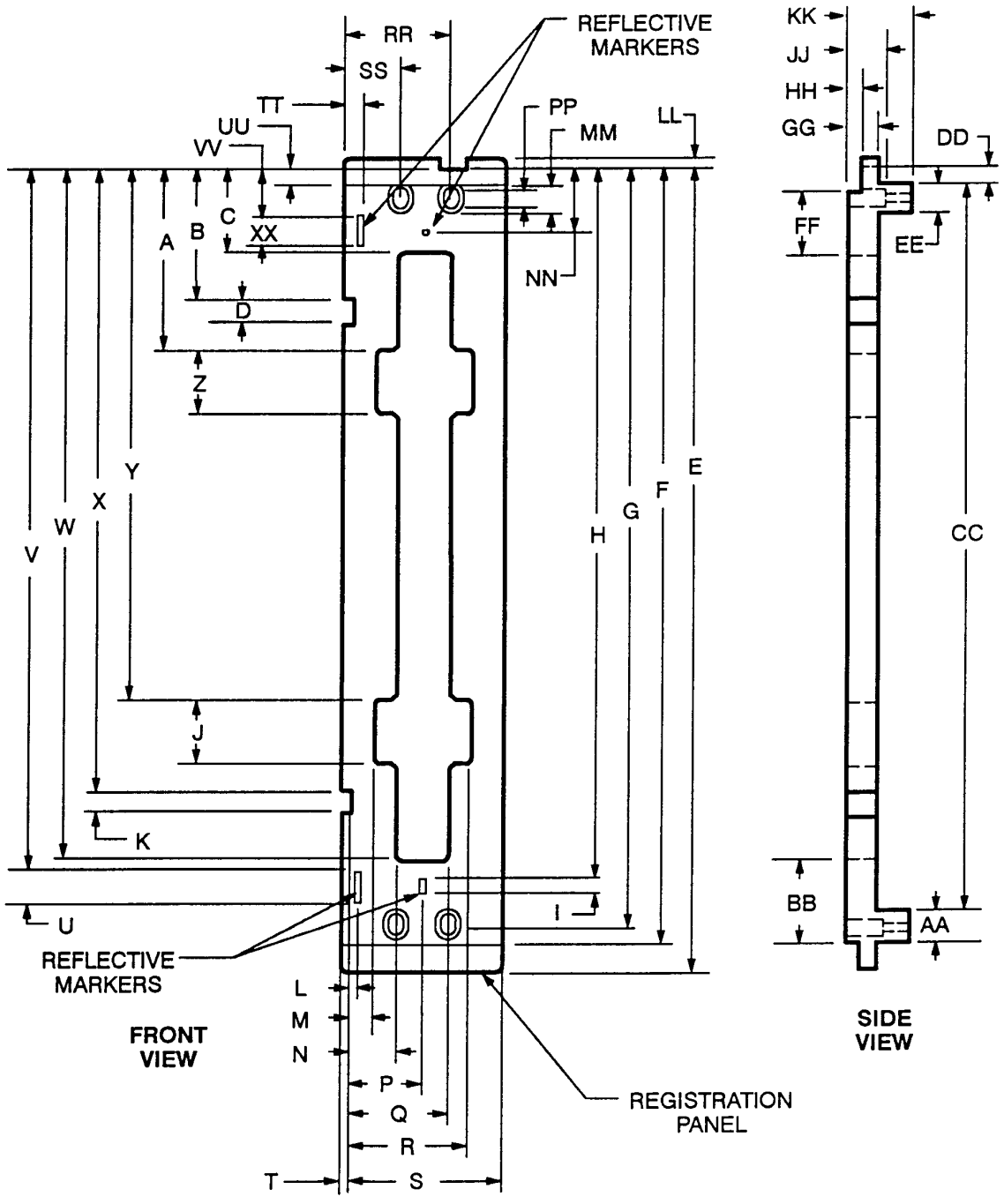


Figure 29. FileNet Registration Panel Dimensions

Table 20. FileNet Registration Panel Dimensions

LOCATION	DIMENSION(1)	LOCATION	DIMENSION(1)
A	118.2 +0.2, -0.8 (4.65+0.01,-0.03)	X	336.4 ± 0.8 (13.24 ± 0.03)
B	86.2 ± 0.8 (3.39 ± 0.03)	Y	288.4+0.2, -0.8 (11.35+0.01,-0.03)
C	50.3+0.2, -0.8 (1.98+0.01,-0.03)	Z	25.4+0.8, -0.2 (1.00+0.03,-0.01)
D	9.5 ± 0.8 (0.37 ± 0.03)	AA	18.54 ± 0.8 (0.730 ± 0.032)
E	435.7 ± 0.8 (17.15 ± 0.03)	BB	38.7 (1.52)
F	420.5 ± 0.8 (16.56 ± 0.03)	CC	401.73+1.5,-0.8 (15.816+0.059,-0.032)
G	411.00 (16.181)	DD	7.23 ± 0.8 (0.285 ± 0.032)
H	396.05 (15.593)	EE	18.54 ± 0.8 (0.730 ± 0.032)
I	3.18 (0.125)	FF	38.2 (1.50)
J	25.4+0.8, -0.2 (1.00+0.03,-0.01)	GG	9.65 (0.380)
K	9.5 ± 0.8 (0.37 ± 0.03)	HH	4.45 (0.175)
L	3.17 (0.125)	JJ	14.00 (0.551)
M	7.9+0.2, -0.8 (0.31+0.01,-0.03)	KK	17.3 (0.681)
N	20.3+0.2, -0.8 (0.80+0.01,-0.03)	LL	3.2 ± 0.8 (0.13 ± 0.03)
P	34.92 (1.375)	MM	13.00 (0.512)
Q	49.5+0.8, -0.2 (1.95+0.03,-0.01)	NN	34.41 (1.355)
R	62.0+0.8, -0.2 (2.44+0.03,-0.01)	PP	8.00 (0.315)
S	73.0 ± 0.8 (2.87 ± 0.03)	RR	46.80 (1.843)
T	3.2 ± 0.8 (0.13 ± 0.03)	SS	21.40 (0.843)

LOCATION	DIMENSION[1]	LOCATION	DIMENSION[1]
U	16.7 (0.66)	TT	2.54 ± 0.12 (0.100 ± 0.005)
V	389.26 (15.325)	UU	12.1 ± 0.8 (0.48 ± 0.03)
W	381.8+0.8, -0.2 (15.03+0.03,-0.01)	V V	26.03 (1.025)
		X X	16.76 (0.660)

[1] Reference dimensions are in millimeters, followed by inches in parentheses, unless otherwise specified.

The figure below shows the dimensional details of the LD 8100 FileNet Library configuration.

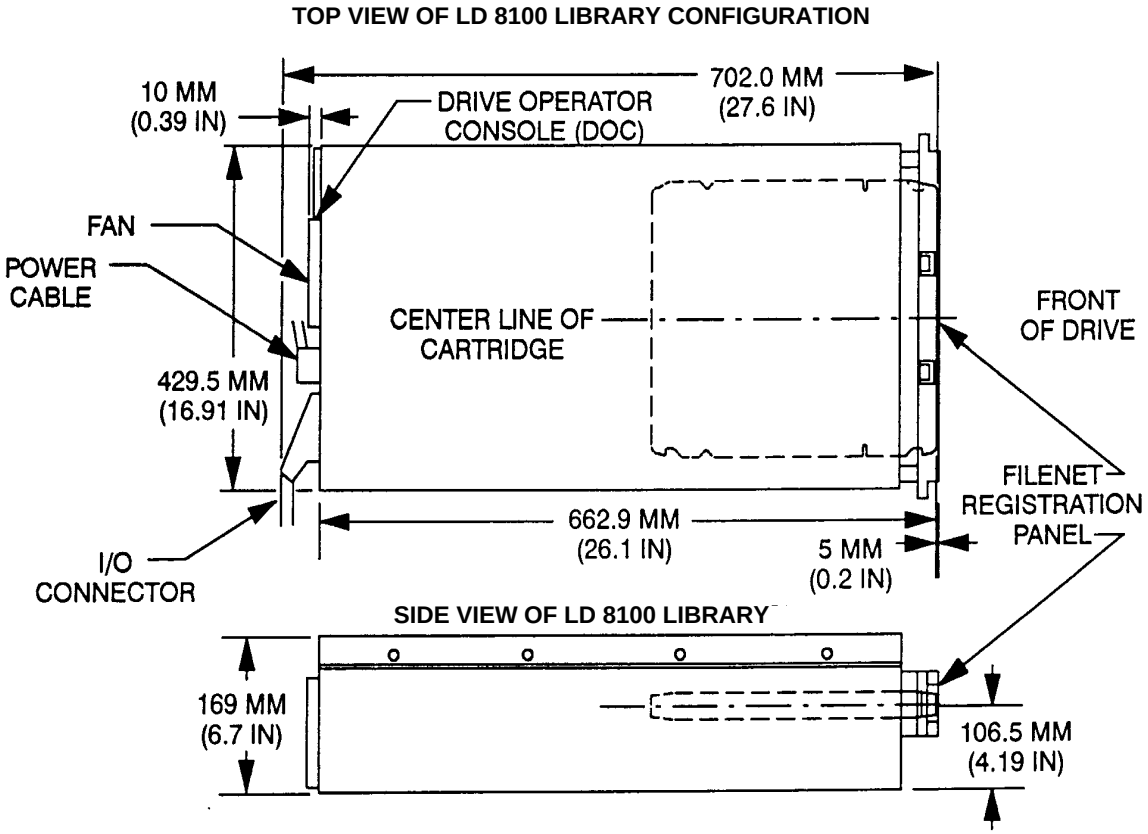


Figure 30. Dimensions for the LD 8100 FileNet Library (for reference only)

PLASMON FRONT AND REAR PANEL

The LD 8100 Plasmon Library configuration is oriented horizontally. The figure below shows the front panel of the Plasmon Library configuration and identifies the location of the DOC/ADP Blank Panel used to cover the DOC and ADP mounting holes. No Bezel or Registration Panel is installed on this configuration.

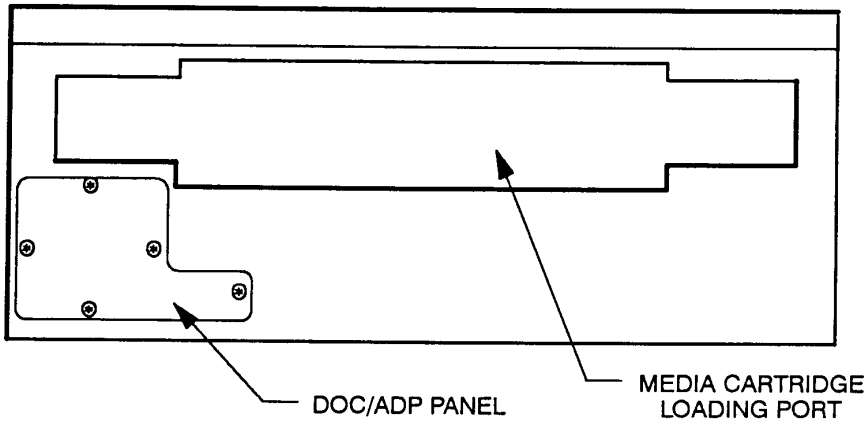


Figure 31. Plasmon Library Front Panel

The figure below illustrates the rear panel of the LD 8100 Plasmon Library configuration and identifies the location of the AC power switch, AC power receptacle, ground connector, SCSI-3 I/O connectors, DOC, ADP connector and the MCLI connector.

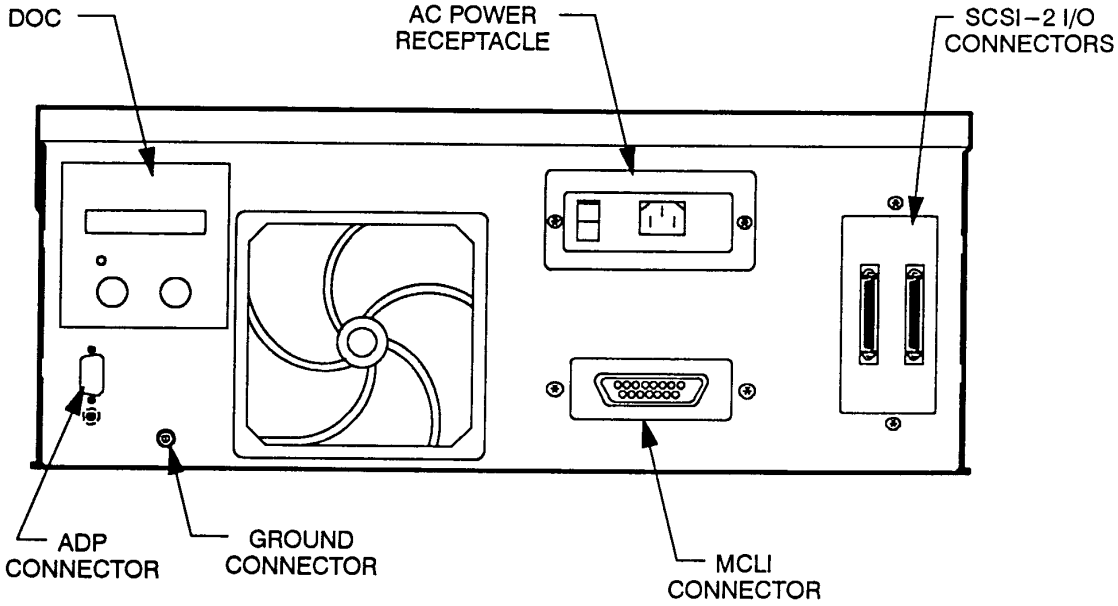


Figure 32. LD 8100 Plasmon Library Rear Panel

DRIVE CHARACTERISTICS

DIMENSIONS

The LD 8100 Library configurations are 429.5 mm (16.91 in.) wide, 169 mm (6.7 in.) high, and 643 mm (25.3 in) long.

In the FileNet configuration, the length of the drive plus an inserted media cartridge extending out the front of the drive is 662.9 mm (26.1 in.).

In the Plasmon configuration, the length of the drive plus an inserted media cartridge extending out the front of the drive is 678 mm (26.7 in.).

These dimensions do not include interface connector protrusions from the rear panel, nor do they allow for movement of the media cartridge during shock and vibration. Reference dimensions are provided in the next figure for both the FileNet and Plasmon Library configurations.

WEIGHT

The weight of the FileNet and Plasmon Library configurations is 30.5 kg (67 lbs). This weight does not include the Registration Panel, cables, mounting rails or media cartridge.

The figure below shows the dimensional details of the LD 8100 Plasmon Library configuration.

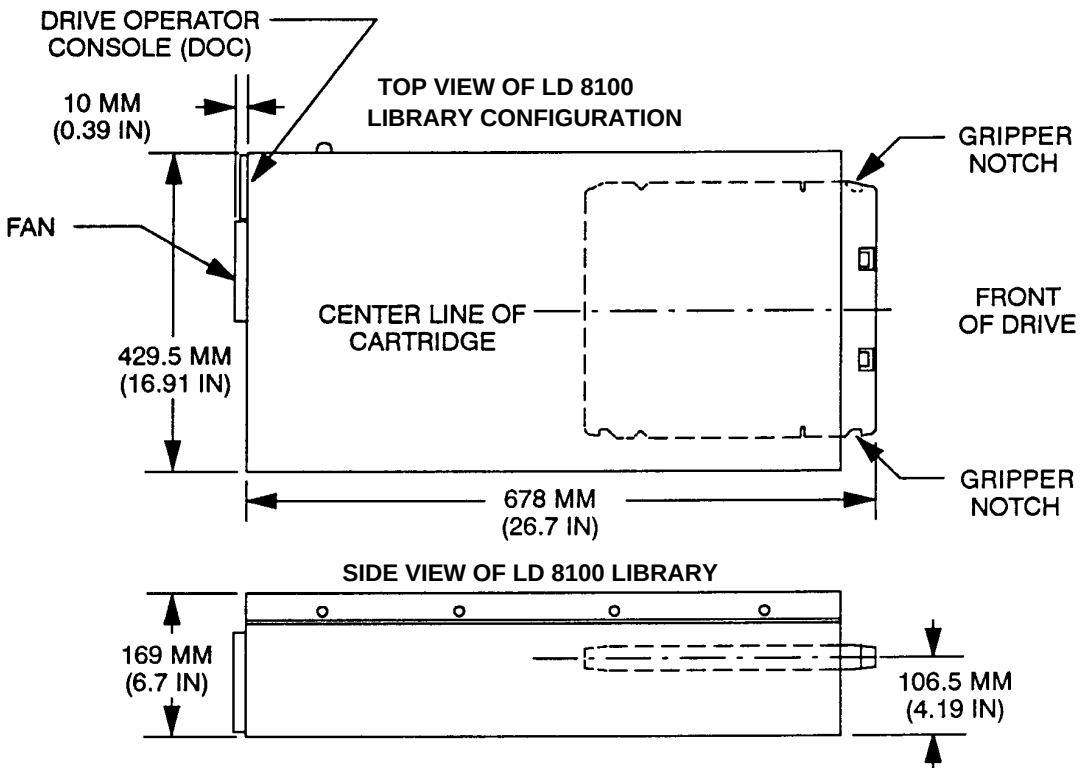


Figure 33. Dimensions for the LD 8100 Plasmon Library Drive (for reference only)

DRIVE MOUNTING AND ORIENTATION

To accommodate vertical and horizontal mounting for the two library configurations, eight mounting holes are located on the bottom surface of the LD 8100 as shown in the figure below. These eight mounting holes have threaded inserts for # 8-32 UNC screws. Four additional mounting holes are located on each side of the LD 8100 with threaded inserts for M4 screws. These holes are used to mount the LD 8100 in a library.

COOLING

Cooling air for the drive is drawn from the rear of the LD 8100 by its fan.

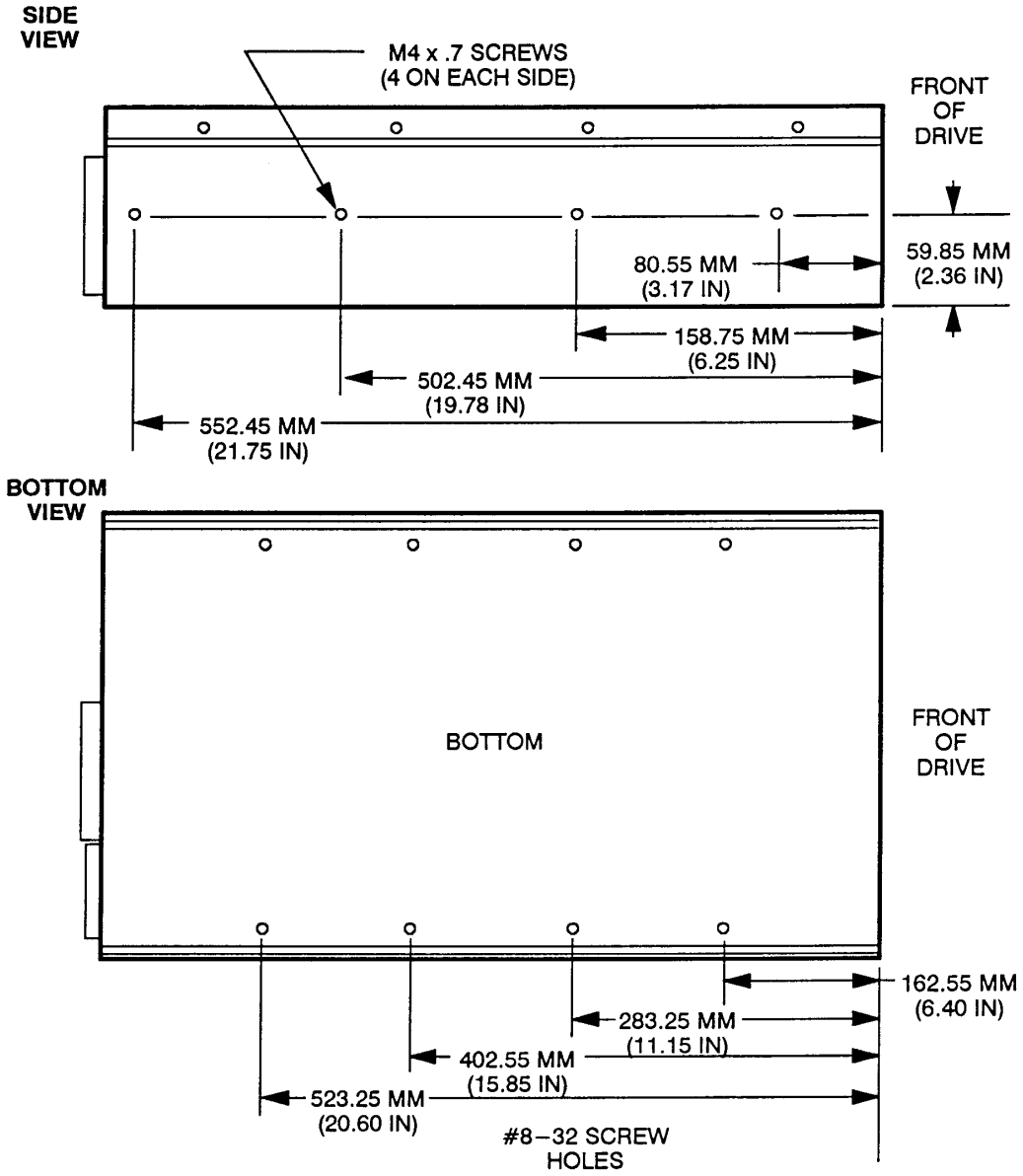


Figure 34. Reference Drawing Showing Location of Mounting Holes

MEDIA CARTRIDGE CHARACTERISTICS

The LM 8000 Media Cartridge is common for all LD 8100/LF 8120/LF 8600/LF 8602 drives, including the library configurations.

SIZE

The LM 8000 media cartridge is 320 mm (12.6 in.) wide, 340 mm (13.39 in.) long, and 16.5 mm (0.63 in.) high.

GRIPPING FEATURES

Both sides of the media cartridge incorporate gripping features designed to work with FileNet and Plasmon library mechanisms and the LF 8600/LF 8602 Autoloader.

There is 11.4 mm (0.45 in.) in the FileNet Registration Panel above and below the media cartridge to accommodate the FileNet library gripper mechanism.

Notches located 10 mm (0.39 in.) from the front surface of the cartridge surface on the sides of the media cartridge provide clearance for the Plasmon gripper mechanism.

Details and dimensions of the gripping features are provided in the.

MEDIA CARTRIDGE CASE

The disk is not removed from the media cartridge during library drive operation. The cartridge and the enclosed media are an integral unit. There is no removable sleeve for the transport mechanism to handle.

CLEANLINESS

When the media cartridge is removed from the drive, the media cartridge encloses the disk and protects it from external contamination. The media cartridge design ensures no contamination occurs internally when the media cartridge is moved and rotated during handling by the transport mechanism.

MEDIA CARTRIDGE INSERTION

The angle of the side of the media cartridge with respect to the front of the drive must be 90 degrees +/- 2.0 degrees in both the horizontal and vertical axes (see next figure). Once the media cartridge is between the media cartridge guides, this angle is 90 degrees +/- 0.3 degrees.

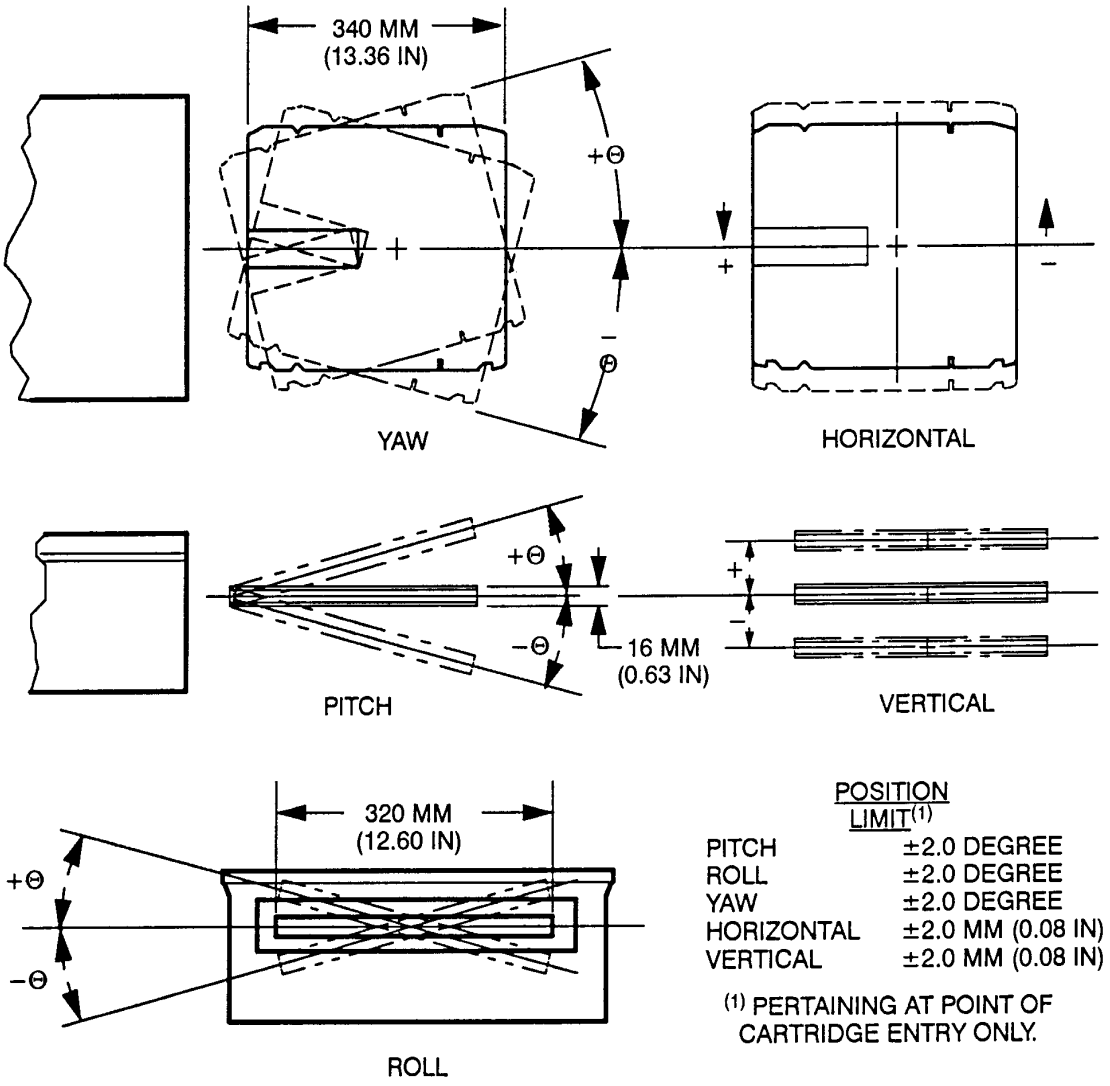


Figure 35. Degrees of Freedom for Media Cartridge Insertion

INSERTION DIRECTION

The media cartridge provides a lead of 5 mm (0.2 in.) on all four sides of the media cartridge. The transport mechanism must take into account 2 mm (0.08 in.) of movement in this area due to shock and vibration.

INSERTION VELOCITY

The maximum allowable velocity at which the media cartridge can be inserted into the drive is 203.2 cm/sec (80 in./sec). The maximum velocity of the media cartridge, upon reaching the media cartridge stop in the media cartridge guide, is 12.7 cm/sec (5 in./sec).

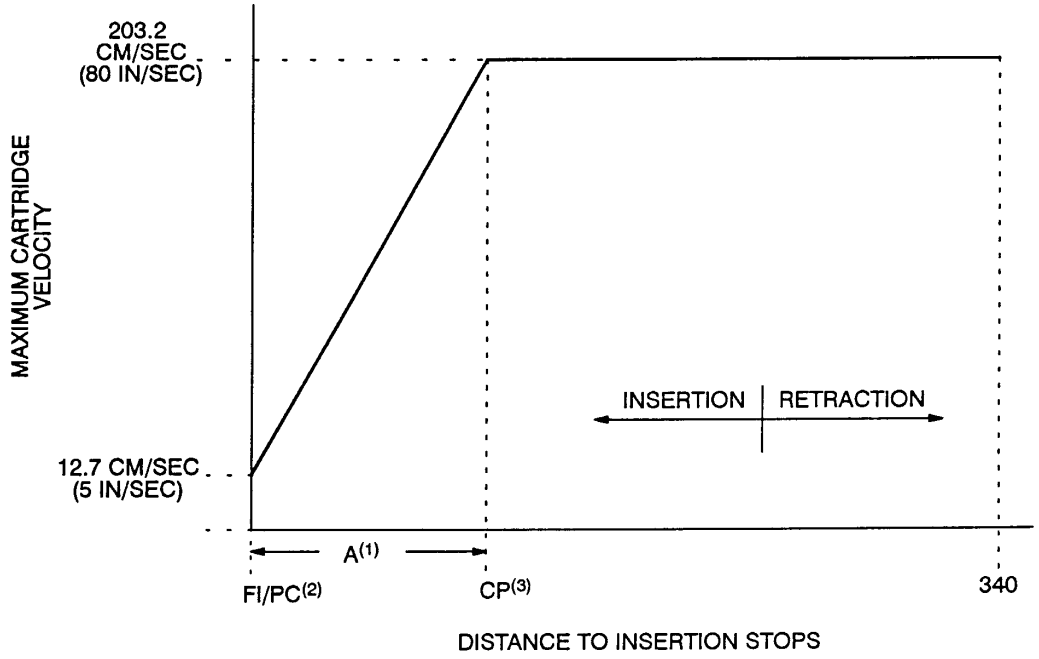


Figure 36. Media Cartridge Velocity - Insertion/Retraction

RESISTANCE FORCE

The maximum force resisting the insertion of the media cartridge into the drive is 10 Newtons (2.25 lbs).

INSERTION STOPS

Media cartridge travel stops in the LD 8100 limit the depth of media cartridge insertion. The stops are capable of repeatedly absorbing impacts that have a kinetic energy of 0.025 Newton-m (0.006 lb-in.). The transport mechanism must take into account 2 mm (0.08 in.) of movement in this area due to shock and vibration.

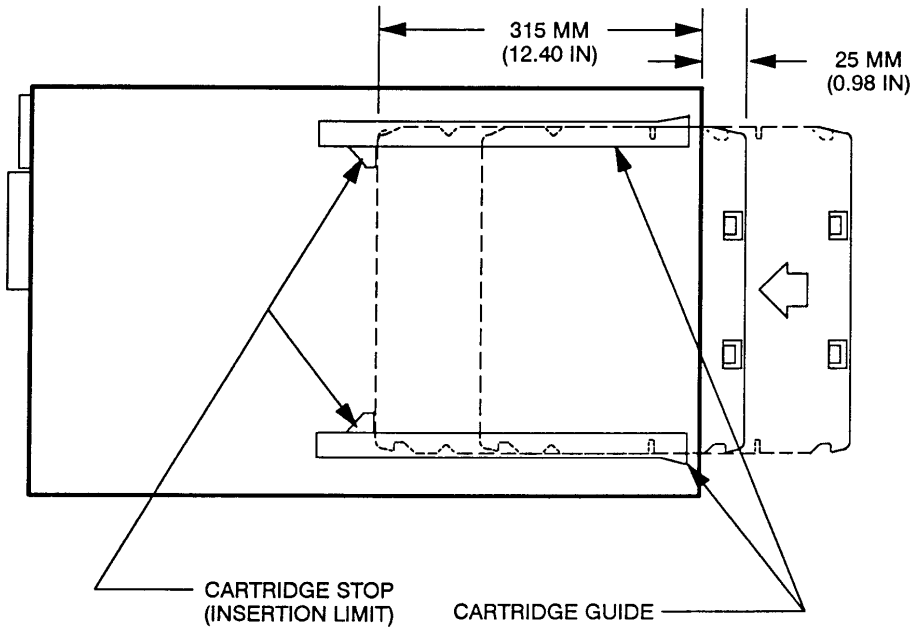


Figure 37. Media Cartridge Insertion Depth·

MEDIA CARTRIDGE RETRACTION

A media cartridge is removed from the LD 8100 solely by the library mechanism. The maximum force perpendicular to the direction of media cartridge motion during retraction is 10 Newtons (2.25 lbs).

RETRACTION DIRECTION

The media cartridge is retracted from the LD 8100 by the transport mechanism pulling the media cartridge straight out from the front.

RETRACTION VELOCITY

The maximum allowable velocity at which a media cartridge can be retracted from the drive is 203.2 cm/sec (80 in./sec).

RESISTANCE FORCE

The maximum force resisting the retraction of the media cartridge from the drive is 10 Newtons (2.25 lbs).

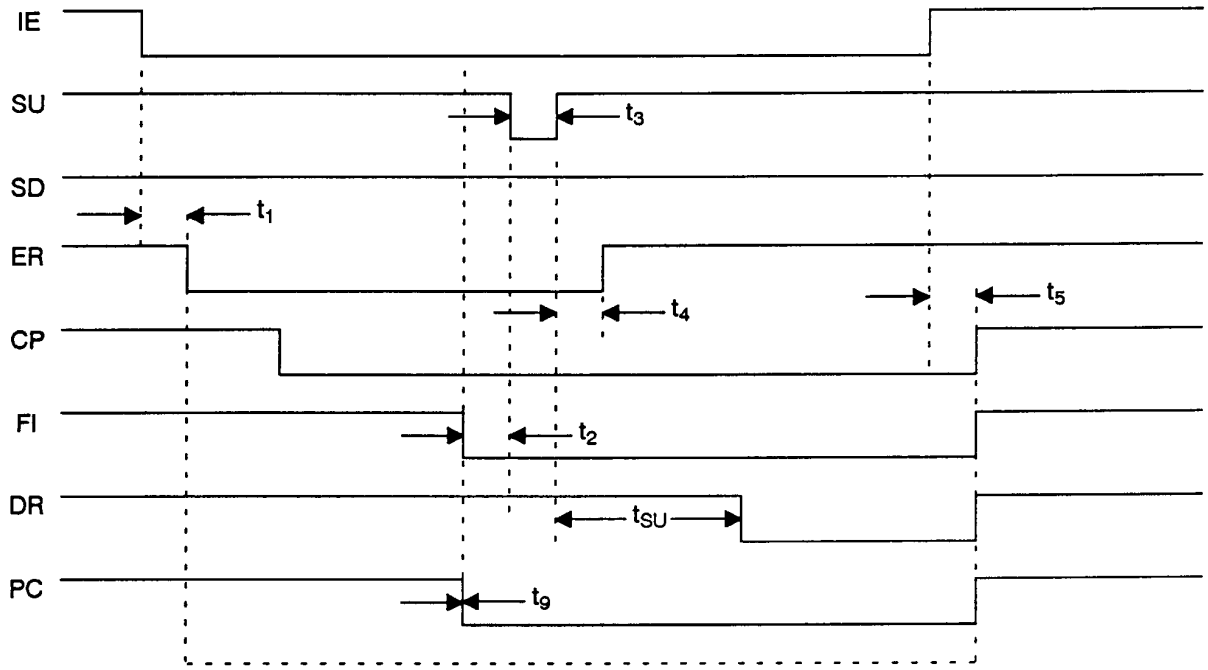
DRIVE/MECHANISM CONTROLLER INTERFACE (MCLI)

The interface between the LD 8100 optical drive and the media cartridge transport mechanism consists of the following signals:

- Interface Enabled (IE)
- Spin Up (SU)
- Spin Down (SD)
- Entrance Ready (ER)
- Cartridge Present (CP)
- Path Clear (PC)
- Fully Inserted (FI)
- Drive Ready (DR)

Three of these signals, Interface Enabled, Spin Up and Spin Down, are control lines which allow the transport mechanism controller to instruct the drive to take certain actions. The remaining signals are status lines which provide the controller with information about the state of the LaserDrives.

Timing diagrams depicting the operation of the transport mechanism controller during spin-up and spin-down sequences are illustrated in the next two figures.



Where:

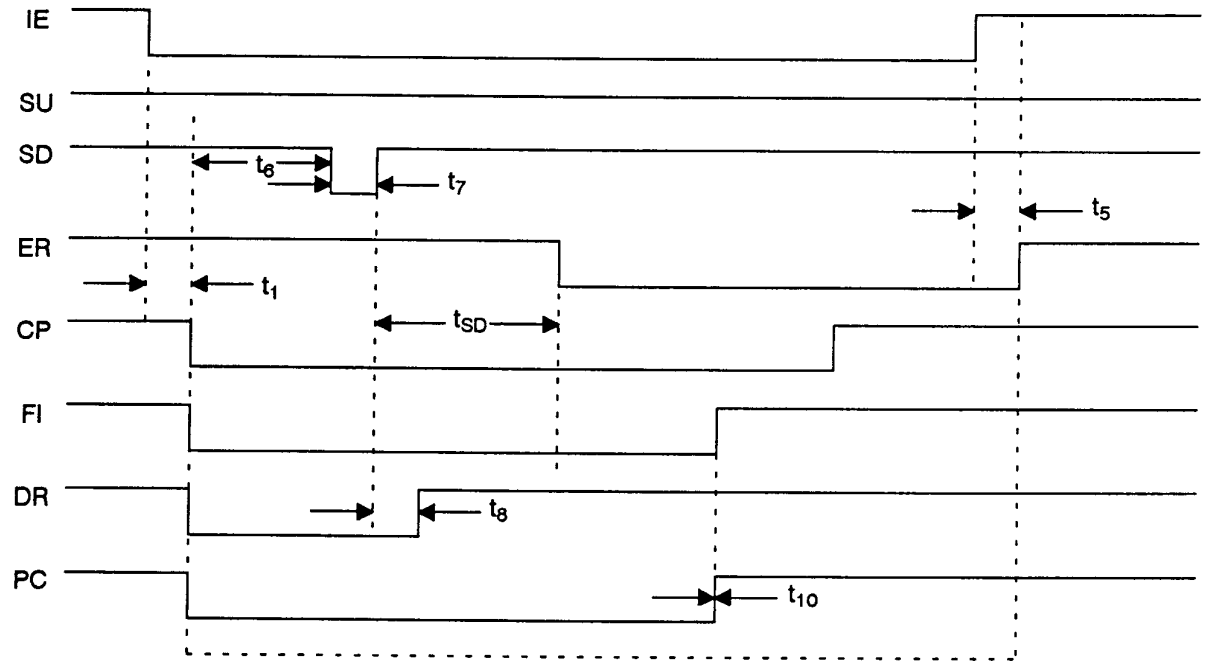
t_1	=	Interface Enable True to interface is valid
t_2	=	FI True to SU True
t_3	=	SU True Pulse Width
t_4	=	SU False to ER False (SU Recognized)
t_5	=	Interface Enable False to interface is not valid
t_{SU}	=	Spin–Up Time
t_9	=	PC True to FI True

MINIMUM TIME(1)	MAXIMUM TIME
—	1.0 µsec
0.0 µsec	—
2.0 µsec	—
2.0 µsec	3.0 msec
—	1.0 µsec
—	4.0 sec(2)
0.0 µsec	—

(1) Minimum time before the MCLI recognizes a command.

(2) Refer to section 6. of this specification for information concerning spin–up time.

Figure 38. Timing Diagram for the Library Spin-Up Sequence



Where:

t_6	=	Interface is valid to SD True
t_7	=	SD True Pulse Width
t_8	=	SD False to DR False (SD Recognized)
t_{SD}	=	Spin–Down Time
t_{10}	=	FI False to PC False

MINIMUM TIME(1)	MAXIMUM TIME
0.0 µsec	—
2.0 µsec	—
2.0 µsec	5.0 msec(2)
—	2.0 sec(3)
0.0 µsec	—

(1) Minimum time before the MCLI recognizes a command.

(2) The drive must not have any pending host commands for this timing to be true.

(3) Refer to section 6. of this specification for information concerning spin–down time.

Figure 39. Timing Diagram for the Library Spin - down Sequence

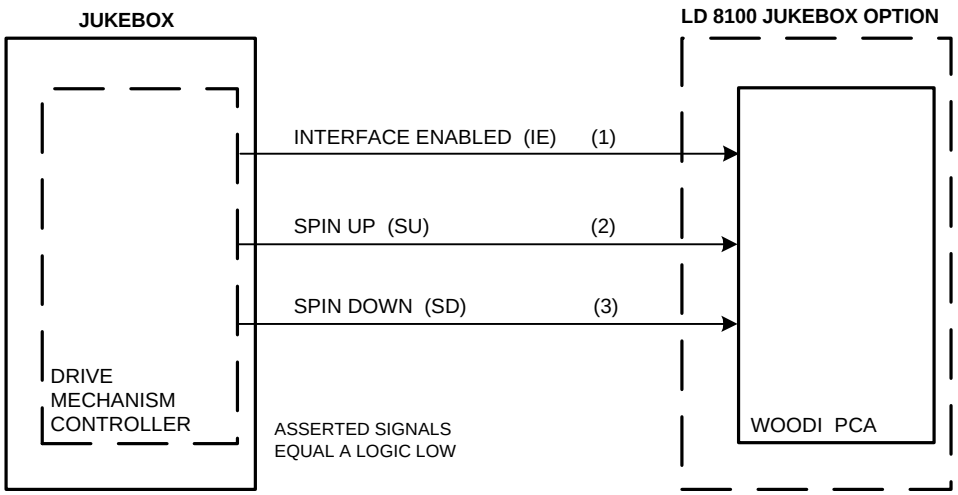
CONTROL SIGNALS

INTERFACE ENABLED (IE)

The Interface Enabled (IE) signal allows the transport mechanism controller to command the LaserDrives to respond to commands on the control lines and to set valid status on the status lines.

The information presented on the status lines by the LaserDrives will be valid and the drive will be ready to respond to commands from the transport mechanism controller within a 2-msec to 10-msec time period after the IE line is asserted.

When the IE line is de-asserted by the transport mechanism controller, the drive will de-assert all of its status lines in the 2-msec to10-msec time period.



(1) IE MUST BE ASSERTED TO ACTIVATE THE MCLI INTERFACE
(2) CAUSES A DRIVE WITH A BLOCKED LCFI SENSOR AND RCP OR LCP SENSOR TO INITIATE A DRIVE SPIN UP
(3) CAUSES A DRIVE AT "READY" TO INITIATE A SPIN DOWN SEQUENCE

Figure 40. MCLI Control

SPIN UP (SU)

The Spin-Up (SU) signal allows the transport mechanism controller to command the LaserDrive that contains a fully inserted media cartridge to close the baseplates, spin the media up to speed and initialize the media for data access.
The transport mechanism controller must assert the SU line for a minimum of 2 msec and then must de-assert the line. A spin-up operation is initiated on the transition of SU from the asserted state to the de-asserted state. The drive will initiate a spin-up operation within a minimum of 2 msec and a maximum of 10 msec from the time that the spin-up command is received.

If the SU command is received by a drive that does not contain a media cartridge, the command is ignored. If this command is received by a drive that contains a disk which is already spun up, this command is ignored.

The LaserDrive may be configured so that spin up is automatic upon media cartridge insertion or at power on when a cartridge is present. This option is enabled from the DOC.

SPIN DOWN (SD)

The Spin-Down (SD) signal allows the transport mechanism controller to command a LaserDrive to spin down the media and open the baseplates. The LaserDrive then unloads the disk from the spindle. This action readies the media cartridge for removal by the transport controller mechanism.

The transport mechanism controller must assert the line for a minimum of 2 msec and then must de-assert the line. A spin-down operation is initiated on the transition of SD from the asserted state to the de-asserted state.

If the SD command is received by a drive that does not contain a media cartridge, the command is ignored. If this command is received by a drive that contains a disk which is locked by the host, the command is ignored. If the SD command is received by a drive that contains a disk which has already been spun down, the command is ignored. The drive will complete any pending host commands before executing a spin-down command.

CONFLICTS

The drive will always execute the last command given by the transport mechanism controller, even if the drive is currently in the process of executing a previous transport mechanism controller command. In the event that the commands are invoked so closely together that the drive is unable to distinguish between the last and previous, both commands will be ignored. Under no condition will the drive enter an undefined state or report an incorrect status due to the sequence in which the control lines change state.

NOISE IMMUNITY

All control signals received by the drive are debounced by the LaserDrive to the maximum degree permitted by the 2-msec minimum response time. This ensures that the transport mechanism controller has the maximum possible noise immunity.

STATUS SIGNALS

The following paragraphs contain short description of the Status Signal.

DRIVE CARTRIDGE SENSOR

The MCLI status signals are derived from sensors internal to the drive. The source sensor for each MCLI status signal is shown in the next figure. Refer to for MCLI timing diagrams.

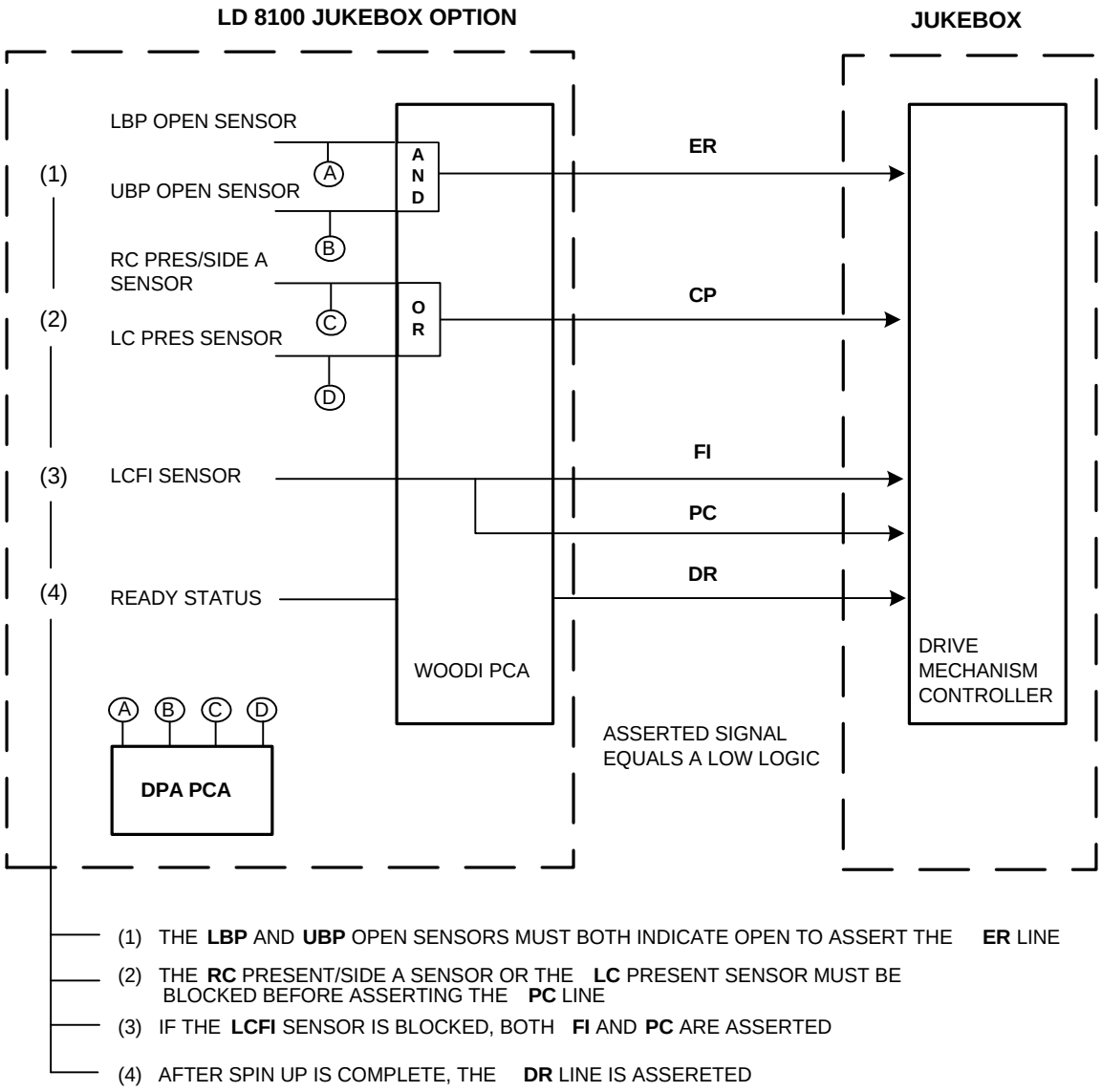


Figure 41. MCLI Status

ENTRANCE READY (ER)

The Entrance Ready (ER) line is used by the drive to report to the transport mechanism controller that the drive's upper and lower baseplates are in the correct position to allow a media cartridge to either be inserted into the drive or retracted from it. The transport mechanism controller initially asserts the IE line. The LD 8100 then asserts the ER line if both upper and lower drive baseplates are fully open.

A drive containing a media cartridge will de-assert the ER line within 2 msec to 10 msec of receiving a spin-up command from the transport mechanism controller.

CARTRIDGE PRESENT (CP)

The media Cartridge Present line is used by the drive to report to the transport mechanism controller that the Left Cartridge Present (LCP) or Right Cartridge Present (RCP) sensor has detected the presence of a partially inserted media cartridge. The transport mechanism controller initially asserts the IE line. The drive then asserts the CP line when the LCP or RCP sensor is within 120 mm (4.7 in.), minimum, of being fully inserted into the drive.

FULLY INSERTED (FI)

The Fully Inserted (FI) line is used by the LaserDrive to report to the transport mechanism controller that a media cartridge has been fully inserted into the drive. If the autospin configuration option is disabled, the drive will accept either a spin up (SU) command via MCLI or a a start command from the SCSI host in order to load the media.

The transport mechanism controller initially asserts the IE line. The drive then asserts the FI line if either Fully Inserted sensor in the drive cartridge guide detects the presence of a fully inserted media cartridge.

PATH CLEAR (PC)

The Path Clear (PC) line is used by the drive to report to the transport mechanism controller that the media cartridge has been inserted into the drive far enough to ensure that the transport mechanism will not strike it as the mechanism passes in front of the drive.

The transport mechanism controller initially asserts the IE line. The drive asserts the PC line when the media cartridge is within 1 mm (0.04 in.) of being fully inserted into the drive. PC and Fully Inserted (FI) are coincident.

DRIVE READY (DR)

The Drive Ready (DR) line is used by drive to report to the transport mechanism controller that the media cartridge has been loaded onto the drive's spindle and spun up to speed and the actuator has been readied. The transport mechanism controller initially asserts the IE line and then the drive asserts the DR line when the drive is ready to transfer data. A drive containing a disk that is spun up de-asserts the DR line within 2 msec to 10 msec of receiving a spin-down command from the transport mechanism controller.

ELECTRICAL CHARACTERISTICS

DRIVERS AND RECEIVERS

All control and status lines use TTL-compatible open collector drivers and receivers and are terminated at both ends as indicated in the figure below.

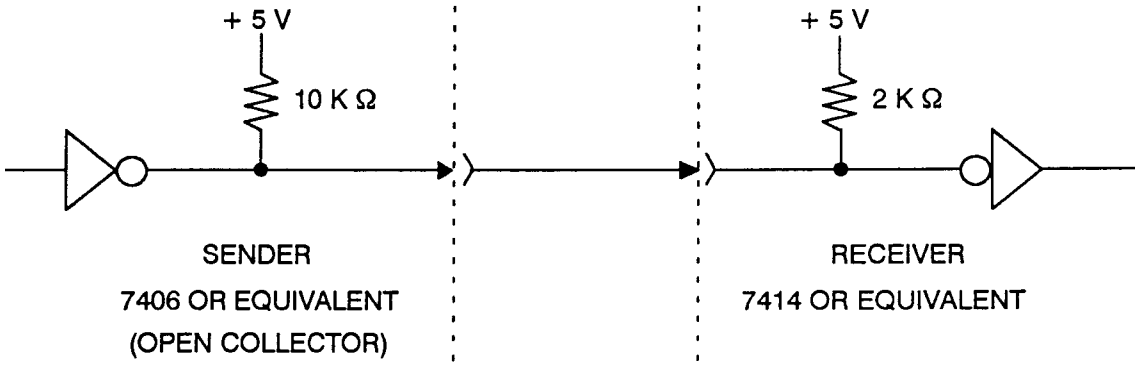


Figure 42. MCLI Interface Hardware

STATE DEFINITION

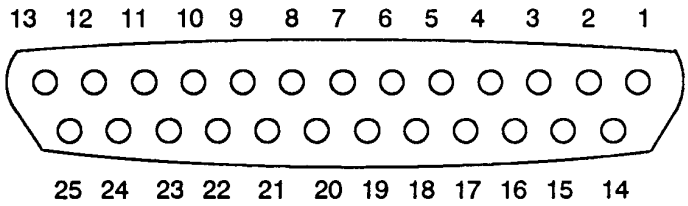
A true or asserted state is defined as a logic low (less than 0.8 VDC). A false or de-asserted state is defined as a logic high (greater than 2.4 VDC).

INTERFACE CONNECTOR

All MCLI signals are available on a single shielded DB-25 type receptacle (female).

CONNECTOR PIN ASSIGNMENTS

The figure below illustrates the graphic representation of the MCLI connector as well as corresponding pin assignments.



PIN ASSIGNMENTS

PIN NUMBER	SIGNAL NAME
1	Chassis Ground
2	Fully Inserted
3	Cartridge Present
4	Entrance Ready
5	Drive Ready
6	Path Clear
7	Not Connected
8	Spin Down
9	Interface Enabled
10	Spin Up
11	Not Connected
12	Not Connected
13	+ 5V
14–25	Ground

Figure 43. MCLI Connector and Pin Assignments

LD 8000 SERIAL PORT SUPPORT

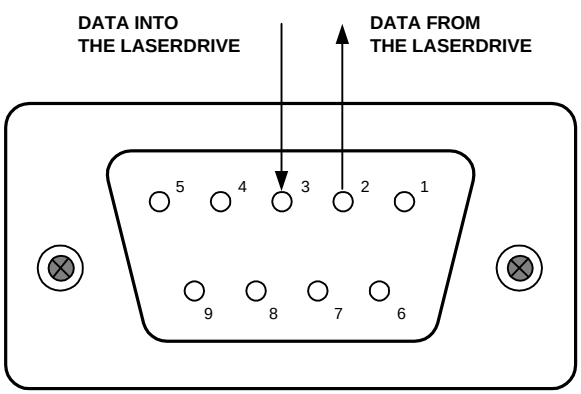
(For Code Level D04 or later)

Most of the configurations of the SET CONFIG menu may also be set via the Serial Port (ADP) on the rear panel of the LD 8100. The setting of a particular configuration may also be retrieved from the Drive.
The interface uses a standard RS232 connection. Only pins 2 and 3 are used as shown in the next figure.
The serial port parameters should be set as follows:

Baud Rate	19.2 Kb[1]
Character Length	8 Bits
Parity	None
Stop Bits	1
Flow Control	None
Control Character (0x0A)	ASCII Line Feed

[1] The Baud Rate is selectable through the Diagnostic Menu at the DOC panel. The selectable rates are: 19.2Kb, 38.4Kb, 57.6Kb, and 115.2 Kb. The factory default is 19.2 Kb.

LASERDRIVE REAR PANEL SERIAL PORT



RECONFIGURING THE LD 8100 VIA THE SERIAL PORT

For each configuration, sending in a new state value as the command argument changes the state of a particular configuration option. Valid state values for the changing the Language option are: “e” (English), “f” (French), or “g” (German). Valid state values for changing the other configuration options are: ”0” (off) or ”1” (on). Valid state values for SCSI id are 0 - 15.

Upon successful completion of a command, the string “Complete\x0A” is returned. For a valid command that cannot be executed, an error message followed by “Complete\x0A” is returned. An Invalid command or an invalid command argument result in “Invalid\x0A” being returned.

The current state of a configuration option can be retrieved by sending in a “?” as the command argument. A valid configuration option retrieval request results in a single byte representing the current state, followed by a line-feed, and then “Complete\x0A” being returned. In order for all of the command strings to operate, the configuration options are case insensitive.

In the following descriptions of the configuration option manipulation, an underscore (“_”) represents the command argument, valid command arguments are shown in parenthesis, and “<LF>” represents the line-feed control character.

SETTING DRIVE CONFIGURATIONS

The SCSI command is used here as an example to show how to set and retrieve configuration settings.

To set or retrieve SCSI ID (0 - 15):

ASCII Character	S	C	S	I	I	D	_	LF
Hex Value	x53	x43	x53	x49	x49	x44	x30-x39 x41-x46	x0A

Examples:

Send String “SCSIID2\x0A” to set SCSI id to 2
Send String “SCSIIDB\x0A” to set SCSI id to 11
Send String “SCSIIDE\x0A” to set SCSI id to 14

Retrieving a configuration setting from the Drive.

To retrieve a configuration setting send x3F in place of the command argument.

Example:

To retrieve the SCSI id vial the Serial Port, send the following string:

ASCII Character	S	C	S	I	I	D	?	LF
Hex Value	x53	x43	x53	x49	x49	x44	x3F	x0A

SETTING OR RETRIEVING THE SET CONFIG OPTIONS:

To set or check the Parity option, send the string:
ASCII String: PARITY_<LF>
Hex String: x50, x41, x52, x49, x54, x59, (x3F, x30, or x31), x0A

To set or check the Language option, send the string:
ASCII String: LANGUAGE_<LF>
Hex String: x4C, x41, x4E, x47, x55, x41, x47, x45, (x 3F, x45, 0x46, or x47), x0A

To set or check the Write Protect option, send the string:
ASCII String: WRITE PROTECT_<LF>
Hex String: x57, x52, x49, x54, x45, x20, x50, x52, x4F, x54, x45, x43, x54, (x3F, x30, or x31), x0A

To set or check the Auto Spin option, send the string:
ASCII String: AUTO SPIN_<LF>
Hex String: x41, x55, x54, x4F, x20, x53, x50, x49, x4E, (x3F, x30, or x31), x0A

NOTE:
The **Auto Spin** option is only valid for an 8100.

To set or check the Load Switch option, send the string:
ASCII String: LOAD SWITCH_<LF>
Hex String: x4C, x4F, x41, x44, x20, x53, x57, x49, x54, x43, x48, (x3F, x30, or x31), x0A

To set or check the Read Ahead option, send the string:
ASCII String: READ AHEAD_<LF>
Hex String: x52, x45, x41, x44, x20, x41, x48, x45, x41, x44, (x3F, x30, or x31), x0A

NOTE:
Read Ahead options cannot be turned on if PER or DTE are set.

To set or check the CDE Cursor option, send the string:
ASCII String: CDE_CURSOR_<LF>
Hex String: x43, x44, x45, x20, x43, x55, x52, x53, x4F, x52, (x3F, x30, or x31), x0A

To set or check the Busy option, send the string:
ASCII String: BUSY_<LF>
Hex String: x42, x55, x53, x59, (x3F, x30, or x31), x0A

To set or check the Mode Select Read Ahead option, send the string:
ASCII String: MODE SEL RA_<LF>
Hex String: x4D, x4F, x44, x45, x20, x53, x45, x4C, x20, x52, x41, (x3F, x30, or x31), x0A

To set or check the Media Management on Spin Up option, send the string:
ASCII String: MM SPIN UP_<LF>
Hex String: x4D, x4D, x20, x53, x50, x49, x4E, x20, x55, x50, (x3F, x30, or x31), x0A

To set or check the Target SDTR option, send the string:
ASCII String: TARGSDTR_<LF>
Hex String: x54, x41, x52, x47, x53, x44, x54, x52, (x3F, x30, or x31), x0A

To set or check the Target WDTR option, send the string:
ASCII String: TARGWDTR_<LF>
Hex String: x54, x41, x52, x47, x57, x44, x54, x52, (x3F, x30, or x31), x0A

APPENDIX B

This Appendix provides site preparations and installation requirements for the LD 8100/LF 8120/LF 8600/ LF 8602.

SYSTEM COOLING REQUIREMENTS

The LD 8100/LF 8120/LF 8600/LF 8602 use internal forced air for cooling electronic components. Air intake for the drive is from rear of the unit with exhaust exiting from the front.

The site selected for the Drives must be able to support a volumetric air flow of 0.77 m^3/min (27 cf/m). The site selected for the LF 8602 must be able to support a volumetric air flow of 1.54 m^3/min (54 cfm).

Dust and particulates in the operating area should be minimized for specific performance levels.

SITE PREPARATION AND INSTALLATION REQUIREMENTS

Clearances for the 8000 series drives must allow for operator access, maintenance and cable routing.

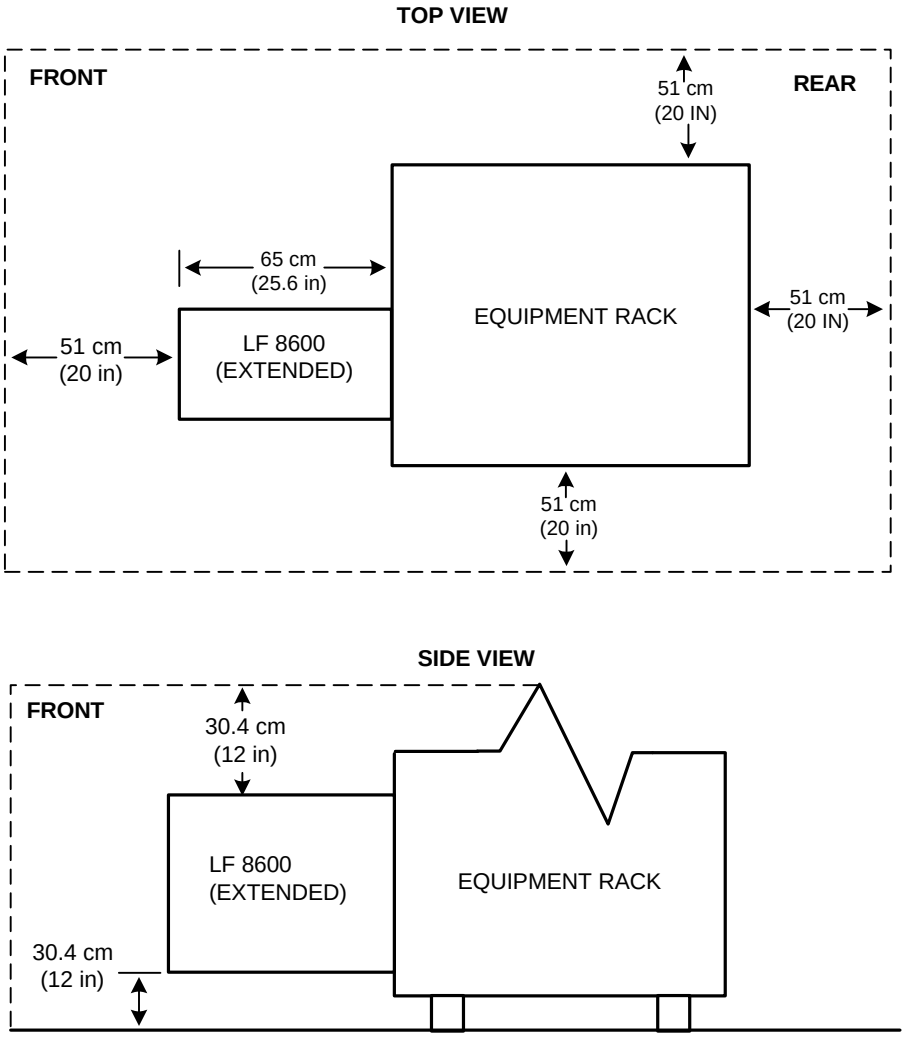
The tables and figures below show the clearances required to provide access for cartridge loading/ unloading and to fully extend rack mounted LD 8100, LF 8120 and LF 8600. All measurements listed in the tables and figures are for references only.

LD 8100 RECOMMENDED CLEARANCES

Table 21 and Figures 44 and show the recommended clearances all LD 8100 Drive configurations. These clearances are required for access and maintenance purposes.

Table 21. Operational Clearances for LD 8100/LF 8120 Configurations

AREA	LD 8100 RACK MOUNT	LD 8100 DESKTOP	LD 8100 TOWER
Front	116 cm (46 in.)	51 cm (20 in.)	51 cm (20 in.)
Rear	12.7 cm (5.0 in.)	12.7 cm (5 in.)	12.7 cm (5 in.)



(1) The LD 8100 Rack Mount configuration is designed to mount in an EIA standard 19 inch rack.

Figure 44. Recommended Clearances for the LD 8100 Rack Mount Configuration

LF 8120 RECOMMENDED CLEARANCES

Table 22 and Figures 44 show the recommended clearances all LD 8120 Drive configurations. These clearances are required for access and maintenance purposes.

Table 22. Operational Clearances for LF 8120 Configurations

AREA	LF 8120 RACK MOUNT	LF 8120 TOWER
Front	51cm (52 in)	51 cm (20 in)
Rear	12.7 cm (5.0 in)	12.7 cm (5.0 in)

LF 8600/LF 8602 RECOMMENDED CLEARANCES

Table 23 and Figures 44 show the recommended clearances all LD 8600 Drive configurations. These clearances are required for access and maintenance purposes.

Table 23. Operational Clearances for LF 8600 Configurations

AREA	LF 8600 RACK MOUNT	LF 8600 TOWER
Front	132 cm (52 in.)	51 cm (20 in.)
Rear	51 cm (20 in.)	51 cm (20 in.)

TEMPERATURE AND HUMIDITY OPERATING RANGE

The maximum wet bulb temperature for the LD 8100/LF 8120/LF8600/LF 8602 is 28 ºC (82 ºF). The shaded portion in the next graph shows the temperature and humidity operating range.

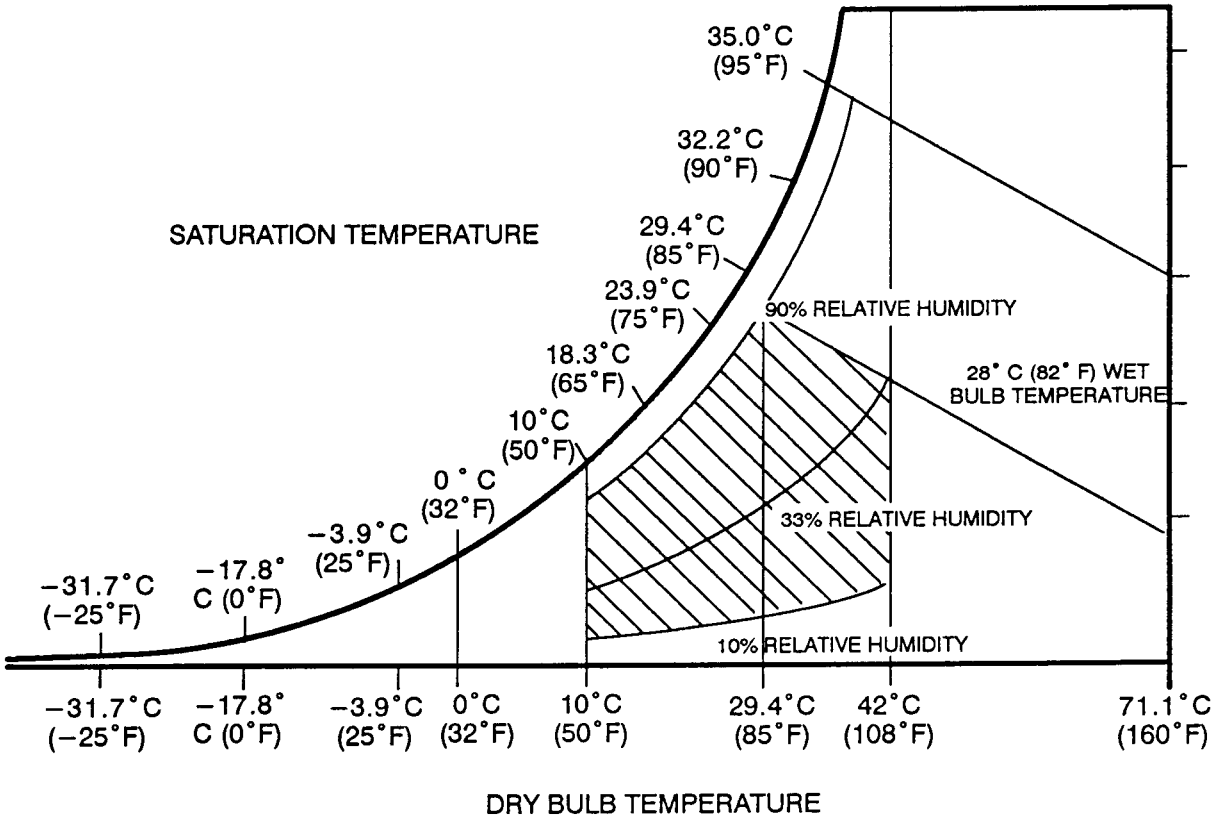


Figure 45. Temperature and Humidity Operating Range

INSTALLATION

The drive must be installed in accordance with the appropriate User Manual. The drive must be grounded via its chassis ground in a manner which is consistent with normal peripheral equipment grounding practices.

A wheeled cart is recommended for transporting the drive within a building. Always ensure that the baseplates are parked prior to moving the drive. Also, precautions should be taken to guard against sudden bumps and jarring when transporting the LaserDrive.

Refer to the LD 8100/LF 8120/LF 8600/LF 8602 SCSI Specification (P/N 97662164) for external interface cable descriptions and pin assignments. Refer to the appropriate User Manual for unpacking and repacking information.

APPENDIX C

GLOSSARY

Presented in this glossary are terms, acronyms and abbreviations which apply to the optical disk drive technology as well as the LX 8000 product line and the entire set of documents for that product line. This means that, although some terms found in this glossary may not be mentioned in this document, they do apply to the product line.

NOTE

The term LaserDrive or the 8000 Drive is used to refer to the LD 8100, LF 8120, LF 8600 and LF 8602.

Actuator	The electromechanical device which positions the laser beam to access the data on the media.
ADP	Auxiliary Diagnostic Port
Bus	One or more conductors used for transmitting signals or power.
Byte	Eight bits of binary information; two nibbles.
Cartridge	The protective enclosure for the LM 8000 optical disk.
Code Word	A portion of the bytes of a field treated as a group for error detection and correction purposes.
Command Descriptor Block (SCSI-2)	The structure used to communicate requests from an Initiator to a Target.
Completion Status (SCSI-2)	One byte of information sent from the Target to the Initiator on completion of one command or a set of linked commands.
Connect (SCSI-2)	The function that occurs when an Initiator (host) selects a Target (LaserDrive) to start an operation.
CRC	Cyclic Redundancy Check
Customer Engineer	A qualified, Plasmon LMS-trained person capable of servicing and repairing Plasmon LMS optical products.
Daisy chained	Series connection of multiple peripherals, with interrupt priority, which requires termination of the last unit in the string.

DAC	Digital-to-Analog Converter. A functional unit that converts data from digital to analog representation.
Data Buffer	The memory used for temporary storage of all data to and from the host plus all data to and from the disk. This buffer allows the controller module to conduct data transfers with the host at an instantaneous rate that is different from the disk rate.
Defective Sector	A sector containing a surface or imbedded irregularity. The sector will be relocated during a write.
Detector	Converts data and servo information from the disk into electrical signals.
Disconnect (SCSI-2)	This function occurs when a Target releases control of the SCSI-2 Bus, allowing it to go to the BUS FREE phase.
Disk	The optical disk media.
DOC	Drive Operator Console. Complete functional control panel for drive operations without need for host control or connection. Interactive panel with LED readout used for operation and diagnostics.
DPC	Drive Power Control PCA.
DPR	Dual Port Random Access Memory
Drive ID	Drive Identification. The assigned SCSI-2 address to which the LaserDrive will respond.
ECC	Error Correction Code. An algorithm constructed to permit correction of certain errors occurring in an acceptable expression.
EDAC	Error Detection and Correction.
EMI	Electromagnetic Interference. Operational interference of a device caused by electromagnetic field generated by another device or coil.
EPROM	Electrically Programmable Read-Only Memory. A type of read only memory.
ESD	Electrostatic Discharge. A sudden transfer of static electricity. Damage can occur to static sensitive components (printed circuit assemblies) if a handler does not eliminate the ESD potential before touching components.
External Interface	Any controlling interface connecting a host to the LaserDrive.

Fault	A malfunction from which the LaserDrive cannot recover without manual intervention.
Firmware	Control software residing in read only memory.
FRU	Field Replaceable Unit. A subassembly or component which can (if malfunctioning) be removed and replaced in the field.
Header	The preformatted area of each sector on a disk.
Hex	Suffix used to denote hexadecimal values (e.g., 7FH is a hex value).
Host	Host computer
Host Adapter	The hardware (printed circuit assembly) and software necessary to interface the host central processing unit to an external device.
ID	Sector identification preformatted in the media header field.
Internal Controller	This is the portion of the LaserDrive which consists of the WOODI PCA.
Initiator (SCSI-2)	A SCSI-2 device (usually a host system) which requests an operation to be performed by a Target.
IPB	Illustrated Parts Breakdown. Located in the Hardware Maintenance Manual and consisting of illustrations of all FRU's with an accompanying parts list.
Jump back	Controlled seek during which the tracking actuator moves to the previous track at a specific sector, once per rotation, making the spiral track logically appear to be concentric circles.
Laser Diode	A forward-biased semiconductor junction used as the active (injection) medium.
LaserDrive	Used for references that apply to the LD 8100, LF 8120, LF 8600 and LF 8602
Laser Pen	Assembly including laser diode and lenses.
LBA (SCSI-2)	Logical Block Address. A means to reference the blocks of the media. A contiguous block numbering from 0 to the maximum address. The addressing in SCSI-2 commands.
LD 8100	The high-performance dual actuator optical disk drive designed for standalone implementation or use within a library.

LF 8120	The LF 8120 is an LD 8100 optical disk drive specifically modified to accept media cartridges and operate as a cartridge autochanger. The Drive can accommodate up to 12 data cartridges.
LF 8600	The LF 8600 is an LD 8100 optical disk drive specifically modified to accept media cartridges and operate as a cartridge autochanger. The Drive can accommodate up to 6 data cartridges.
LF 8602	The LF 8602 is a cabinet, housing two LF 8600 drives. The LF 8602 can accommodate up to 12 data cartridges.
Logical Unit	A SCSI-2 physical or virtual device addressable through a Target.
Logical Unit Number	(LUN) A SCSI-2 encoded 3-bit identifier for a Logical Unit.
LSB	Least Significant Byte
LSD	Least Significant Digit
MCDW	Media Certification During Write
MCLI	Mechanized Cartridge Loading Interface
Media	The physical medium (optical disk) where data is stored.
Media Cartridge	Consists of a 300-mm (12-in.) diameter glass sandwich disk (media) within a protective enclosure.
Modulation Code	The technique used to map bytes onto the media using a special code to ensure data integrity. The LaserDrive employs a 1,7 RLL modulation code for the LM 8000 media.
MPU	Microprocessor Unit. An integrated circuit that accepts and executes instructions with the capacity of delivering signals describing the status of those instructions.
MSB	Most Significant Byte
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
Nibble	A 4-bit binary pattern representing half a byte of information.
NVRAM	Nonvolatile Random Access Memory. That part of memory responsible for retaining Drive specific information when power is removed from the drive.

Objective Lens	A lens system used to focus the laser beam on the media and direct the reflected beam to the quad detector.
OMA	Opto Mechanical Assembly which includes the actuator, optics module and EPROM that stores the servo parameters.
Parity	Odd Parity. The sum of true bits including parity is odd. Even Parity. The sum of true bits including parity is even.
PCA	Printed Circuit Assembly, consisting of all active components mounted on a printed circuit board.
Peripheral Device (SCSI-2)	A peripheral which can be attached to and can respond on the SCSI-2 bus (e.g., magnetic or optical disk drive, printer or similar device).
Physical Block Address	A means to reference the location of a sector by a count of sectors starting with sector zero.
PLL	Phase Locked Loop. A circuit which provides timing signals for the Read/Write and Servo Channels.
Ports	The addressable access to a device, (e.g., SCSI-2, MPU ports).
PROM	Programmable Read Only Memory
RAM	Random Access Memory
PSI	Product Specific Information
Read/Write Channel	The paths taken by read and write data signals through the LaserDrive electronics.
Reconnect (SCSI-2)	The function that occurs when a Target selects an Initiator to continue an operation after a Disconnect.
RFI	Radio Frequency Interference. Operational interference of electric devices caused by a strong, uncontrolled electromagnetic field.
ROM	Read Only Memory
RWS PCA	Read Write Servo (RWS) PCA. That part of the LaserDrive responsible for performing the servo, read/write and control functions of the drive.
Sampled Servo	Tracking and clocking information embedded in the disk.

SCSI-2	Small Computer System Interface. American National Standards Institute (ANSI) defined interface.
SCSI-2 Address	The unique address (0 - 15) assigned to a SCSI-2 Device. This address is assigned and set in the SCSI-2 Device during system installation.
SCSI-2 Device	A host adapter, peripheral controller or intelligent peripheral, such as the LD 8100, LF 8120, LF 8600, or LF 8602 which can be attached to and respond on the SCSI-2 Bus.
SDI	Specific Disk Information
SCSI-2 ID	The bit-significant representation of the SCSI-2 Address referring to one of signal lines DB15 through DB0.
Signal Assertion	A signal driven to the true state.
Signal Negation	A signal either driven to the false state or biased to the false state by cable terminators.
Signal Release	A signal that is not driven to the false state but is biased to that state by cable terminators.
Sync	Synchronize. Timing and location control of more than one event during a single time period.
Target (SCSI-2)	A SCSI-2 device (usually referred to as the LaserDrive) that performs an operation requested by an Initiator.
Terminator Assembly (SCSI-2)	Electrical terminator required at each end of the SCSI-2 bus to terminate the bus.
Transfer Period (SCSI-2)	The Synchronous Data Transfer Period is the minimum time allowed between leading edges of successive REQ pulses and successive ACK pulses to meet LaserDrive requirements for successful data transfer.
WOODI PCA	Write Once Optical Drive Interface PCA. Embedded controller.

APPENDIX D

ORDERING INFORMATION

Appendix D provides configuration option information for the LaserDrives. Also, optional SCSI cable are listed for connecting the LaserDrive to the host. All Plasmon SCSI cables are shielded and can be used for both differential and single ended applications.

CONFIGURATION OPTIONS

The table below lists available LD 8100/LF 8120/LF 8600/LF 8602 configuration options and part numbers that must be used when requesting information or placing a purchase order.

NOTE

Model numbers that end with an LU, LB or LE indicate country-specific power configurations (see table below). LU represents those drives intended for the United States; LB, for Great Britain; and LE, for the rest of Europe.

Table 24. Plasmon 8000 Series Model Numbers

CONFIGURATION	MODEL NUMBER
LD 8100	
Rack Mount Drive	LD 8100 - LU LD 8100 - LB LD 8100 - LE
Tower Drive	LD 8100 - LU LD 8100 - LB LD 8100 - LE
Desktop Drive	LD 8100 - LU LD 8100 - LB LD 8100 - LE
Plasmon Library Drive	LD 8100 - LU LD 8100 - LB LD 8100 - LE
FileNet Library Drive	LD 8100 - LU LD 8100 - LB LD 8100 - LE

CONFIGURATION	MODEL NUMBER
LF 8120	
Rack Mount Drive	LF 8120 - LU LF 8120 - LB LF 8120 - LE
Tower Drive	LF 8120 - LU LF 8120 - LB LF 8120 - LE
LF 8600	
Rack Mount Drive	LF 8600 - LU LF 8600 - LB LF 8600 - LE
Tower Drive	LF 8120 - LU LF 8120 - LB LF 8120 - LE
LF 8602	LF 8602 - LU LF 8602 - LB LF 8602 - LE

OPTIONS AND ACCESSORIES

The next tables list options and accessories that are available for each LD 8100/LF 8120/LF 8602 configuration. Those items must be ordered separate from the drive.

Table 25. LD 8100/LF 8120/LF 8600/LF 8602 Options and Accessories

OPTION/ACCESSORY	PLASMON PART NUMBER
Rack Mount Slide Kit, Quick Release (LD 8100/LF 8600)	97654652
LD 8100/lF 8120/LF 8600/LF 8602 SCSI Interface Specification	97662164
LD 8100 User Manual	97662915
LF 8120 User Manual	97664106
LF 8600 User Manual	97663032
LF 8602 User Manual	97663083
LD 8100 Hardware Maintenance Manual	97663081
LF 8120/LF 8600/LF 8602 Hardware Maintenance Manual	97668032

The following optional SCSI cables are available from Plasmon LMS.

The cables listed in the table below can be purchased to connect product and host. All Plasmon SCSI cables are shielded and can be used for both Differential and Single Ended applications.

Table 26. Optional SCSI Cables

LENGTH	CONNECTOR A	CONNECTOR B	PLASMON PART NUMBER
1 M (3.3 ft)	68 pin high-density B cable-Male	68 pin high-density B cable-Male	97654499
12 M (39.6 ft)	68 pin high-density B cable-Male	68 pin high-density B cable-Male	97660914
2 M (6.6 ft)	68 pin high-density B cable-Male	68 pin high-density B cable-Male	97654500
4 M (13.2 ft)	68 pin high-density B cable-Male	68 pin high-density B cable-Male	97660913

The table below contains optional SCSI accessories such as terminators and adapters that can be purchased to connect the drive to the host.

Table 27. Optional SCSI Accessories

PRODUCT DESCRIPTION	TYPE	CONNECTOR A	CONNECTOR B	PLASMON PART NUMBER
Interface Adapter AS/400 for 6501 Controllers	Adapter	Special long pin 68 pin high-density B cable-Male	68 pin high-density B cable Female	97654411
Interface Adapter RS/600-Wide-68pin	Adapter	68 pin Micro Centronics-Male	68 pin high-density B cable Female	97654412
Terminator	S/E Terminator	68 pin high-density B cable Male	None	97653428
Terminator	Differential Terminator	68 pin high-density B cable Male	None	97653429
Pass Thru Terminator	S/E Terminator	68 pin high-density B cable Male	68 pin high-density B cable Female	97655539
Pass Thru Terminator	Differential Terminator	68 pin high-density B cable Male	68 pin high-density B cable Female	97655540

The table below lists the optional power cables for each country:

Table 28. Optional Power Cables

PRODUCT DESCRIPTION	LENGTH	CONNECTOR A	CONNECTOR B	PLASMON PART NUMBER
U.S. Power Cord	2 M (6.6 ft)	U.S. AC Plug Male	In-Line Plug Female	15165428
British Power Cord	2 M (6.6 ft)	United Kingdom Plug	In-Line Plug Female	97646184
European Power Cord	2 M (6.6 ft)	Cont. Europe Plug	In-Line Plug Female	97646185
AS/400 Power Cord	2 M (6.6 ft)	In-Line Plug Male	In-Line Plug Female	97653763

The table below list the optional media cleaning accessories

Figure 46. Optional Media Cleaning Accessories

PLASMON PART NUMBER	PRODUCT DESCRIPTION	INCLUDES
97662550	12 inch Media Cleaning Kit	One 12 inch media cleaning fixture One container of cleaning liquid One package of 500 cleaning tissues One pair of latex gloves Cleaning Instructions
SP97662548	Media Cleaning Refills	Replacement container of cleaning liquid Replacement package of cleaning tissues

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