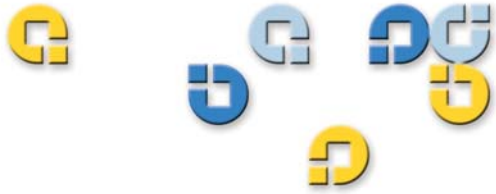
Quantum



Product Specification Product Specification Product Specification

Tape Drive

SDLT 600

81-81218-02 A01

SDLT 600 Product Specification, 81-81218-02 A01, December 2005, Made in USA.

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Preface

This document serves as an easy-to-use information source to familiarize Quantum customers and systems professionals with the SDLT 600 tape drive system. The SDLT 600 tape drive is an extension of the Quantum Digital Linear Tape (DLT®) product family.

Overview

The Quantum SDLT tape drive system is a highly scalable tape drive designed for multiple product generations. It is an extension of the DLT product family. The SDLT 600 tape drive system is the latest product offering; it comprises both the tape drive and the data cartridge. The system is available in three models: a tabletop (or external) unit, an internal unit for server installation, and a library model for installing in tape automation systems. The model SDLT 600 tape drive system provides 300 Gigabyte (GB) of storage capacity with a transfer speed of 36 Megabyte per second (MB/sec) native; 600 GB of storage capacity with a transfer speed of 72 MB/sec compressed (2:1 compression ratio).

About this Specification

This specification describes the SDLT 600 tape drive and defines its performance and environmental specifications. It is the basis for the *SDLT 600 Product Manual.*

This document defines the parameters for tape drive design and qualification.

Audience

The primary audience for this document consists of Quantum Account Managers, Product Sales personnel, Field Engineering, and others who need a pre-sales document with information on the SDLT 600 tape drive specifications.

Related Documents

The following documents are related to the SDLT 600 tape drive:

Document No.	Document Title	Document Description
81-81196-xx	SDLT 600 Design and Integration Guide	Provides information that helps you install the tape drive into a larger system
81-81283-xx	SDLT 600 Quick Start Guide	Provides "quick" instructions on how to install and run the tape drive
81-81297-xx	DLTSage and DLT*Ice* User's Guide	Provides information on DLTSage™ and DLT*Ice*™, a suite of preventative maintenance diagnostic software tools that enables users to more simply manage tape storage environments.
81-81220-xx	SDLT 600 User Reference Guide	Provides instructions on how to install, run the tape drive, hardware, performance, environment, shock and vibration, and regulatory specifications for the tape drive
81-81305-xx	SDLT 600 Quick Start Guide	Provides brief instructions on how to install the tape drive
81-81202-xx	SDLT 600 Fibre Channel Interface Guide	Provides Fibre Channel command information specific to the tape drive.
81-81200-xx	SDLT 600 SCSI Interface Guide	Provides SCSI command information specific to the tape drive.

Document No.	Document Title	Document Description
6464162-xx	SDLT DLTtape Interactive Library Interface Specification	Provides information specific to the library tape drive.
81-81252-xx	Bezel Replacement Guide	Provides instructions on how to replace the bezel on the tape drive

Current SCSI standards documents available from www.t10.org

- SCSI Architecture Model (SAM-3)
- SCSI Primary Commands (SPC-3)
- SCSI Parallel Interface (SPI-5)
- SCSI Stream Commands (SSC-3)
- Fibre Channel Protocol (FCP-2)
- Fibre Channel Framing and Signaling (FC-FS-2)
- Fibre Channel Arbitrated Loop (FC-AL-2)
- Fibre Channel General Services (FC-GS-5)

Notational Conventions

This document uses the following conventions:

Note: Notes emphasize important information related to the main topic.

Caution: Cautions indicate potential hazards to equipment and are included to prevent damage to equipment.

Warning: Warnings indicate potential hazards to personal safety and are included to prevent injury.

This document uses the following:

- Tape Drive System — Refers to the complete system including the cartridge.

- Tape Drive — Refers to just the tape drive and does not include the cartridge.
- Right side of the tape drive — Refers to the right side as you face the component being described.
- Left side of the tape drive — Refers to the left side as you face the component being described.
- Power cycle — Means to turn the tape drive or system on, then turn them off (or off, then on).
- Dimensions in figures — All dimensions are shown with no units specified (Inches understood unless otherwise specified).

Contacts

Quantum company contacts are listed below.

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Europe/Middle East/Africa:	eurohelp@quantum.com

Chapter 1

Product Description

Modular Design

The SDLT 600 tape drive is designed as a total system. The system includes a complex interaction of a number of important components including such items as the tape path, tape heads, data cartridge, and host interface.

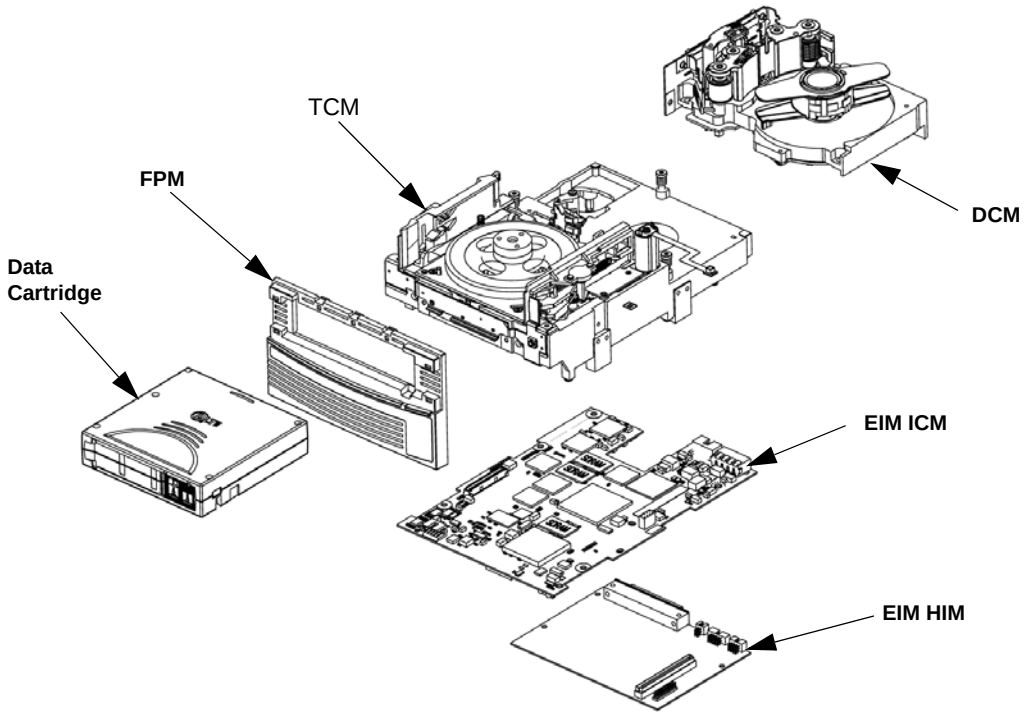
As shown in figure 1, the SDLT 600 tape drive consists of five distinct modules or system components:

- Data Control Module (DCM)
- Tape Control Module (TCM)
- Front Panel Module (FPM)
- Electronic Interface Module (EIM)
- Data Cartridge.

The modular concept makes the SDLT 600 tape drive system easy to manufacture and configure. Each module is optimized to perform a specific set of functions and is designed to interface with the other modules in a well defined, yet flexible manner.

The following subsections provide a brief overview of each module.

Figure 1 SDLT 600 Tape Drive Modular Design



Data Control Module

The Data Control Module (DCM) contains several of the functions and features of Quantum's Laser Guided Magnetic Recording (LGMR) technology, which is at the heart of the SDLT technology. Of the five technologies that constitute the LGMR technology, two are in the DCM. These are the Pivoting Optical Servo (POS) and the Magneto Resistive Cluster (MRC) heads.

The main functions of the DCM are to provide the path and guides for all tape motion inside the tape drive and to write data to and read data from the tape. The DCM contains a number of components that interact to perform these functions. These components include:

- Advanced head guide assembly
- Take-up reel
- Drive motor

- Optical servo system
- Tape heads.

In addition to its mechanical components, the DCM also contains printed circuit boards that control the functions of the DCM and the tape heads.

Tape Control Module

The Tape Control Module (TCM) implements the functions required to buckle and unbuckle the tape and control the tape motion. The TCM consists of a variety of components:

- TCM printed circuit board assembly (PCBA)
- Base plate
- Data cartridge receiver
- Positive engagement tape leader buckling mechanism
- Tape supply motor assembly
- Floor plate assembly.

TCM PCBA

The TCM has its own PCBA that controls the functions of the TCM and interfaces with the main controller board in the EIM. By designing the TCM as a distinct module, it allows manufacturing and testing the TCM as a stand-alone module, simplifying the design, manufacturing, and troubleshooting processes.

Base Plate

The SDLT 600 tape drive base plate is an aluminum die casting with precisely machined surfaces. The casting acts as the support platform for the other modules and for the tape drive enclosure. The base plate also includes the precision mounting holes used to install SDLT 600 tape drives into a server or tape library. The SDLT 600 tape drive conforms to the 5.25 inch, full-height form factor.

Data Cartridge Receiver

On media insertion, the data cartridge receiver assembly guides the media into its operating position, opens the data cartridge door, releases the reel locks, engages the data cartridge drive motor, and secures the media for operation. On media ejection, the data cartridge receiver assembly reverses the process and automatically ejects the data cartridge a fixed distance from the front of the tape drive.

Positive Engagement Tape Leader Buckling Mechanism

The buckling mechanism is responsible for engaging the tape leader upon data cartridge load and disengaging it on data cartridge unload.

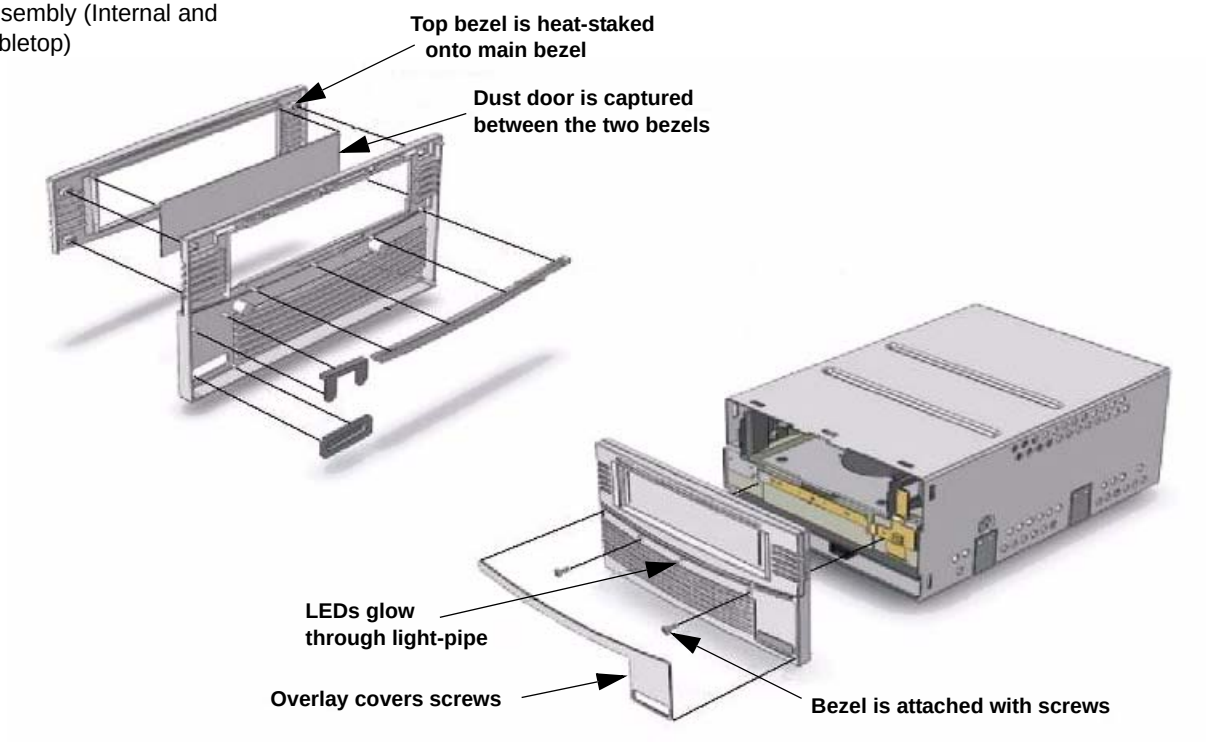
Front Panel Module

The Front Panel Module (FPM) of the system (also referred to as the bezel) performs a number of functions:

- Protects the front of the TCM from physical damage
- Channels airflow through the system
- Aligns the data cartridge when it is inserted into the system
- Provides label identifiers for the LEDs mounted on the front of the tape drive
- Enables data cartridge ejection
- Reduces internal environmental contamination with a built-in dust door (internal and tabletop configurations only)
- Delivers the overall cosmetic look of the system.

The FPM is a single module with lenses for the system's LEDs and a button to activate the drive eject switch. The SDLT 600 tape drive front panel contains no electronics. (See figure 2.)

Figure 2 Front Panel Module Assembly (Internal and Tabletop)



Electronic Interface Module

The Electronic Interface Module (EIM) is the electronic heart of the SDLT 600 tape drive system. It provides the main control function for the system and the interface from the system to the host computer, library, or autoloader. The EIM provides the Advanced Partial Response Maximum Likelihood (PRML) feature of SDLT technology.

The EIM consists of two major boards: the Integrated Controller Module (ICM), and a separate Host Interface Module (HIM). The ICM contains the main controller and servo microprocessor, the custom-designed SDLT ASICs, and the cache memory. The HIM implements the interface between the host system and the tape drive.

There are two different HIM boards, depending on whether your tape drive interface is SCSI or Fibre Channel. This allows easy configuration of the tape drive to match different host interfaces by simply substituting the appropriate HIM card.

As with the other major modules of the SDLT technology, the EIM is manufactured and tested as a distinct module.

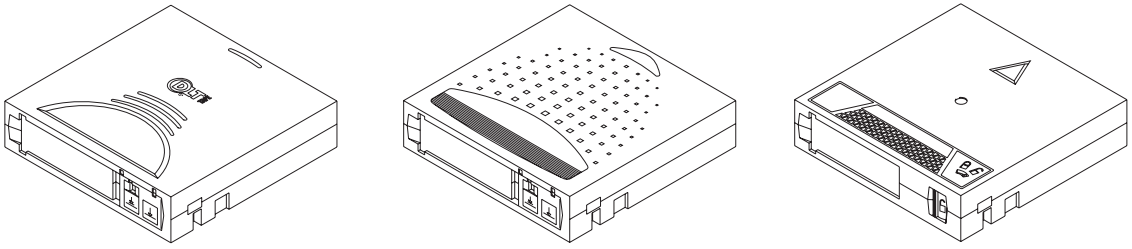
Data Cartridge

A data cartridge is a very significant component of any tape drive system. The SDLT 600 tape drive writes to Super DLTtape II data cartridges. The Super DLTtape II cartridge is blue and has a distinctive pattern, in addition to the DLTtape logo, molded into the plastic. The cartridge's geometry is similar to previous DLTtape cartridges to simplify integration with existing tape library designs, but is unique enough to ensure it cannot be loaded into previous generations of tape drives where writing to the media is incompatible.

Backward-read Capability

The SDLT 600 tape drive system features a backward-read compatibility (BRC) mode. When in BRC mode, the SDLT 600 tape drive is capable of reading SDLT 220 and SDLT 320 tape formats in a Super DLTtape I data cartridge, as well as the DLT VS160 tape format in the DLTtape VS1 data cartridge. See figure 3 for various data cartridge illustrations; see Backward Read Compatibility (BRC) Transfer Rates on page 34 for more BRC information.

Figure 3 Data Cartridges Readable by SDLT 600 Tape Drive



Super DLTtape II Data Cartridge | Super DLTtape I Data Cartridge | DLTtape VS1 Data Cartridge

Cleaning Cartridge

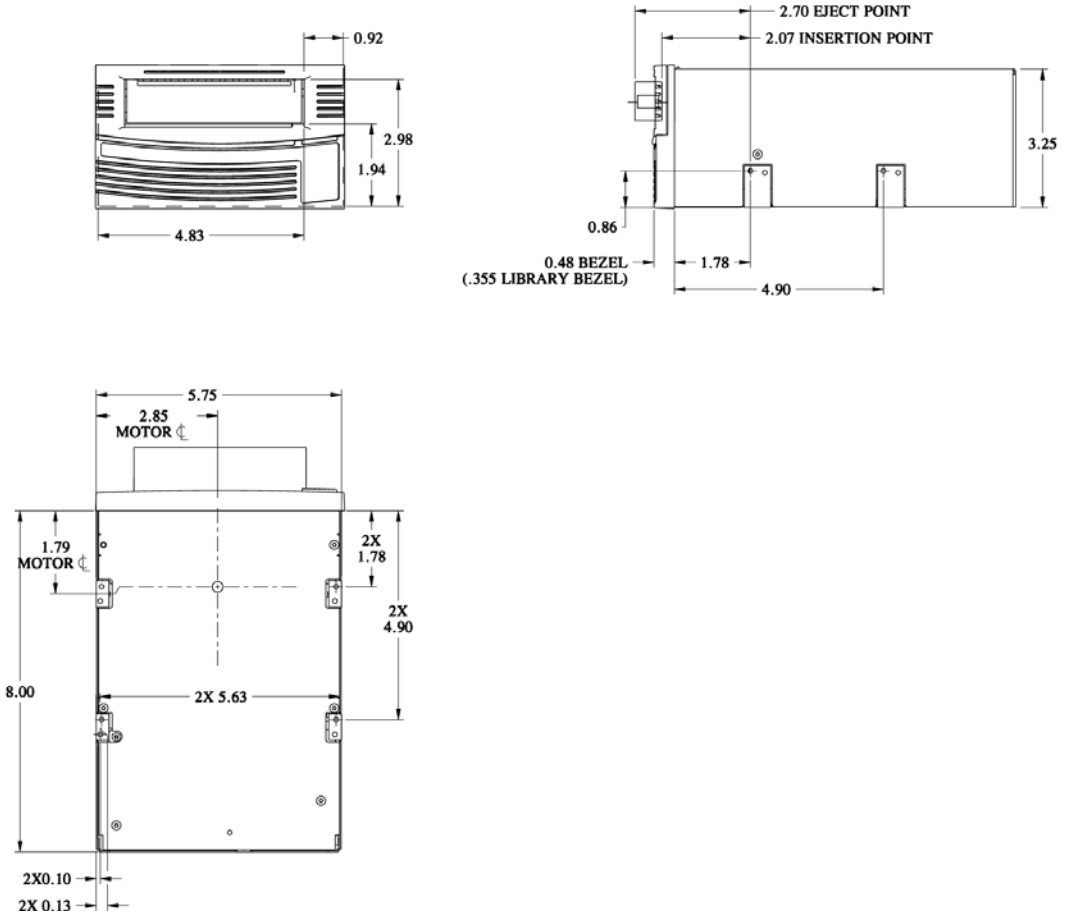
Certain infrequent occurrences cause the tape drive Cleaning LED to illuminate, indicating the need to insert a SDLTtape CleaningTape. This LED illuminates after the various internal, automatic retry algorithms are attempted. The LED illuminates in a preventative mode if the internal soft error statistics of any channel becomes too great. It also illuminates after a hard write or read error, if the drive determines it is due to debris.

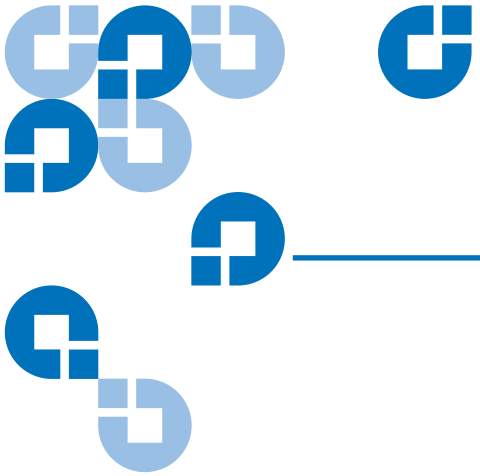
Clean the SDLT 600 tape drive with the SDLT CleaningTape, which is the same one used to clean the SDLT 220 and SDLT 320 tape drives.

Dimensions and Tolerances

Figure 4 shows the physical specifications of the internal/library versions of the SDLT 600 tape drive.

Figure 4 Front, Side, and Bottom Views of the SDLT 600 Tape Drive





Chapter 2

Hardware Specifications

Physical Description

Table 1 Physical Dimensions and Weights

	Internal Version	Library Version	Tabletop Version
Height	82.55 mm (3.25 in.) without front bezel 85.73 mm (3.38 in.) with front bezel	82.55 mm (3.25 in.) without front bezel 85.73 mm (3.38 in.) with front bezel	164.46 mm (6.48 in.)
Width	146.05 mm (5.75 in.) behind front bezel 148.59 mm (5.85 in.) with front bezel	146.05 mm (5.75 in.) behind front bezel 148.59 mm (5.85 in.) with front bezel	174.75 mm (6.88 in.)

	Internal Version	Library Version	Tabletop Version
Depth	203.20 mm (8.00 in.) from back of front bezel 215.40 mm (8.48 in.) including front bezel	203.20 mm (8.00 in.) from back of front bezel 212.22 mm (8.36 in.) including front bezel	320.04 mm (12.60 in.)

Note: The mounting hole pattern for the bottom and sides of the system is industry standard.

Table 2 Unpackaged and Shipping Weights

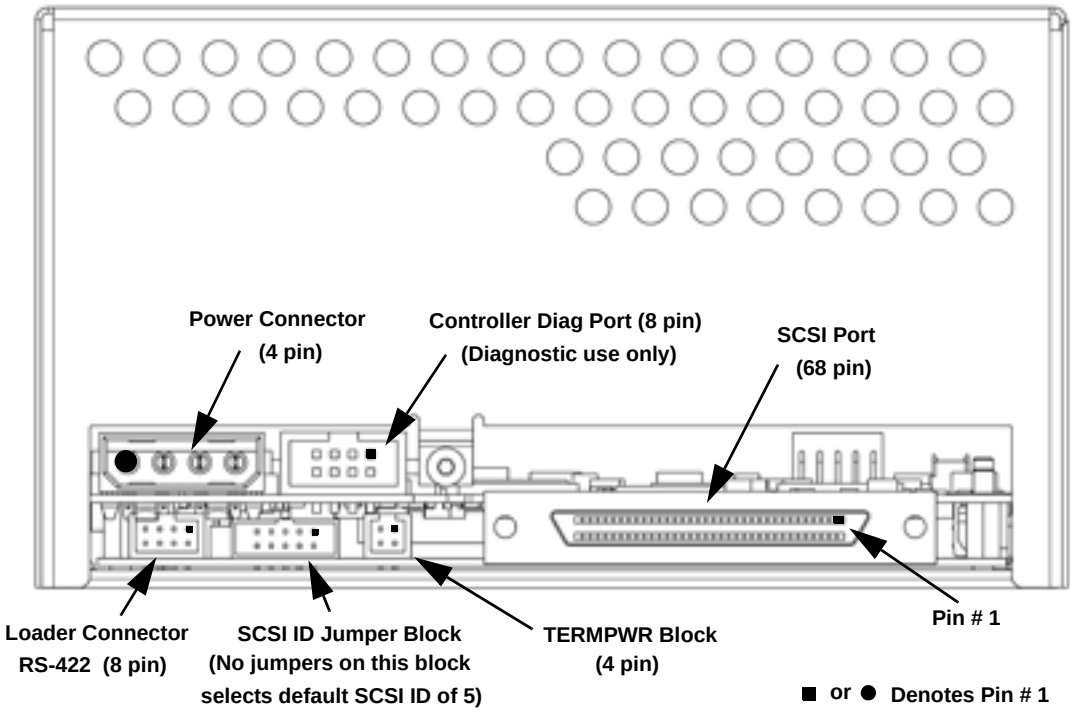
	Internal/Library Versions	Tabletop Version
Unpackaged Weight*	2.38 kg (5 lbs 4 oz)	6.27 kg (13 lbs 13 oz)
Shipping Weight**	3.77 kg (8 lbs 5 oz)	9.90 kg (21 lbs 13 oz)

*Weights depend on configuration.
**The configuration and packaging used may change the shipping weight.

Tape Drive Connections

Figure 5 shows the various connectors at the rear of a SCSI configured tape drive. The paragraphs that follow this figure provide information about the various connectors.

Figure 5 Internal SCSI Connectors and Jumpers at Rear of Tape Drive



Power Pin Assignments

Table 3 4-Pin Power Connector Pin Assignments

Pin Number	Signal Name
1	+12 VDC
2	Ground (+12V return)
3	Ground (+5V return)
4	+5 VDC

Loader Connector Pin Assignments

Table 4 8-Pin Loader Connector Pin Assignments

Signal Name	Pin Number	Pin Number	Signal Name
Ground	1	5	SEND_TO_LOADER_H
REC_FROM_LOADER_H	2	6	SEND_TO_LOADER_L
REC_FROM_LOADER_L	3	7	Ground
Ground	4	8	LOADER_PRESENT_L

SCSI ID

Each device on the SCSI bus must have a unique SCSI ID address assigned to it. The SCSI ID is set by placing jumpers on the SCSI ID jumper block at the rear of the tape drive. With no jumpers in place the tape drive will default to SCSI ID 5 as long as no cable is attached to the library port. With a library port cable attached the SCSI ID is selected by the library application.

Configuring the Internal Tape Drive for TERMPWR

At least one device on a SCSI bus must supply terminator power (TERMPWR). TERMPWR is enabled by placing a jumper on the TERMPWR jumper block at the rear of the tape drive. Remove the jumper to disable TERMPWR.

SCSI Connections

The various SCSI connector options are:

- Multi-mode Single-Ended (MSE) and Single-Ended (SE) Mode
- MSE Low Voltage Differential (MSE LVD) Mode SCSI Connector Pin Assignments.

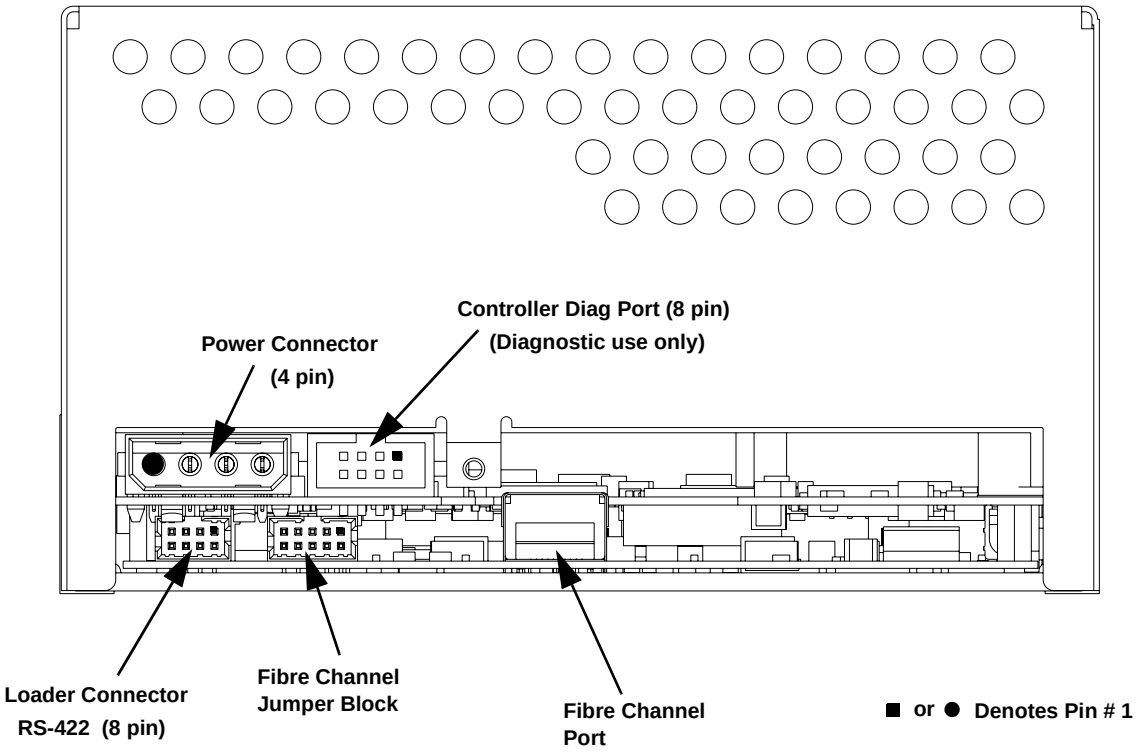
The connector pin assignments for these SCSI connector options are standard SCSI pin assignments and can be found in any SCSI reference that lists them.

You may also refer to the *SDLT 600 Design and Integration Guide (81-81196-xx).*

Fibre Channel Connection

SDLT 600 tape drives configured with the Fibre Channel interface are connected by inserting a fiber optic cable into the Fibre Channel port on the back of the tape drive. The connector is fully seated when it snaps into the port. Figure 6 shows the various connectors at the rear of a Fibre Channel configured tape drive.

Figure 6 Internal Fibre Channel Connectors and Jumpers at Rear of Tape Drive

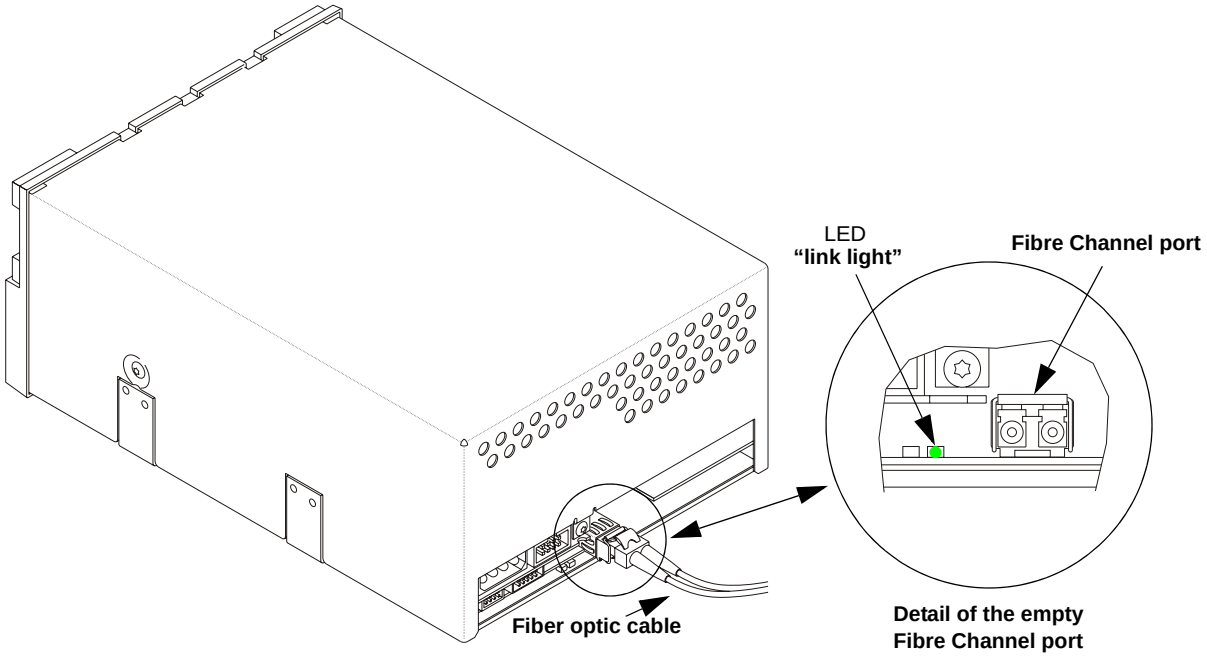


Fibre Channel Link Light

There is a Fibre Channel **link light** LED located at the rear of the Fibre Channel SDLT 600 tape drive near the Fibre Channel cable connector; see figure 6 to see where it is located.

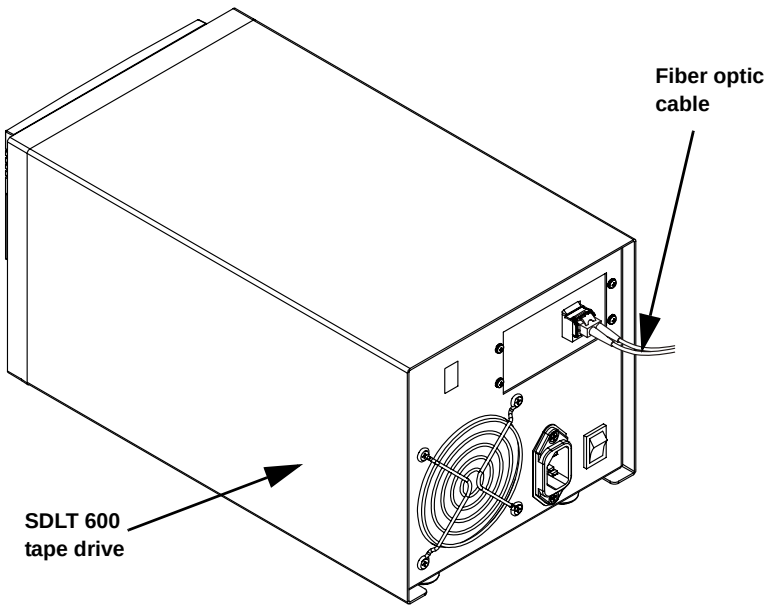
The **link light** LED illuminates when Fibre Channel link initialization is achieved, indicating the Fibre Channel link is up and working as expected. The only other time this LED illuminates is for about one second during Power-On Self-Test (POST) to indicate the LED itself is functional.

Figure 7 Connecting the Fiber Optic Cable to the Fibre Channel Tape Drive



Note: You can connect a Fibre Channel connector while the tape drive is still powered on; this capability is known as "hot-swappable" or hot-pluggable."
When connecting to the Fibre Channel port, make sure to use a 50µM Fiber core fiber optic cable with an LC, Duplex connector.

Figure 8 Connecting the Fiber Optic Cable to a Tabletop Fibre Channel Tape Drive



Fibre Channel Speed and Topology

Although Fibre Channel SDLT 600 tape drives will auto-negotiate the speed and topology, you may override the automatic selections by placing jumpers on the Fibre Channel jumper block at the rear of the tape drive. See figure 6 for the location of the jumper block. For jumper details, refer to *SDLT 600 Design and Integration Guide (81-81196-xx)*.

Current and Power Requirements

Table 5 lists the current and power requirements for the two versions of the SDLT 600 tape drive system (internal and tabletop) configured with the SCSI interface. table 6 on page 19 lists the current and power requirements for the internal version of the SDLT 600 tape drive system configured with the Fibre Channel interface. The library version of the SDLT 600 tape drive uses the same amount of power as the internal version with both the SCSI and Fibre Channel interfaces. The tabletop version requires AC power.

The tape drive draws the highest current (and power) during the native write modes. *Standby* is measured with the tape loaded and tensioned or untensioned; *Idle* is measured with power on with no tape loaded. (The power drawn in these two modes is similar enough that they are listed together.)

Note: In the tables, the current and DC power values pertain to the internal tape drive, while the AC power values apply to the tabletop tape drive.

Table 5 Current and Power Requirements (SCSI Interface)

Mode	5 V Current (A) MaxPk[1] MaxMean[2] Typ[3]			12 V Current (A) MaxPk[1] MaxMean[2] Typ[3]			DC Power (W) Max[4] Typ[5]		AC Power (W) Max[6] Typ[7]	
Standby/Idle	2.6	2.6	2.4	0.2	0.1	0.1	14	14	47	45
Media Loading/ Unloading	6.2	5.3	3.4	2.7	0.9	0.7	30	26	64	56
600 Write Motor Start[8]	4.3	4.0	3.7	1.3	0.3	0.3	23	22	51	48
600 Write Streaming	5.4	5.1	4.9	0.7	0.5	0.4	30	30	65	63
Max for SDLT 600 Tape Drive Modes[9]	n/a	5.3	n/a	n/a	0.9	n/a	30	n/a	70	n/a

Mode	5 V Current (A) MaxPk[1] MaxMean[2] Typ[3]	12 V Current (A) MaxPk[1] MaxMean[2] Typ[3]	DC Power (W) Max[4] Typ[5]	AC Power (W) Max[6] Typ[7]

1 The Max-Peak value represents short current spikes drawn for durations of < 50ms. On the 12V supply, the peaks correspond to the pulse-width-modulated switching of the motors. These values are calculated from the average of Peak-ripple-current + 2 sigma, measured at nominal DC voltage.

2 The Max-Mean value is the average of the maximum Mean current drawn during this operating mode. These values are calculated from the average of Mean current + 3 sigma, measured at nominal DC voltage.

3 The typical current is calculated from the average of all the Mean currents drawn during this operating mode, measured at nominal DC voltage.

4 The Max DC power is calculated from the typical DC power + 3 sigma, measured at nominal DC voltage. This value takes into account that the peak currents on the 5V and 12V power sources do not occur at the same time.

5 The Typical DC power is calculated from the average of the Mean DC power drawn during this operating mode, measured at nominal DC voltage. This value also takes into account that the peak currents on the 5V and 12V do not occur at the same time.

6 The Max AC power is calculated from the typical AC power in tabletop tape drives + 3 sigma.

7 The Typical AC power is calculated from the average of AC power drawn in tabletop tape drives.

8 These events last less than 1 second and occur at a duty cycle of less than 25%.

9 The Max values for each mode are based on the Max-RMS values, since the peak values are of very short duration.

(Common Notes)

1 Voltage tolerance: 5V ±5%, 12V ±5%; Room temperature 24 °C. AC power measured at 117 V, 60 Hz.

2 DC Current, MaxMean, and DC/AC Power Max refer to the statistically calculated maximum average requirement based on a sample population of tape drives. These values do not reflect the peak current or power requirement; this amount is given by the DC MaxPk current.

Table 6 Current and Power Requirements (Fibre Channel Interface)

Mode	5 V Current (A) MaxPk[1] MaxMean[2] Typ[3]			12 V Current (A) MaxPk[1] MaxMean[2] Typ[3]			DC Power (W) Max[4] Typ[5]		AC Power (W) Max[6] Typ[7]	
Standby/Idle	3.5	3.5	3.1	0.2	0.1	0.1	18	17	n/a	n/a
Media Loading/ Unloading	5.4	4.4	4.4	2.7	0.7	0.7	30	30	n/a	n/a
600 Write Motor Start[8]	4.6	4.3	4.2	1.3	0.3	0.3	25	25	n/a	n/a
600 Write Streaming	5.9	5.6	5.5	0.7	0.5	0.4	33	33	n/a	n/a
Max for SDLT 600 Tape Drive Modes[9]	n/a	5.6	n/a	n/a	0.7	n/a	33	n/a	n/a	n/a

Mode	5 V Current (A) MaxPk[1] MaxMean[2] Typ[3]	12 V Current (A) MaxPk[1] MaxMean[2] Typ[3]	DC Power (W) Max[4] Typ[5]	AC Power (W) Max[6] Typ[7]

1 The Max-Peak value represents short current spikes drawn for durations of < 50ms. On the 12V supply, the peaks correspond to the pulse-width-modulated switching of the motors. These values are calculated from the average of Peak-ripple-current + 2 sigma, measured at nominal DC voltage.

2 The Max-Mean value is the average of the maximum Mean current drawn during this operating mode. These values are calculated from the average of Mean current + 3 sigma, measured at nominal DC voltage.

3 The typical current is calculated from the average of all the Mean currents drawn during this operating mode, measured at nominal DC voltage.

4 The Max DC power is calculated from the typical DC power + 3 sigma, measured at nominal DC voltage. This value takes into account that the peak currents on the 5V and 12V power sources do not occur at the same time.

5 The Typical DC power is calculated from the average of the Mean DC power drawn during this operating mode, measured at nominal DC voltage. This value also takes into account that the peak currents on the 5V and 12V do not occur at the same time.

6 The Max AC power is calculated from the typical AC power in tabletop tape drives + 3 sigma.

7 The Typical AC power is calculated from the average of AC power drawn in tabletop tape drives.

8 These events last less than 1 second and occur at a duty cycle of less than 25%.

9 The Max values for each mode are based on the Max-RMS values, since the peak values are of very short duration.

(Common Notes)

1 Voltage tolerance: 5V ±5%, 12V ±5%; Room temperature 24 °C. AC power measured at 117 V, 60 Hz.

2 DC Current, MaxMean, and DC/AC Power Max see the statistically calculated maximum average requirement based on a sample population of tape drives. These values do not reflect the peak current or power requirement; this amount is given by the DC MaxPk current.

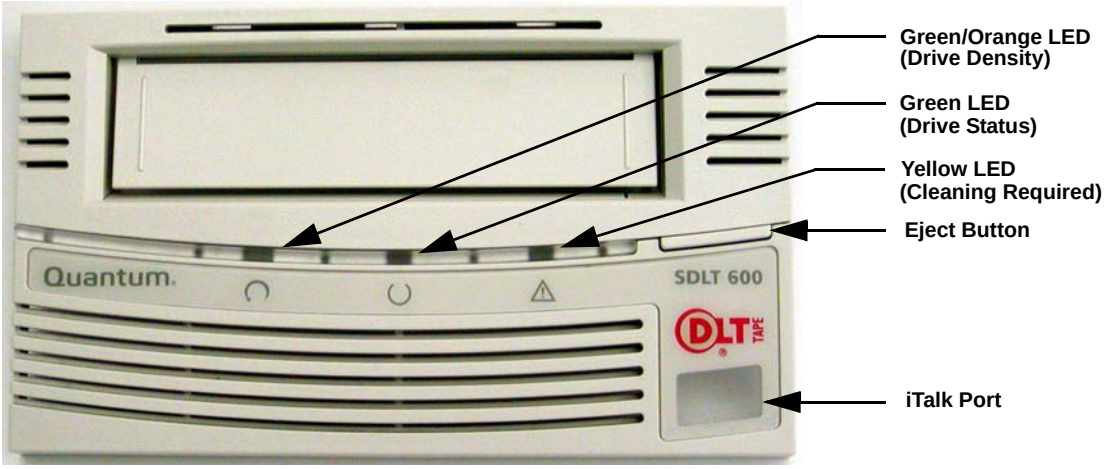
Front Panel Controls and LEDs

All controls and LEDs are on the tape drive's front panel. See figure 9 for details. For tabletop and imbedded applications, use these controls and LEDs to operate the tape drive and monitor the SDLT 600 tape drive system's activities.

Note:	Library applications do not use the front bezel controls unless user intervention is required.

Table 7 and table 8 describe Control and LED functionality.

Figure 9 SDLT 600 Tape Drive Front Panel



On the SDLT 600 tape drive, the leftmost LED is dual color (green/orange). This LED is the Density Indicator. When you insert a Super DLTtape II data cartridge, this LED illuminates green. When the tape drive detects a backward read compatible (BRC) data cartridge, this LED illuminates orange. (For BRC details, see Backward Read Compatibility (BRC) Transfer Rates on page 34.)

If a DLTtape IV data cartridge is inserted, the Drive Density LED is off. Table 7 summarizes these combinations.

Drive Density LED

Table 7 explains the function of the dual-color Drive Density LED on the front panel.

Table 7 Drive Density LED Appearance for Type of Data Cartridge Loaded

Possible Data Cartridge Scenario	LED Color/State
No data cartridge is inserted	Off
SDLT 600 tape drive formatted Super DLTtape II data cartridge inserted	Green/On
Blank Super DLTtape II data cartridge inserted	Green/On
Super DLTtape II data cartridge ejected	Green/Remains On
SDLT 220 tape drive formatted Super DLTtape I data cartridge inserted	Orange/On
SDLT 320 tape drive formatted Super DLTtape I data cartridge inserted	Orange/On
Blank Super DLTtape I data cartridge inserted	Orange/On
Any Super DLTtape I data cartridge ejected	Off
DLT VS160 tape drive formatted DLTtape VS1 data cartridge inserted	Orange/On
Blank DLTtape VS1 data cartridge inserted	Orange/On
DLTtape VS1 data cartridge ejected	Off
Any DLTtape IV data cartridge inserted	Off
SDLT 600 tape drive “reset”	All LEDs illuminate briefly and then illuminate in sequence until the reset completes

Table 8 explains the function of the LEDs and controls in the front panel other than the Drive Density LED. For functional details on the Drive Density LED, see table 7.

Table 8 Front Panel Elements

LED/Button/ Port Title	Color/ Symbol	Action	Explanation
Drive Density LED	Orange/Green 	On/Off	See table 7.
Drive Status LED	Green 	Flashing	The tape drive is in use. This includes functions such as: • The media is moving. • The tape drive is calibrating, reading, or writing. • The tape drive is loading, unloading, or rewinding the media.
		On	The tape drive is idle. There may or may not be a data cartridge in the tape drive.
		Off	The tape drive has not been powered on or is not plugged into a power source.
Cleaning Required LED	Yellow 	On	Cleaning is required.
		Off	Cleaning is not required.
Eject Button		Press	Used to eject the data cartridge from the tape drive. When the eject button is pressed, the tape drive completes any active writing of data to the media, then ejects the data cartridge. Also used to put the tape drive into firmware update mode when using a data cartridge containing the firmware image
Infrared Communication Port			This infrared port, also known as iTalk, provides a wireless remote testing base for customers and integrators to access system diagnostic information.

Note: Whenever the tape drive resets, all LEDs illuminate briefly and then illuminate in sequence until the reset completes.
All LEDs flashing together indicates a drive error has been encountered.

Behavior of the LEDs During POST

The SDLT 600 tape drive system performs a Power-On Self-Test (POST) each time the tape drive is powered on. While POST is running, the SDLT 600 tape drive system responds BUSY to SCSI commands, but will respond to various SCSI messages.

During this time, if a host tries to negotiate Synchronous or Wide transfers, the SDLT 600 tape drive system negotiates to Asynchronous or Narrow. It may take longer than the duration of POST for the tape drive to become ready.

Table 9 provides the normal sequence of operation of the LEDs when power is applied.

Table 9 LED Lighting Pattern During Power-On Self-Test (POST)

Stage	What You Observe
1 (Power On)	All LEDs illuminate for approximately one second.
2	The LEDs flash on, then off in a progressing pattern from left to right. Stages 1 and 2 generally complete within approximately five seconds.
3	The right LEDs remain off, the left LED illuminates steadily, and the middle LED flashes until POST completes. This stage typically lasts 5 to 10 seconds.
4	When POST is complete, the middle LED stops flashing and remains illuminated; the left LED turns off, and the right LED remains off.
POST Failure	If POST fails, the middle and right LEDs illuminate steadily and the left LED flashes.

Note: If a data cartridge is loaded when power is applied, all stages remain the same except stage 3. It may take a considerably longer time for stage 3 to complete due to media rewind and searching operations that occur during this stage.

Chapter 3

Performance Specifications

Interface Types

The tabletop model of the SDLT 600 tape drive has an Ultra 160 SCSI interface. The internal model has either an Ultra 160 SCSI interface or a Fibre Channel interface. These versions provide two possible parallel SCSI interface types and one Fibre Channel interface type that can be configured to run at a fast speed or a low speed. For details, see table 12, which provides speeds and options for the SDLT 600 tape drive interface versions.

Table 10 SDLT 600 Tape Drive Interface Versions, Speeds, and Options

Interface Versions	Speeds	Protocol Options

Ultra 160	• 160 MB/second maximum burst speed *	• Multi-mode Single-Ended (MSE) provides one of two differential senses:
		  • Low Voltage Differential (LVD) running up to 160 MB/second, or
		  • Single Ended (SE) running up to 40 MB/second
		• Ultra 160 2/FAST-20/Asynchronous
		• SCSI-3 (SAM-2, SPC-2, and SSC)
		• Supports up to 15 hosts

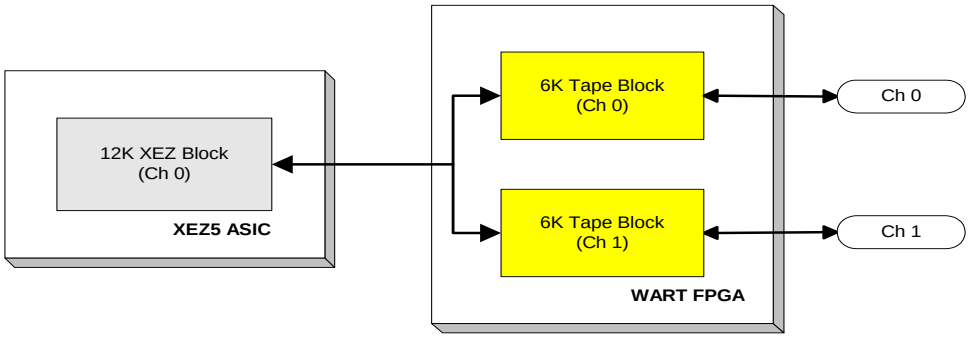
Fibre Channel **	• 100 MB/second • 200 MB/second	• Class3 • Connect to N port, NL port, FL port • FC-MI • FC-AL-2 • FCP-2 • FC-FS • SCSI-3 (SAM-2, SPC-2, or SSC)

*The SCSI bus itself limits this speed, not the design of SDLT 600 tape drive or Super DLTtape II media.
**Fibre Channel interface not available in the tabletop model.

Process for Writing Data

The SDLT 600 design has 16 tape channels, but retains 8 XEZ channels. This function is controlled primarily by the WART FPGA, inasmuch as it handles the channel splitting. The block diagram for this data flow is shown in figure 10.

Figure 10 Data Flow—8 to 16 Channels



Read/Write Channel Architecture

The SDLT 600 tape drive read/write channel architecture supports 16 channels. Table 11 summarizes several of these architectural features.

Table 11 Read/Write Channel Technology

Feature	Comments
PreAmp/Write Driver	Integrates pre-amp and write driver. The preamp/write driver supports higher linear density than previous products.
Read Channel	Better heat dissipation than previous products. (Thermal pads on the headboard and the ICM board.)
Head Channels	16 single cluster channels: 17.0 µm writer, 8.5 µm reader.
Head Flex	Head flex was redesigned to support 16 channels.
Headboard	Headboard was redesigned to support 16 channels.

Transfer Rate

Table 12 shows the maximum sustained (and burst) data transfer rates for the SDLT 600 tape drive.

Table 12 Maximum Data Transfer Rates

Configuration	Native	Compressed*	Burst Max**
SCSI Ultra 160 (LVD mode)	36 MB/sec	72 MB/sec	160 MB/sec
SCSI Ultra 160 (MSE LVD mode)	36 MB/sec	72 MB/sec	160 MB/sec
SCSI Ultra 160 (SE mode)	36 MB/sec	40 MB/sec	40 MB/sec
Fibre Channel (1 Gigabits per sec)	36 MB/sec	72 MB/sec	100 MB/sec
Fibre Channel (2 Gigabits per sec)	36 MB/sec	72 MB/sec	200 MB/sec

*The compression rates shown assume an industry standard 2:1 compression ratio. Actual compression ratios achieved depend on the redundancy of data files being recorded.
**The SCSI bus limits burst speeds, not the design of SDLT 600 tape drive or Super DLTtape II media.

Note: Cable lengths and cable type may limit attainable transfer rate; for details, see *SDLT 600 Design and Integration Guide (81-81196-xx)*.

Performance Data

Table 13 provides performance data for the SDLT 600 tape drive system.

Table 13 SDLT 600 Tape Drive Performance Data

Feature	SDLT 600 Tape Drive
Drive Read/Write Transfer Rate*	36 MB/second, native 72 MB/second, at 2:1 compression ratio
Tracks	40 logical tracks 640 physical tracks
Track Density	1502 tracks per inch (tpi)
Linear Bit Density	233 Kbits per inch (Kbpi)
Read/Write Tape Speed	108 inches per second (ips)
Rewind Tape Speed	160 ips
Linear Search Tape Speed	160 ips
Average Rewind Time**	77 seconds
Maximum Rewind Time**	156 seconds
Average Access Time** (from BOT)	79 seconds
Maximum Access Time** (from BOT)	190 seconds
Load to BOT**	18 seconds (typical) 63 seconds (unformatted tape)
Unload from BOT**	19 seconds
Nominal Tape Tension	Stationary: 3.0 ± 0.5 oz Operating Speed: 3.5 ± 0.5 oz

*Depending on data type and SCSI bus limitations/system configuration.
**Note that data is typical; times may be longer if error recovery time is necessary.

Compression

The tape drive contains on-board hardware to compress and uncompress data using a DLZ algorithm. Data compression is enabled by default.

Storage Capacity

Table 14 provides native and compressed capacity ranges for the Super DLTtape II data cartridge.

Table 14 SDLT 600 Tape Drive Storage Capacity

Mode	Capacity
Native Storage Capacity	300 GB
Compressed Storage Capacity	600 GB (2:1 compression ratio)

Note: In accordance with industry practice, a typical compression ratio of 2:1 is quoted. The redundancy and type of data files being written determine the actual compression ratios achieved.

Reliability

Head Life and MTBF

The projected mean time between failures (MTBF) for the overall SDLT 600 tape drive system is 250,000 hours, not including the heads. Head life is a minimum of 30,000 tape motion hours with an average of 50,000 tape motion hours.

Note: Quantum Corporation does not warrant that predicted MTBF is representative of any particular unit installed for customer use. Actual figures vary from unit to unit.

Media Durability

Table 15 shows the number of media passes and full media uses to expect from a Super DLTtape II data cartridge.

Table 15 Super DLTtape II Data Cartridge Media Durability

	Media Durability
Media passes*	1,000,000
Full media uses**	250

*A media pass occurs with any movement (in either direction) of the surface of the media over the tape head.
**A full media use is an operation that reads or writes (with verify off) the full capacity of the data cartridge.

Data Cartridge Life Expectancy

Table 16 shows the number of load and unload cycles you can expect before the data cartridges need to be replaced.

Table 16 Loading and Unloading the Data Cartridge (Maximum)

	Super DLTtape II Data Cartridge
Data cartridge load/unload cycles*	5,000
Media insertions**	20,000

*A load/unload cycle is when a data cartridge is inserted into the receiver, loaded to BOT, calibrated, and then unloaded.
**An insertion is when a data cartridge is inserted into the receiver and then unloaded.

Data Integrity

SDLT 600 tape drive data transfer errors are extremely rare; table 17 shows data integrity for the overall SDLT 600 tape drive system.

Table 17 Data Transfer Error Rates

Error Type	Frequency
Detected, Recoverable (ECC) READ	<1 error in 10^6 bytes read
Detected, Unrecoverable READ	<1 error in 10^{17} bits read
Undetected READ	<1 error in 10^{27} bits read
Rewrite of Data	<1 per 10^6 bytes written

Backward Read Compatibility (BRC) Transfer Rates

The SDLT 600 tape drive system features a backward-read compatibility (BRC) mode. When in BRC mode, the SDLT 600 tape drive is capable of reading SDLT 220 and SDLT 320 tape formats in a Super DLTtape I data cartridge, as well as the DLT VS160 tape format in the DLTtape VS1 data cartridge.

Table 18 lists the BRC transfer rates for the SDLT 600 tape drive.

Table 18 Backward-Read Compatibility (BRC) Transfer Rates

Format	Data Cartridge Type	Native Capacity	BRC Transfer Rate (80% of Native Read Transfer Rate)*
SDLT 320 Tape Drive	Super DLTtape I	160 GB	12.8 MB/sec**
SDLT 220 Tape Drive	Super DLTtape I	110 GB	8.8 MB/sec**
DLT VS160 Tape Drive	DLTtape VS1	80 GB	6.4 MB/sec**

*Quantum strives to operate BRC transfer rate at 100% of native read transfer rate, but guarantees 80%.
**Transfer rates shown are nominal based on 80% of actual native read transfer rate of uncompressed data.

Note: The SDLT 600 tape drive will eject a data cartridge written in DLT formats other than DLT VS160.

Chapter 4

Environmental Specifications

The SDLT 600 tape drive system operates in environments that include general offices and work spaces with systems capable of maintaining standard comfort levels.

The following subsections provide the environmental specifications for the SDLT 600 tape drive systems (both the internal and the tabletop configurations). For long-term trouble-free operation, Quantum strongly recommends that SDLT 600 tape drives be used in a clean, smoke-free environment.

Air Flow Requirements

The internal tape drive requires adequate air flow to dissipate the heat resulting from continuous drive operation. Specifically, the air flow must be sufficient to keep the tape path temperature below 50 °C.

To allow enough air into the tape drive to keep the tape path below 50 °C, it is important to keep the cooling holes in the rear and the grill in the front of the tape drive clear of any obstructions that may hinder the air flow. For more details about airflow, refer to the SDLT 600 Design and Integration Guide (81-81196-xx).

> **Note:** It is also important to operate the tape drive in an environment with the ambient air temperature no greater than 40 °C (104 °F).

Altitude

Both the internal and tabletop tape drives operate in normal pressures from –500 to 10,000 feet when operated within the ambient operating environments specified in Temperature and Humidity.

The SDLT 600 tape drive will operate to 30,000 feet for temperatures from 10 °C to 20 °C (50 °F to 68 °F).

Temperature and Humidity

The ambient operating environment for the tape drive may not exceed the limits shown in Table 19. The specifications shown in the table are valid for both the internal and tabletop tape drives.

Table 19 Temperature and Humidity Specification

Specification	Operating Limits	Non-Operating Limits (Power On, No Tape Loaded)
Wet Bulb Temperature	25 °C (77 °F)	25 °C (77 °F)
Dry Bulb Temperature Range	10 °C to 40 °C (50 °F to 104 °F)	10 °C to 40 °C (50 °F to 104 °F)
Temperature Gradient	11 °C (20 °F)/hour (across range)	15 °C (27 °F)/hour (across range)
Relative Humidity	20% to 80% (non-condensing)	10% to 90% (non-condensing)
Humidity Gradient	10%/hour	10%/hour

Storage and Shipment

The ambient storage and shipment environment for the tape drive may not exceed the limits shown in table 20. The specifications shown in the table are valid for both the internal and tabletop tape drives.

Table 20 Tape Drive Storage and Shipment Specifications

Specification*	Storage (Unpacked or Packed)	Shipping
Wet Bulb Temperature	46 °C (114 °F)	46 °C (114 °F)
Dry Bulb Temperature	–40 °C to 66 °C (–40 °F to 150 °F)	–40 °C to 66 °C (–40 °F to 150 °F)
Temperature Gradient	20 °C (36 °F)/hour (across range)	20 °C (36 °F)/hour (across range)
Relative Humidity	10% to 95% (non-condensing)	10% to 95% (non-condensing)
Humidity Gradient	10%/hour	10%/hour

*These specifications apply to the tape drive only, not the media.

Chapter 5

Shock and Vibration Specifications

Shock Specifications

Table 21, table 22, and table 23 provide operating and non-operating shock specifications for the SDLT 600 tape drive system.

Table 21 Operating Shock Specifications

Shock	
Pulse Shape	**½ sine pulse**
Peak Acceleration	10 G
Duration	10 ms
Application	X, Y, Z axes, twice in each axis (once in each direction)

Table 22 Non-Operating Shock Specifications (Unpackaged)

Shock (Unpackaged)		
Pulse Shape	**Square wave**	**½ sine pulse**
Peak Acceleration	40 G	140 G
Duration	10 ms (180 inches/ second)	2 ms
Application	X, Y, Z axes, twice in each axis (once in each direction)	

Table 23 Non-Operating Shock Specifications (Packaged, Drop)

Shock (Packaged, Drop)	**Height of Drop**	**Number of Drops**	**Package Weight**
Drop	42 inches	16 drops total	0 lbs < package weight ≤ 20 lbs
	36 inches	16 drops total	20 lbs < package weight ≤ 50 lbs

Vibration Specifications

Table 24, table 25, and table 26 provide operating and non-operating vibration specifications for the SDLT 600 tape drive system.

Table 24 Operating Vibration Specifications

Vibration		
Type	**Sine**	**Sweep**
Frequency Range	5 to 500 to 5 Hz	Upward and downward sweep
Acceleration Level	0.010" DA 0.25 G	Between 5 and 22 Hz (crossover) Between 22 and 500 Hz
Application	X, Y, Z axes	Sweep rate = 1.0 octave/minute

Table 25 Non-Operating Vibration Specifications (Unpackaged)

Vibration (Unpackaged)		
Type	**Sine**	**Sweep**
Frequency Range	5 to 500 to 5 Hz	Upward and downward sweep
Acceleration Level	0.02" DA 1.0 G	Between 5 and 31 Hz (crossover) Between 31 and 500 Hz (crossover)
Application	X, Y, Z axes	Sweep rate = ½ octave/minute

Vibration (Unpackaged)		
Type	**Random**	
Frequency Range	10 to 500 Hz	
Acceleration Level	2.0 G	
PSD Envelope	0.008 G^2/Hz	

Table 26 Non-Operating Vibration Specifications (Packaged)

Vibration (Packaged)	
Type	**Random**
Frequency Range	Truck Profile* (0.5 Grms) Air Profile* (1.0 Grms)
Application	X, Y, Z xes (30 minutes, each profile and each axis, for a total of 3 hours)
Type	**Sine, Sweep, and Dwell**
Frequency Range	5 to 150 to 5 Hz; 0.5 octave/minute, 0.5 G
Application	X, Y, Z axes; dwell at lowest resonant frequency in axis for 30 minutes. Additional 30 minutes for each additional resonance; up to 4 resonances total.

*Air and truck profiles are specified in ASTM D4728, Standard Test Method for Random Vibration Testing of Shipping Containers.

Chapter 6

Regulatory Compliance

This chapter describes various regulations that apply to the SDLT 600 tape drive:

Safety Regulations

This section lists the safety regulations that the SDLT 600 tape drive meets or exceeds.

Safety Certifications

The SDLT 600 tape drive meets or exceeds the following safely requirements:

- UL 60950: Information Technology Including Electrical Business Equipment (USA)
- EN60950/IEC 950: Information Technology Including Electrical Business Equipment (Europe)
    - EN60825-1 Information Technology Equipment

The SDLT 600 tape drive is also certified to bear the GS mark.

The SDLT 600 tape drive is a Class I laser product that complies with 21 CFR 1040.10 as applicable on the date of manufacture.

Electromagnetic Field Specifications

SDLT 600 tape drives are electrical devices; as such, this equipment generates, uses, and may emit radio frequency energy. The tape drives may emit energy in other frequencies, as well, as discussed in the following subsections.

Electromagnetic Emissions

The internal version of the SDLT 600 tape drive system complies with FCC Class A in a standard enclosure; the tabletop version complies with FCC Class B limits.

Electromagnetic Interference Susceptibility

Table 27 provides regulations and certifications held by the SDLT 600 tape drive for Electromagnetic Interference (EMI).

Table 27 EMI Regulations and Certifications

Type	Regulation/Certification
EEC Directive 89/336 CE	EN55022 (EU) EN55024 (EU)
CFR 47, 1995	FCC Rules Part 15B Class B
IECS-003	Canada
V-3/97.04	VCCI Class B (Japan)

Type	Regulation/Certification
CNS 13438	BSMI Class A (Taiwan)
AS/NZS 3548	Australia/New Zealand

Immunity and ESD Limits

Table 28 lists the immunity and ESD failure level limits to which the SDLT 600 tape drive has been tested.

Test Name	Test Specification	Required Performance
EN55022: 1998 Radiated and Conducted Emissions		
Radiated Electromagnetic Emissions	EN55022: 1998	Class B
Conducted Electromagnetic Emissions		
Current Harmonics and Flicker Emissions Tests		
AC Power Supply Harmonic Emissions	EN61000-3-2	As per the standard
AC Power Supply Voltage Flicker	EN61000-3-3	As per the standard
EN55024: 1998 Immunity Tests		
Electrostatic Discharge Immunity	EN61000-4-2	Criteria A
Radiated Electromagnetic Immunity	EN61000-4-3	Criteria A
Electrical Fast Transient / Burst Immunity	EN61000-4-4	Criteria B
Electrical Surge Immunity	EN61000-4-5	Criteria B
Conducted Electromagnetic Immunity	EN61000-4-6	Criteria A
Power Frequency Magnetic Field Immunity	EN61000-4-8	Criteria A

Test Name	Test Specification	Required Performance
AC Voltage Dips and Interrupts Immunity	EN61000-4-11	Criteria B

Acoustic Noise Emissions

Table 28 lists acoustic noise emission levels, both as noise power and sound pressure, for the SDLT 600 tape drive. The table provides the preliminary declared values per ISO 9296 and ISO 7779/EN27779.

Table 28 Acoustic Noise Emissions, Nominal

Mode	Noise Power Emission Level (LNPEc)		Sound Pressure Level (LPAc)*	
	Internal	Tabletop	Internal	Tabletop
Idle	Not applicable	5.4 Bel	Not applicable	42 dB
Streaming	5.9 Bel	5.9 Bel	47 dB	53 dB

* Sound pressure level measured at front of tape drive.

Class A Statements (Internal Tape Drive)

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the

instruction manual, may cause harmful interference to radio communications.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

> **Note:** Additional information on the need to interconnect the device with shielded (data) cables or the need for special devices, such as ferrite beads on cables, is required if such means of interference suppression was used in the qualification test for the device. This information will vary from device to device and needs to be obtained from the EMC (Electromagnetic Compatibility) group or product manager.

Canada (Digital Apparatus)

Reference: *Interference-Causing Equipment Standard*, ICES-003, Issue 2

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CISPR-22 Warning!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in

welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention!

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

Taiwan (BSMI) Statement

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Japan (VCCI) Statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－ A

DEN-AN Notice (Japan)

すべての電源コードが同じ定格電流を使用するとは限りません。同封されている電源コードを他の製品と一緒に使用しないでください。また、家庭用の延長コードをQuantum製品と一緒に使用しないでください。複数の電源コードを必要とする製品の電源を完全に切るには、システムに接続しているすべての電源コードを外してください。

Class B Statements (Tabletop Tape Drive)

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment.

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

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

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

> **Note:** Additional information on the need to interconnect the device with shielded (data) cables or the need for special devices, such as ferrite beads on cables, is required if such means of interference suppression was used in the qualification test for the device. This information will vary from device to device and needs to be obtained from the EMC (Electromagnetic Compatibility) group or product manager.

Canada (Digital Apparatus)

Reference: *Interference-Causing Equipment Standard*, ICES-003, Issue 2

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Taiwan (BSMI) Statement

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Japan (VCCI) Statement

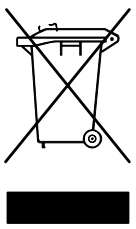
Environmental Compliance

Quantum is committed to providing quality products in an environmentally sound manner and to comply with all applicable environmental laws, rules and regulations.

This product was designed, manufactured and made available with consideration to worldwide laws, rules and regulations applicable to the product and the electronics industry including the European Union Directives 2002/95/EC & 2002/96/EC (RoHS and WEEE).

For further information on Quantum's Environmental Compliance and Global Citizenship, please consult the following Web site at http://qcare.quantum.com.

Disposal of Electrical and Electronic Equipment



This symbol on the product or on its packaging indicates that this product should not be disposed of with your other waste. Instead, it should be handed over to a designated collection point for the recycling of electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please visit the Quantum Web site at http://qcare.quantum.com or contact your local government authority, your household waste disposal service or the business from which you purchased the product.

Chapter 7

Media Specifications

Recording Media

Physical Specifications

Super DLTtape II media differs slightly from previous generations of Super DLTtape media.
Table 29 shows overall specifications for Super DLTtape II media.

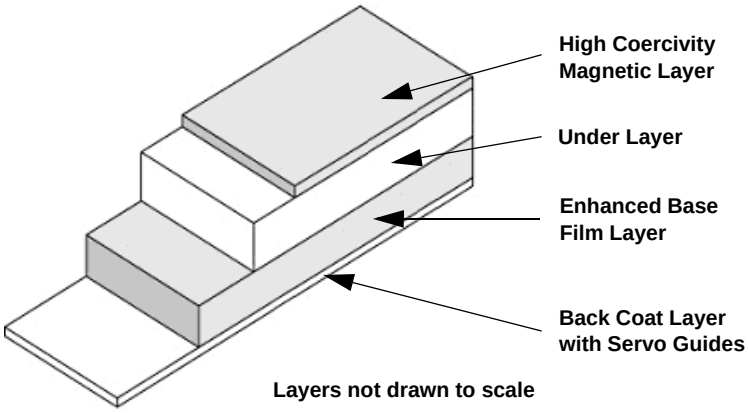
Table 29 Super DLTtape II Media Specifications

Characteristic	Specification
Magnetic layer thickness	150 nm
Overall tape thickness	8.0 µM
Media length, total	2066 feet
Media length, usable	1957 feet
Media Mrt	2.7 memu/cm^2
Media particle size	60 nm

Media Structure

Super DLTtape II media comprises several layers, as shown in figure 11.

Figure 11 Multiple Layers Comprise Super DLTtape II Media



Media Shipping, Operating, and Storage Specifications

Table 30 describes the optimum media shipping conditions.

Table 30 Super DLTtape II Media Shipping Limits

Shipping Conditions	Limits
Temperature	–18 °C to 49 °C (0 °F to 120 °F)
Relative Humidity	20% to 80% (non-condensing)
Maximum Wet Bulb Temperature	26 °C (79 °F)
Maximum Dew Point	2 °C (36 °F)

Table 31 describes the optimum media operation conditions.

Table 31 Super DLTtape II Media Operating Limits

Operating Conditions	Limits
Temperature	10 °C to 40 °C (50 °F to 104 °F)
Relative Humidity	20% to 80% (non-condensing)

Table 32 describes the optimum media storage conditions.

Table 32 Super DLTtape II Media Storage Limits

Storage Conditions	Archival	Non Archival
Temperature	18 °C to 28 °C (64 °F to 82 °F)	16 °C to 32 °C (60 °F to 90 °F)
Relative Humidity	40% to 60% (non-condensing)	20% to 80% (non-condensing)

141 Innovation Drive
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