

Quantum®

SDLT 220 & SDLT 320

User Reference Guide



User Manual Statements for Class A Equipment (Internal Tape System)

This is a Class A product. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any modifications to this device—unless expressly approved by the manufacturer—can void the user’s authority to operate this equipment under Part 15 of the FCC rules.

User Manual Statements for Class B Equipment (Tabletop Tape System)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Any modifications to this device—unless expressly approved by the manufacturer—can void the user’s authority to operate this equipment under part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesirable operation.

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

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

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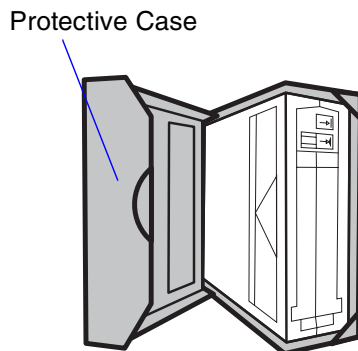
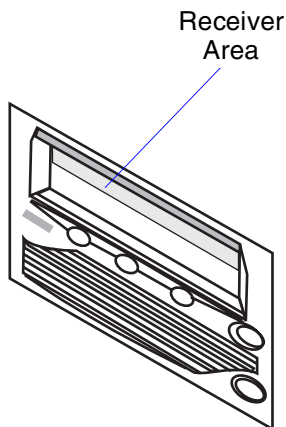
Pointers for Using this Guide

! Pay attention to these points. They are important for tape drive operation.

⇒ **A1**
Follow these cross references for information on related topics.

A1

Handling the Tape Drive and Data Cartridges



Handling the Tape Drive

! Do not carry the tape drive by inserting your fingers into the receiver area. You could damage the tape drive if you lift or carry it in this manner.

- ▶ Do not stand the tape drive on its front panel.
- ▶ Always place the tape drive on a flat, stable surface.
- ▶ Avoid dusty, humid, or smoke-filled areas.
- ▶ Use proper Electrostatic Discharge (ESD) protection.
- ▶ Allow at least 6 inches of space behind the drive for ventilation.

Handling Data Cartridges

- ▶ Protect cartridges from shock, vibration, moisture, direct sunlight, dust, smoke, and magnetic fields.
- ▶ Use the slide-in labels provided. Do not use adhesive labels or Post-it® notes, and do not write on the cartridge.
- ▶ Never touch the tape or tape leader. Dust and oils from your skin contaminate the tape and affect performance.
- ▶ Keep cartridges in their protective cases when not in use.
- ▶ Store data cartridges vertically.

! Always visually inspect a data cartridge before placing it in the tape drive. If it is damaged, do not use the cartridge.
⇒ B4

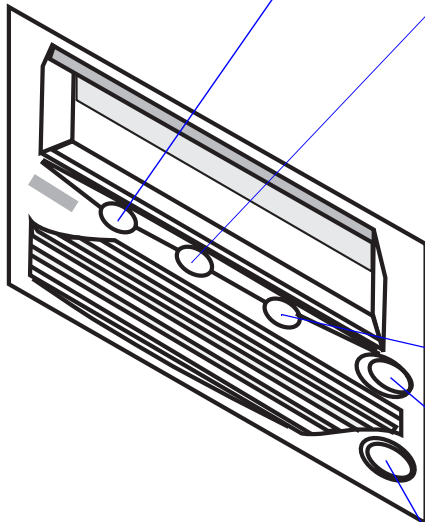
! Never power off the tape drive while it contains a cartridge.

For a more comprehensive list of data cartridge handling guidelines, ⇒ B3.

A2

Indicators and Controls

This section describes the tape drive controls as well as tape drive and data cartridge conditions communicated by the LEDs on the front of the tape drive.

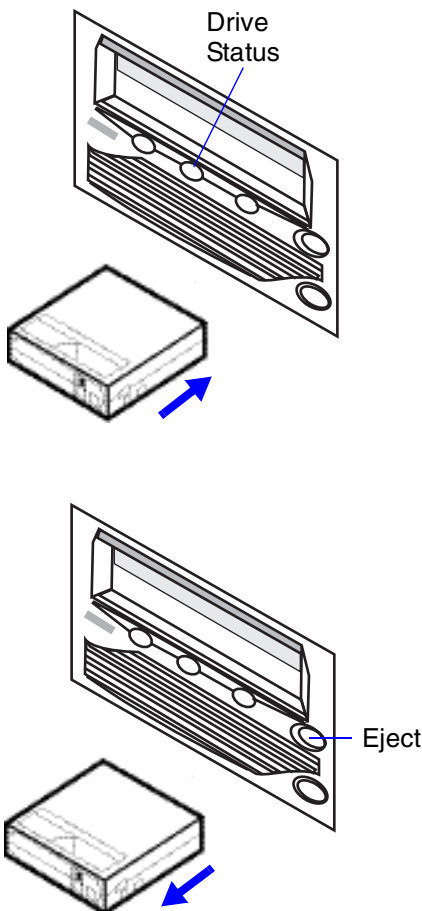


Color	LED	Action	Explanation
Amber	SDLT 220 Write Protect	On	The cartridge is write-protected.
		Off	The cartridge is write-enabled.
Green	SDLT 320 Drive Density	On	The cartridge is 220-formatted.
		Off	The cartridge is 320-formatted.
		Flashing	The tape drive is in use. This includes functions such as: <ul style="list-style-type: none"> • Loading and unloading tape • Reading • Writing • Rewinding • Calibrating
Yellow	Cleaning Required	On	Cleaning is required.
		Off	Cleaning is not required.
Eject	N/A	Press	Use the Eject button to eject a data cartridge from the tape drive. When you press Eject, the tape drive finishes writing data to the tape, then ejects the cartridge.
Infrared Port			The infrared port provides a wireless remote testing base for customers and integrators to access system diagnostic information.

Note: Upon reset, all LEDs flash briefly and then illuminate in sequence until the tape drive is ready for use. All LEDs flash when the tape drive encounters an error.

A3

Loading and Unloading Data Cartridges

**To Load a Data Cartridge**

1. Insert the data cartridge into the receiver on the front of the tape drive.
2. Push the cartridge completely into the receiver.

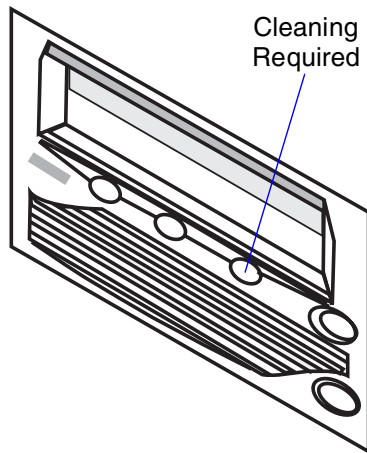
The green Drive Status LED (⇒ A2) flashes as the tape loads. When the tape reaches the Beginning of Tape (BOT) marker, the Drive Status and Drive Density LEDs (⇒ A2) light steadily, indicating that the cartridge is ready for use.

To Unload a Data Cartridge

1. Press the Eject button on the front bezel.
The tape drive completes writing data to the tape, and the green LED (⇒ A2) flashes as the tape rewinds. When the tape reaches the BOT marker, the tape drive ejects the data cartridge. The green LED lights steadily.
2. Remove the cartridge from the tape drive and return it to its plastic case (⇒ A1).

A4

Cleaning the Tape Heads



Over time, ambient pollution and particulates in the environment contaminate the tape heads. The tape drive indicates when cleaning is required by illuminating the yellow Cleaning Required LED. → A2

- ! Do not clean the tape heads unless the Cleaning Required LED is illuminated.
- ! Use ONLY the SDLT CleaningTape. Other cleaning tapes, such as CleaningTape III or DLT VS CleaningTape, are incompatible with the SDLT 220/320 tape drive heads.

To Clean the Tape Heads

1. Insert a Super DLTtape cleaning cartridge (the brand name to look for is *SDLTape™ CleaningTape*) into the tape drive.
The green Drive Status LED flashes and the cleaning cycle begins automatically.
When the cleaning cycle completes, the tape drive automatically ejects the CleaningTape; turns off the Cleaning Required LED; and steadily illuminates the Drive Status LED.
 2. Remove the CleaningTape, place it back in its plastic case, and mark the label after each cleaning.
- Note:** On the last cleaning, the tape drive does not eject the CleaningTape. Use the Eject button on the front of the tape drive to eject the expired cleaning cartridge and dispose of it.

B1 Super DLTtape Media

From the outside, the Super DLTtape I cartridge looks very similar to the DLTtape IV cartridges. The basic geometry, write-protect switch, and label space are unchanged from the DLTtape IV cartridge. This simplifies the integration of Super DLTtape into existing operating environments and into automated tape libraries.

The Super DLTtape I cartridge is easy to recognize; it has a different color (green) than the DLTtape IV cartridge (charcoal gray) and contains a distinctive pattern molded into the shell. The Super DLTtape I cartridge has a keying feature to ensure that it cannot be loaded into previous generation DLTtape drives.

Both the SDLT 220 and SDLT 320 tape drives feature an optional backward-read compatibility (BRC) mode. When in BRC mode, the drives are capable of reading DLTtape IV tapes with DLT 4000, DLT 7000, DLT 8000, and DLT 1 formats. The Backward-Read Compatibility table below lists BRC rates for the Super DLTtape drive.

Backward-Read Compatibility

Format	Cartridge Type	Native Capacity (GB)	Native Read Transfer Rate (MB/second)
SDLT 320	SDLT I	160	16.0
SDLT 220	SDLT I	110	11.0
DLT 8000	DLT IV	40	4.0
DLT 7000	DLT IV	35	3.5
DLT 4000	DLT IV	20	1.5
DLT 1 (Benchmark)	DLT IV	40	3.0

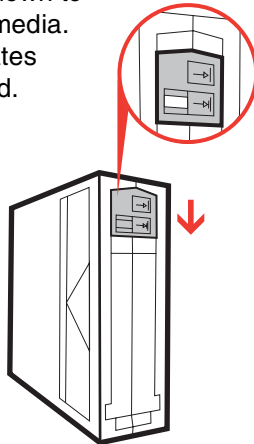
Notes:

- Transfer rates quoted are nominal, measured reading uncompressed data.
- Non-SDLT drives will eject a cartridge written in SDLT 320 format.
- The SDLT 320 can read and write the SDLT 220 format at the native SDLT 220 transfer rate of 11.0 MB/s.

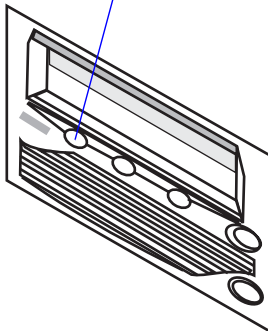
B2

Write-protecting Data Cartridges

Move switch down to write-protect media. Orange indicates write-protected.



SDLT 220 – Write Protect LED
SDLT 320 – Drive Density LED



To prevent accidental erasure of your data, each data cartridge has a write-protect switch. When active, this switch prevents the tape drive from writing data to the cartridge.

! For valuable data, always make sure the cartridge is write-protected before inserting it into the tape drive.

To enable write-protection:

- ▶ Move the write-protect switch left so that the bright orange rectangle is visible.

To disable write-protection:

- ▶ Move the write-protect switch right so that the orange rectangle is *not* visible.

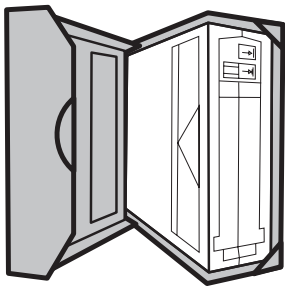
On the SDLT 220 tape drive, when you insert a write-protected cartridge into the drive, the amber LED on the front panel lights.

On the SDLT 320 tape drive, the amber LED indicates the format of the tape: Light on or blinking indicates SDLT 220 density; light off indicates SDLT 320 density.

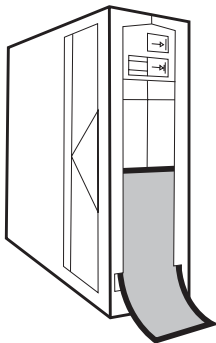
B3

Media Care Guidelines

Store data cartridges vertically in plastic cases.



Use slide-in labels.



Super DLTtape I data cartridges are engineered to be reliable, robust, and durable. They are manufactured to withstand 1,000,000 passes, and have a shelf life of 30 years. For best results, follow these guidelines for data cartridge handling and storage:

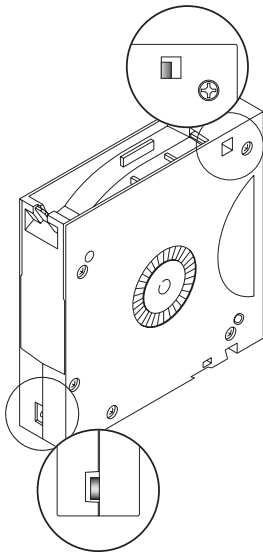
- ▶ Follow the handling instructions and observe the environmental specifications provided in the plastic cartridge case.
- ▶ Keep cartridges in their protective cases when not in use.
- ▶ Protect cartridges from shock, vibration, moisture, direct sunlight, dust, smoke, and magnetic fields.
- ▶ Do not stack more than five cartridges on top of each other.
- ▶ Store cartridges vertically in protective cases for archival.
- ▶ Use the slide-in labels provided. Do not use adhesive labels or Post-it® notes, and do not write on the cartridge.
- ▶ Do not write on the labels with debris-producing writing instruments, such as graphite pencils and water-soluble felt pens. Replace labels instead of erasing them.
- ▶ Never touch the tape or tape leader. Dust and oils from your skin contaminate the tape and affect performance.
- ▶ Avoid unnecessarily opening the cartridge door to prevent contamination and physical damage.
- ▶ Inspect data cartridges for damage after dropping them.
⇒ B4
- ▶ Condition cartridges to the recommended normal operating environment for 24 hours after exposing them to abnormal temperature or humidity (such as after transporting the cartridges from one location to another).

! The safety of your data depends on proper care and handling of cartridges.

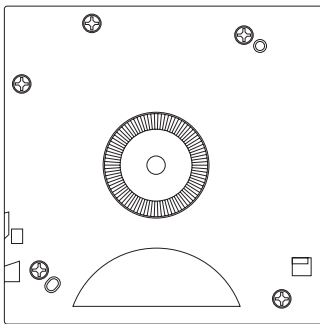
B4

Inspecting Data Cartridges

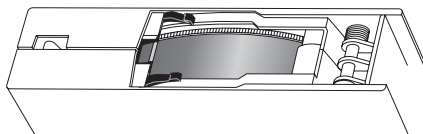
Check reel locks.



Inspect spring-loaded hub for proper tension.



Check for toed-in clips.



Improper data cartridge handling is the primary reason for tape drive problems. To avoid losing data or damaging the tape drive, inspect cartridges:

- ▶ Before loading a new cartridge
- ▶ After dropping a cartridge or subjecting it to physical shock
- ▶ When the tape drive becomes inoperable after loading a cartridge
- ▶ When you receive a shipment of data cartridges that shows any sign of shipping damage.

If the cartridge does not pass the following criteria, do not use it.

To Inspect a Cartridge

1. Inspect the exterior of the cartridge for physical damage (cracks, broken parts) and contamination (sticky or oily substances, attached debris).
2. Gently shake the cartridge. Listen for loose pieces.
3. Check that both reel locks on the cartridge are visible. One reel lock is located on the end of the cartridge that is inserted into the tape drive. The other is on the bottom of the cartridge.
4. Confirm that the spring-loaded hub on the bottom of the cartridge is centered. Press the hub to ensure that the spring is functioning properly and that the hub returns to its normal position.
5. Verify that the orange write-protect switch snaps smartly into position and is not damaged. → B2
6. Open the cartridge door by pressing the tab in the door pivot notch. Check for possible damage to the tape leader buckle, including a bent or toed-in appearance or improper seating.
7. Examine the visible tape leader (without touching it) for excessive debris, oily or sticky residue, condensed droplets of moisture, or any other signs of contamination.

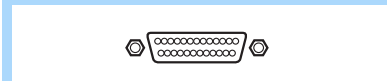
C1

SCSI Connectors

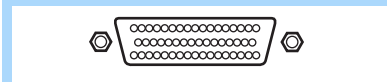
The Super DLTtape drive has two SCSI-2 connectors on the back of the drive. If you are unsure of your host system's SCSI connector, use the guide below to identify it and purchase the appropriate cable.

- ! Always ensure that SCSI cables are in good working order and pins are not bent or damaged.
- ! When connecting or disconnecting SCSI cables, always ensure that the host computer and SCSI devices are powered off.

SCSI Connectors



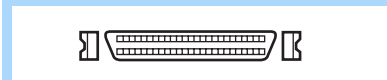
DB-25 MAC 25-pin



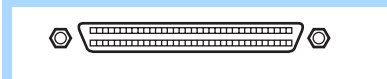
Sun and Data General Proprietary



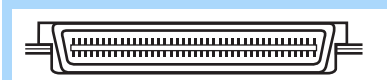
Low-density 50-pin Centronics



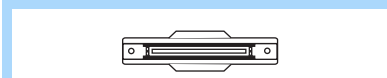
High-density 50-pin Micro DB50 or Mini DB50



High-density 68-pin Micro DB68 or Mini DB68



SCA 80-pin Hot Swap Connector



Very High-density Interconnect

C2

SCSI Controller Interfaces

You can configure the Super DLTtape drive with one of two possible SCSI interface cards. These cards can provide one of three possible SCSI interface types. The multimode single-ended (MSE) card provides either a low-voltage differential (LVD) mode running at 80 MB/second or single-ended (SE) mode running at 40 MB/second. The high-voltage differential (HVD) mode runs at 40 MB/second.

A single-ended drive only works with a single-ended SCSI controller card. A differential drive only works with a differential SCSI controller card.

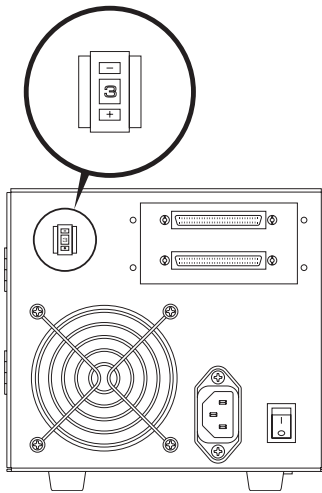
- ▶ Single-ended SCSI interfaces support up to 7 devices on the SCSI chain using cable lengths up to 3 meters.
- ▶ Differential SCSI interfaces support up to 15 devices on the SCSI chain using cable lengths up to 25 meters.

! A low-voltage differential SCSI interface only works with a single-ended device if the controller is switched to single-ended mode.

! For more information about SCSI interfaces and SCSI bus settings, visit www.dlftape.com.

C3

Setting the SCSI ID



This section describes how to set the SCSI ID on the tabletop tape drive. For information about setting the SCSI ID on an internal tape drive, refer to the *SDLT 220 and SDLT 320 Product Manual*.

Each device connected to a SCSI bus must have a unique SCSI ID number. The factory preset SCSI ID is 3 for the tabletop tape drive and 5 for the internal tape drive. Ensure that your tape drive's SCSI ID is unique on your SCSI bus.

- ! If the drive is the only SCSI device, leave the SCSI ID set to the default setting.**
- ! Do not use a SCSI ID of 7. This setting is typically reserved for the SCSI controller.**

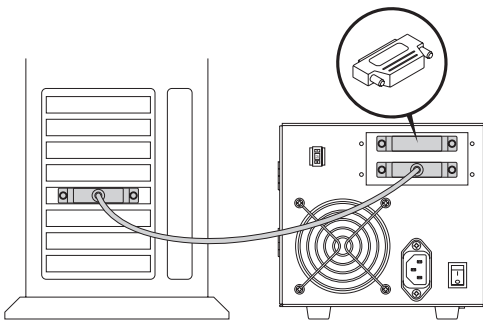
You can change the SCSI ID using the push-button switch on the back of the drive. Press the switch buttons above or below the number display with the point of a pencil to increase or decrease the ID number.

C4

Connections: Single Drive

The Super DLTtape drive performs best when it is the only device connected to the SCSI bus. If the tape drive is the only SCSI device you intend to connect to the SCSI bus, follow these steps:

Terminate upper SCSI port.



1. Make sure the host computer and all peripheral devices are powered off.

! Never connect the tape drive while the host system or peripheral devices are powered on.

2. Connect a terminator to the upper SCSI connector on the back of the tape drive.

! You must terminate the SCSI bus. The SCSI controller terminates one end, while a terminator on the tape drive terminates the other end.

3. Connect one end of the SCSI cable to the lower connector on the back of the tape drive.

4. Connect the other end of the SCSI cable to the SCSI connector on the host computer.

! For optimum performance, the Super DLTtape drive should be the only device connected to the SCSI bus.

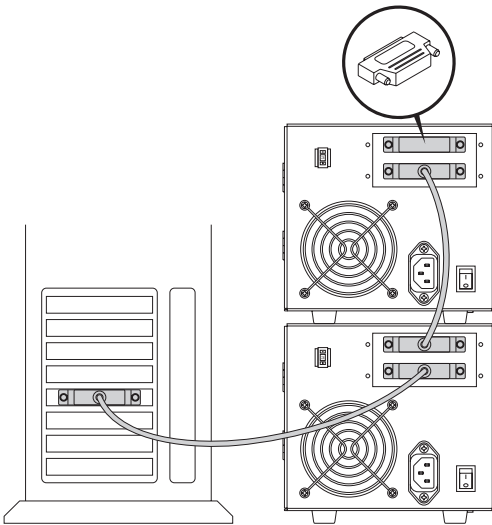
For more information about connecting the tape drive, refer to the *SDLT 220 and SDLT 320 Product Manual*.

C5

Connections: Daisy Chain

If you are adding your Super DLTtape drive to a SCSI daisy chain, follow these steps:

Terminate upper SCSI port.



1. Ensure that all devices have unique SCSI IDs. ⇒ C3
2. Make sure the host computer and all peripheral devices are powered off.

! Never connect the tape drive while the host system or peripheral devices are powered on.

3. Connect the SCSI cable from the host computer to the lower SCSI connector on the back of the tape drive.
4. Continue the SCSI chain using the upper SCSI connector.
5. If the SDLT Super DLTtape drive is the last device in the chain, connect a terminator to the upper SCSI connector.

! You must terminate the SCSI bus. The SCSI controller terminates one end, while a terminator on the last device in the chain terminates the other end.

For more information about connecting the tape drive, refer to the *SDLT 220 and SDLT 320 Product Manual*.

D1

Using the Power-On Self-Test

The Super DLTtape drive performs a self-diagnostic test, called a Power-On Self-Test (POST), each time you power it on. This test helps you detect problems with your tape drive.

POST completes in approximately 10 seconds. While POST is in progress, the tape drive responds BUSY to SCSI commands.

During this time, if the host computer attempts to negotiate synchronous or wide transfers, the tape drive negotiates to asynchronous or narrow. It may take longer than the duration of POST for the tape drive to become ready.

During POST, each LED lights in sequence. When POST is complete, the green Drive Status LED lights steadily.

If the tape drive fails POST, check for the following possible problems:

- ▶ There is no cartridge in the tape drive.
- ▶ The tape drive is not receiving adequate power (try a new cord or different outlet).
- ▶ The tape drive is not properly connected to the host computer and other SCSI devices.

If any of these problems exist, correct the problem, power off the tape drive and power it back on to restart POST. If none of these problems exists or the tape drive fails POST after you have corrected them, refer to additional troubleshooting information in the *SDLT 220 and SDLT 320 Product Manual* available on the product CD-ROM.

! Do not attempt to open the tape drive enclosure. Only a qualified Quantum technician should perform service.

D2

General Troubleshooting

Troubleshoot problems with your tape drive using the following steps:

1. Visually inspect the cartridge for damage, and try a new cartridge if necessary. → **B4**
2. Make sure the cables and connectors are in good condition. For example, check that they are not worn or broken, and there are no missing or bent pins.
3. Make sure the connector on each end of the cable is fully seated.
4. Disconnect the tape drive from the host system, power off the tape drive, and power it on again to perform a POST. → **D1**
5. Remove all devices from the SCSI bus. Connect the tape drive directly to the host computer and terminate it (→ **C4**). Confirm that the tape drive and host computer are communicating properly before adding other devices.
6. Ensure that your operating system (modules, patches, and drivers), backup software, and tape drive are compatible. Visit www.quantum.com/sdlt for the most current compatibility information.

If you cannot identify or correct the problem, call Quantum Technical Support at 1-888-827-3378. Have your model and serial number available when you call. Find these numbers on the bottom of the tape drive.

D3 SCSI Troubleshooting

If the tape drive passes POST with no power or data cartridge problems, but is still performing poorly, check for the following SCSI issues.

SCSI Troubleshooting

Possible Problem	Solution
SCSI cables are worn or broken.	Check that SCSI cables are in good condition and that there are no missing or bent pins in the connectors.
Your system is not configured to see the SCSI ID.	Check your system and SCSI bus settings. Configure your system to recognize the drive.
The SCSI ID is not unique.	Change the SCSI ID. The new ID will take effect the next time you turn the drive on. → C3
The parameters for your SCSI adapter are incorrect.	Check your SCSI adapter card. Ensure that the SCSI interface (single-ended or differential) matches that of your drive.
The SCSI signal cable is loose.	Ensure that the connector on each end of the cable is fully seated. → C1
The SCSI terminator is absent or loose.	Install a terminator (if none exists) and make sure that it is fully seated.
The SCSI bus is not terminated correctly.	Confirm that a terminator is installed on the device at the end of the SCSI chain. → C4 , C5
The SCSI bus is too long.	For single-ended SCSI mode, limit the length of the bus to 6 meters (19 feet). For differential SCSI cards, limit the length to 25 meters (82 feet).
Too many devices are connected to the SCSI bus.	Limit the number of external devices. Try using the tape drive as a stand-alone device. → C2

D4

Checking for Tape Drive Errors

The Super DLTtape drive provides status and event information about the SCSI controller, devices, data transfer, and errors.

You can use iTalk to access this information through the tape drive's infrared port located on the front of the tape drive. You can find iTalk on the CD-ROM that accompanies the tape drive, or you can download it from

www.quantum.com/sdlit

(you must first register your tape drive on the web site). See iTalk's online help for information about using the software.

D5

Optimizing the Tape Drive

Many factors contribute to Super DLTtape drive performance. Host system considerations include processor speed, block size, SCSI adapter performance, bus configurations, and software.

If you are concerned about the performance of your tape drive, check the following:

1. Ensure that your tape drive is properly defined for the host system. If the tape drive is not defined within the system, the SCSI adapter does not interact well with the tape drive.
2. Make sure your controller card and the SCSI bus are operating in the same mode, preferably LVD. If the controller card or the SCSI bus are operating in SE, the tape drive switches to SE.
3. De-fragment your hard disk on a regular basis. Fragmented disks and files take much longer to back up.
4. Check your host block size. The Super DLTtape drive supports block sizes up to 16 MB. In general, the larger the block size, the better the throughput. Many older software applications default to a 512-byte block size, which results in poor performance.
5. Make sure you are using a data cartridge that is compatible with the tape drive. → **B1**

E1

Specifications

This section lists the dimensions, weight, physical specifications, and functional specifications for the Super DLTtape drive.

Dimensions

Description	Internal Version	Tabletop Version
Height	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	174.75 mm (6.88 in.)
Depth	203.20 mm (8.00 in.) measured from back of front bezel; 212.73 mm (8.38 in.) including front bezel	320.04 mm (12.60 in.)

Weight

Description	Internal Version	Tabletop Version
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 packaging used may change the shipping weight.

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

Physical Specifications

The following table lists operating limits and accuracy for SDLT drives.

Data Integrity	
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	< 5 per 10^6 bytes written
Temperature	
Operating	10 °C to 40 °C (50 °F to 104 °F)
Storage	-40 °C to 66 °C (-40 °F to 150 °F)
Humidity	
Operating	20% to 80% non-condensing
Storage	10% to 95% non-condensing
Safety Certifications	
Meets UL 1950, CSA C22.2 No. 950, GS mark, and EN60950/IEC 950 standards	
Operating Air Velocity	
125 LFM average air velocity measured directly in front of the bezel	
Electrical Rating	
100 to 240 VAC, 65 W (internal rating) maximum, 47 to 63 Hz	
Communication Interface	
SCSI MSE (LVD or SE) or HVD, 8-bit single-ended or differential	

Functional Specifications

The following table lists tape capacity, tape performance characteristics, and media life expectancy.

Capacity: Super DLTtape I Formatted Cartridge		
	SDLT 220	SDLT 320
Native	110 GB	160 GB
Compressed (2:1)	220 GB	320 GB
Super DLTtape I Characteristics		
Load to BOT	12 s (typical), 40 s (unformatted tape)	Same
Unload from BOT	12 s	Same
Average access time	70 s (from BOT)	Same
Max access time	142 s (from BOT)	Same
Average rewind time	69 s	Same
Max rewind time	140 s	Same
Read/Write tape speed	116 ips	122 ips
Rewind tape speed	160 ips	Same
Linear search tape speed	160 ips	Same
Linear density	133 Kbpi	193 Kbpi
Media Life Expectancy		
	DLTtape IV	SDLTtape I
Cartridge load/unload cycles [*]	10,000	100,000
Tape insertions [†]	5,000	Same
Full tape uses (end-to-end)	250	Same
Tape life (media only) [‡]	1,000,000 passes	Same

* Load and unload cycles are rated at 5,000 for the cartridge itself.

† An insertion is when a tape is inserted into the receiver, loaded to BOT, calibrated, and then unloaded.

‡ A media pass is defined as movement of the tape head over the surface of the media (in either direction).

E2

Regulatory Information

Electromagnetic Emissions

The integratable version of the drive complies with FCC Class A in a standard enclosure; the tabletop version complies with the FCC Class B limits. The following table provides regulations and certifications held by the tape drives.

Type	Regulation/Certification
EEC Directive 89/336 CE	BS6527 (UK) EN55022 (EU) EN55024 (EU)
CFR 47, 1995	FCC Rules Part 15B Class B (MDOC)
IECS-003	Canada
V-3/97.04	VCCI Class B (Japan)
AS/NZS 3548	Australia / New Zealand (C-Tick Mark)
CNS 13438	BSMI Class A (Taiwan)

Conducted Emissions

Limits for Class B equipment are in the frequency range from 0.15 to 30 MHz.

Frequency Range	Limits dB	
	Quasi-peak	Average
0.15 to 0.50 MHz	66 to 56*	56 to 46
0.50 to 5 MHz	56	46
5 to 30 MHz	60	50

* The limit decreases linearly with the logarithm of the frequency.

Radiated Emissions

The following table lists limits of radiated interference field strength, in the frequency range from 30 MHz to 1000 MHz at a test distance of 10 meters, for Class B equipment.

Frequency Range	Quasi-peak limits dB ($\mu\text{V}/\text{m}$)	
	Class A	Class B
30 to 230 MHz	40	30
230 to 1000 MHz	46	37
Above 1000 MHz	54	Not applicable

Acoustic Noise Emissions

The following table lists limits of acoustic noise emissions both as noise power and sound pressure.

Acoustics – Preliminary declared values per ISO 9296 and ISO 7779/EN27779

Mode	Noise Power Emission Level (LNPEc)	
	Internal Version	Tabletop Version
Idle	Not applicable	5.4 Bel
Streaming	5.9 Bel	5.9 Bel

Mode	Sound Pressure Level (LPAc)	
	Internal Version	Tabletop Version
Idle	Not applicable	42 dB
Streaming	47 dB	53 dB

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It is the responsibility of the user to carefully read and understand the User Manual statements for Class A Equipment and Class B Equipment that appear on the inside of the front cover.

Contact Information

Telephone numbers and street addresses change frequently; for the latest, up-to-date contact information, visit www.quantum.com.

Telephone numbers, street addresses, time zones, and other pertinent facts are listed in the *Support* section of the web site.

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