User Guide

LTO-5 Half-Height SAS Tape Drive

English
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Feel free to send us your comments by e-mail to manuals@ts.fujitsu.com.

Certified documentation according to DIN EN ISO 9001:2000

To ensure a consistently high quality standard and user-friendliness, this documentation was created to meet the regulations of a quality management system which complies with the requirements of the standard DIN EN ISO 9001:2000.

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About this guide

This guide provides information about:

● Installing the LTO-5 SAS half-height tape drive
● Using the LTO-5 SAS half-height tape drive
● Troubleshooting the LTO-5 SAS half-height tape drive

Intended audience

This guide is intended for users who install, operate and maintain the LTO-5 half-height tape drive.

Document conventions and symbols

<table>
<thead>
<tr>
<th>Convention</th>
<th>Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue text: table 1 on page 5</td>
<td>Cross-reference links and e-mail addresses</td>
</tr>
<tr>
<td>Bold text</td>
<td>● Keys that are pressed</td>
</tr>
<tr>
<td></td>
<td>● Text typed into a GUI element, such as a box</td>
</tr>
<tr>
<td></td>
<td>● GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes</td>
</tr>
<tr>
<td>Italic text</td>
<td>Text emphasis</td>
</tr>
<tr>
<td>Monospace text</td>
<td>● File and directory names</td>
</tr>
<tr>
<td></td>
<td>● System output</td>
</tr>
<tr>
<td></td>
<td>● Code</td>
</tr>
<tr>
<td></td>
<td>● Commands, their arguments, and argument values</td>
</tr>
<tr>
<td>Monospace, italic text</td>
<td>● Code variables</td>
</tr>
<tr>
<td></td>
<td>● Command variables</td>
</tr>
<tr>
<td>Monospace, bold text</td>
<td>Emphasized monospace text</td>
</tr>
</tbody>
</table>

Table 1: Document conventions
| WARNING! | Indicates that failure to follow directions could result in bodily harm or death. |
| CAUTION: | Indicates that failure to follow directions could result in damage to equipment or data. |
| IMPORTANT: | Provides clarifying information or specific instructions. |
| NOTE: | Provides additional information. |
1 Getting started

In this chapter:

● "Your LTO-5 tape drive" on page 7
● "How do I connect the drive to my server?" on page 8

1.1 Your LTO-5 tape drive

Figure 1: Front view of LTO–5 SAS tape drive

1. Drive door  5. Drive LED
2. Encryption LED  6. Ready LED
3. Clean LED  7. Eject button
4. Tape LED
1.2 How do I connect the drive to my server?

The tape drive is installed into a 5¼-inch drive bay in your server and is attached to the host server's internal SAS controller or SAS host bus adapter, as illustrated below.

Connect a spare power cable from the server's internal power supply to the power connector on the SAS data cable.

Figure 2: Connecting cables to the LTO—5 tape drive

1. Power connector on data cable 2. SAS connector to tape drive (SFF-8482 SAS cable with power)
1.3 Drivers

The driver can be obtained from the Fujitsu ServerView Suite DVD, for updates please check http://support.ts.fujitsu.com. Refer also to the documentation of your software application to ensure you are using the recommended driver.

1.3.1 Installing on Windows

Install as instructed in the readme file in the drivers directory.

1.3.2 Installing on Red Hat Enterprise Linux

Drivers are included with the operating system and should be loaded automatically.
2 Verify installation

Once you have installed the drive hardware, check that drivers have been installed correctly and you have the correct version of backup software, and verify that the tape drive is functioning properly before you store your valuable data.

1. Switch on the server.

2. The tape drive will run its hardware self-test, which takes about 5 seconds. If self-test passes, the green Ready LED flashes and then shows steady green. If the test fails, the Drive and Tape LEDs flash, while the Ready and Clean LEDs are off. This continues until the drive is reset. See "Understanding LED sequences" on page 27 for more information about front panel LEDs.

   ● If you installed drivers before connecting the tape drive (Windows only)
     The tape drive should be detected automatically and the correct drivers used.

   ● Installing drivers after connecting the tape drive (Windows only)
     If you have not already installed drivers, install the driver according to the supplied documentation in the driver's folder.

   ● Installing drivers (other operating systems)
     Drivers are included with the operating system and should be loaded automatically.

   NOTE:
   Certain backup applications require you to use their own Tape driver.

3. Verify that the tape drive installation was successful.

4. For all operating systems ensure that you have downloaded any upgrades necessary for your backup application.
3 Operating your tape drive

In this chapter:

- "Loading a cartridge" on page 13
- "Unloading a cartridge" on page 14
- "Removing power from the drive" on page 14

3.1 Loading a cartridge

1. Lift the drive door and insert the cartridge into the slot in the front of the drive with the arrow uppermost and facing the drive slot.

![Figure 3: Inserting a cartridge](image)

2. Apply gentle pressure until the drive takes the cartridge and loads it.

3. The Ready LED flashes green while the drive performs its load sequence. When the cartridge is loaded, the Ready LED shows steady green.
3.2 Unloading a cartridge

**CAUTION:**

Never try to remove a cartridge before it is fully ejected.

1. Press the Eject button on the front panel.

![Figure 4: Ejecting a cartridge](image)

1. Eject button

2. The drive will complete its current task, rewind the tape to the beginning, and eject the cartridge. The rewind process may take up to 10 minutes. The Ready LED will flash to indicate that the unload is still in progress.

3.3 Removing power from the drive

To ensure reliable operation, do not remove power from the drive during read, write, fast-search, load and unload activities.
4 Cautions concerning backup

In this chapter:

● "Ejecting the data cartridge after backup" on page 15
● "Data compression rate" on page 15
● "Backup performance/capacity" on page 16
● "Points to note during system configuration" on page 16

4.1 Ejecting the data cartridge after backup

● Do not leave the data cartridge in this product.
  
  Doing so makes the data cartridge wear faster, because the longer it is used, the faster it wears. The tape recording surface of the data cartridge is exposed when inserted in this product and if it is left in this state for a long time it will easily be affected by suspended particles of dust. Insert the data cartridge just before the backup operation, and remove it immediately after the operation.

● Do not turn off the power with the data cartridge inserted.
  
  If the power is turned off with the data cartridge inserted, it takes a while before this product can be used after the next power-on.

4.2 Data compression rate

This product has a data compression function included in the hardware.

Although the data compression rate is approximately 200%, it varies depending on the data content.

Data that has already been compressed by software is not effected by this product.

Some backup software has a data compression function prior to transfer, however, do not compress data by software if the hardware compression function is on.
4.3  **Backup performance/capacity**

The backup performance and backup capacity that can be used in one data cartridge varies depending upon the following factors:

- The conditions (attrition, dust, etc.) of the recording surface of the data cartridge to be used
- The dust and dirt condition of the product's magnetic head
- The data compression rate
- The workload on the server

4.4  **Points to note during system configuration**

When repeatedly using a single data cartridge, all the data can be lost if the backup fails. Also, if a backup data cartridge becomes damaged, the data cannot be recovered.

Damage in the event of a failure can be minimized if two or more data cartridges are used for backup operation. For example, use different data cartridges for each day of the week.
5 Use the correct media

In this chapter:
● "Cartridges" on page 17
● "Cartridge life" on page 18
● "Write protecting cartridges" on page 19
● "WORM data cartridges" on page 20
● "LTO-5 tape drives and encryption" on page 20
● "Cleaning the tape drive" on page 23
● "Handling cartridges" on page 23
● "Storage environment" on page 24

5.1 Cartridges

5.1.1 Cleaning cartridges

Use the universal cleaning cartridge. It may be used for up to 50 cleans.

5.1.2 Data cartridges

LTO–5 tape drives use LTO Ultrium 5 tape cartridges. These are single-reel cartridges that match your drive's format and are optimized for high capacity, throughput and reliability. Compatible media can be recognized by the Ultrium logo, which is the same as the logo on the front of your drive. Do not use other format cartridges in your tape drive and do not use LTO Ultrium 5 cartridges in other format tape drives.

To achieve best performance we recommend using only “Fujitsu — Preferred Quality” LTO Media cartridges.

For optimum performance always use LTO Ultrium 5 data cartridges because they match the specification of your tape drive. A lower specification will have a lower transfer speed and may not support write activities; a higher specification will not support read or write.
Cartridge life

The drive supports the following LTO data cartridges:

<table>
<thead>
<tr>
<th>Data Cartridge Type</th>
<th>Capacity/Compression</th>
<th>Read/Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTO Ultrium 5 data cartridges</td>
<td>1500 GB (3000 GB at 2:1 compression)</td>
<td>Read/Write</td>
</tr>
<tr>
<td>LTO Ultrium 4 data cartridges</td>
<td>800 GB (1600 GB at 2:1 compression)</td>
<td>Read/Write</td>
</tr>
<tr>
<td>LTO Ultrium 3 data cartridges</td>
<td>400 GB (800 GB at 2:1 compression)</td>
<td>Read only</td>
</tr>
<tr>
<td>LTO Ultrium 2 data cartridges</td>
<td>unsupported</td>
<td></td>
</tr>
<tr>
<td>LTO Ultrium 1 data cartridges</td>
<td>unsupported</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Supported data cartridges

5.2 Cartridge life

To avoid a backup failure due to worn media, replace the media (data cartridge) before either of the following occur:

- After one year of use
- After being used 1000 times

The lifespan of media varies depending on the environment (temperature, humidity, dust, etc.) and operating conditions of this product.

**IMPORTANT:**
The data cartridge is a replaceable part. Worn media can cause problems such as magnetic tape surface damage, dirty magnetic head, many media errors, and so on. See also "Problems with cartridges" on page 32.
5.3 Write protecting cartridges

**WARNING!**

Always remove the cartridge from the tape drive before you change the write protection.

If you want to protect the data on a cartridge from being altered or overwritten, you can write protect the cartridge.

- To write protect a cartridge, push the switch to the right to prevent any data recording on the cartridge. Note the padlock on the tab that indicates that the cartridge is protected.

- To write enable a cartridge, push the switch to the left to allow data recording on the cartridge. Figure 5 on page 19 illustrates the location of the write-protect tab.

![Write protecting a cartridge](image)

Figure 5: Write protecting a cartridge

1. Write-protect tab
5.4 WORM data cartridges

The LTO–5 tape drive includes support for both re-writable and Write-Once, Read-Many, WORM, data cartridges. WORM cartridges provide an enhanced level of data security against accidental or malicious alteration of data on the tape cartridge. The WORM data cartridge can be appended to maximize the full capacity of the tape cartridge, but the user will be unable to erase or overwrite data on the cartridge. Any attempt to modify a WORM cartridge to enable writing over existing data will result in the media becoming permanently write protected. It should still be readable in a WORM drive, depending upon the severity of the tampering, but no further appended backups will be possible.

WORM data cartridges are clearly identified by their distinctive, two-tone cartridge color. They can only be used with LTO tape drives that support the WORM feature.

To check whether your backup or archive software application supports WORM cartridges, refer to the software manual.

5.5 LTO-5 tape drives and encryption

The LTO–5 tape drive includes hardware capable of performing data encryption at full speed while writing data, and decrypting when reading.

Encryption is the process of changing data into a form that cannot be read until it is deciphered, protecting the data from unauthorized access and use. LTO–5 tape drives use the strongest version of the industry-standard AES encrypting algorithm to protect your data.

To make use of this feature you need:

- A backup application that supports hardware encryption
- LTO Ultrium 5 media (recommended) or LTO Ultrium 4 media; no encryption will be performed when writing earlier generations of tape
5.5.1 When should I use encryption?

Your company policy will determine when you need to use encryption. For example, it may be mandatory for company confidential and financial data, but not for personal data. Company policy will also define how encryption keys should be generated and managed. Backup applications that support encryption will generate a key for you or allow you to enter a key manually.

NOTE:
Encryption with keys that are generated directly from passwords or passphrases may be less secure than encryption using truly random keys. Your application should explain the options and methods that are available. Please refer to your application's user documentation for more information.

5.5.2 How do I enable encryption?

Hardware encryption is turned off by default and is switched on by settings in your backup application, where you also generate and supply the encryption key. Your backup application must support hardware encryption for this feature to work.

5.5.3 What happens if I don't remember the key?

If you are unable to supply the key when requested to do so, neither you nor Technical Support will be able to access the encrypted data.

This guarantees the security of your data, but also means that you must be careful in the management of the encryption key used to generate the tape.

WARNING!
You should keep a record or backup of your encryption keys and store them in a secure place separate from the computer running the backup software.

5.5.4 Does encryption affect tape drive performance?

Hardware encryption can be used with or without compression and without speed or capacity penalties.
5.5.5 Does the tape drive encrypt media in an earlier LTO format?

Encryption is supported only on LTO Ultrium 5 media and LTO Ultrium 4 media.

Encrypted LTO Ultrium 5 and LTO Ultrium 4 tapes can be read on any compatible LTO tape drive that supports hardware encryption. (LTO-5 tape drives can read and write encrypted LTO Ultrium 5 media and LTO Ultrium 4 media.)

Hardware encryption is not supported on any earlier LTO media, such as LTO Ultrium 3 media.

5.5.6 Where can I get more information?

For detailed instructions about enabling encryption please refer to the documentation supplied with your backup application. This will also highlight any default states, for example when copying tapes, that may need changing if using encrypted tapes.
5.6 Cleaning the tape drive

Perform magnetic head cleaning as follows:

- Periodically (once every three months)
- If the Clean LED flashes

You must use the Ultrium Universal Cleaning cartridge with LTO-5 tape drives, as other cleaning cartridges will not load and run.

To clean the tape drive:

1. Insert the Ultrium Universal Cleaning cartridge.

2. The drive will carry out its cleaning cycle and eject the cartridge on completion (which can take up to 5 minutes). During the cleaning cycle the orange Clean LED will be on solidly and the green Ready LED will flash.

   Each Ultrium universal cleaning cartridge can be used up to 50 times with Ultrium tape drives. If the cleaning cartridge is ejected immediately with the Tape LED on, it has expired.

5.7 Handling cartridges

- Do not touch the tape media.
- Do not open the drive door and touch the tape media.
- Do not attempt to clean the tape path or tape guides inside the cartridge.
- Do not leave cartridges in the drive. The tape loses tension in the power-off state, which can lead to problems, particularly if the drive has been moved.
- Do not leave cartridges in excessively dry or humid conditions.
- Do not leave cartridges in direct sunlight or in places where magnetic fields are present (for example, under telephones, next to monitors or near transformers).
- Do not drop cartridges or handle them roughly.
- Stick labels onto the label area only.
- Do not bulk erase (or degauss) LTO format cartridges because this will render them unusable.
- Attach the label at the location shown in the following figure.
Storage environment

IMPORTANT:
Always use the supplied label.

Figure 6: Attaching a label to media

1. label position

5.8 Storage environment

To prevent condensation and for long life, the cartridge should only be stored as follows:

- Day-to-day storage (in plastic container): 16° C to 32° C (60° F to 90° F)
- Non-condensing relative humidity: 20% to 80% (storage)
- Wet bulb temperature should not exceed 26° C (79° F)

Tapes intended for long-term storage should be stored in the plastic containers, at temperatures between 5° C and 23° C (41° F and 73° F) and 20% to 60% relative humidity.
6 Troubleshooting

In this chapter:

- "General Procedure" on page 25
- "Understanding LED sequences" on page 27
- "Problems with cartridges" on page 32

6.1 General Procedure

If a problem occurs, the first step is to try to establish whether the problem lies with the cartridge, the drive, the host computer and connections, or the way the system is being operated.

Has the system just been installed?

There could be an installation problem:

1. Check through the information in the relevant installation chapter of this guide.

2. Has the system booted? If not, check that all hard disks are correctly seated in the hard disk bay and then check the cabling between the disks and the SAS controller.

3. Has the system booted but the operating system has not seen the tape drive? Check that the drive has power, the Ready LED should be illuminated. If it is not, check that the power cord is connected correctly to the tape drive. If the Ready LED is illuminated, check the cabling between the tape drive and the SAS controller. Ensure that the HBA port to which the drive is connected is enabled.

4. Are appropriate Tape drivers as well as supported application software installed on the host?

5. Check the environmental conditions against the specified limits.
General Procedure

Are you using new cartridges or a different brand of cartridge? Have you been using the particular cartridge for a very long time?

The problem could lie with the cartridge:

1. Check through the media chapter on "Use the correct media" on page 17.
2. Check that you are using an LTO cartridge. Compatible media can be recognized by the logo, which is the same as the logo on the front of your drive.
3. Use the correct media type:
4. Has the cartridge been write-protected, see "Write protecting cartridges" on page 19?
5. Clean the tape heads with the cleaning cartridge, see "Cleaning cartridges" on page 17. Make sure you are using the Ultrium Universal cleaning cartridge.
6. If the Tape LED is flashing, the cartridge is probably faulty. Try using a different cartridge.
7. Try the operation again.
8. If the problem still occurs and you have not yet replaced the cartridge, try using a different cartridge.
9. If the problem is still there, the problem probably lies with the drive or the host computer.

Has the drive been moved recently? Have any cables been disconnected and reconnected? Has the environment changed—unusually hot, cold, damp or dry? Has there been dust or dirt near the drive. Have reasonable precautions against static been taken?

The problem could lie with the drive or the environment:

1. Check the cables and connectors.
2. Clean the tape heads with the cleaning cartridge.
3. If the problem persists, check the environmental conditions against the specified limits. Perhaps move the drive to a more suitable site.
Has a new operating system been installed in the host computer? Has new backup software been installed?

The problem could lie with the host or the software. Consult the computer's operating manuals, the software manual, or seek help from a service engineer.

6.2 Understanding LED sequences

![Figure 7: Front view of LTO–5 tape drive](image)

1. Drive door
2. Encryption LED
3. Clean LED
4. Tape LED
5. Drive LED
6. Ready LED
7. Eject button
The LED sequences in the following table relate to the Clean, Tape Error, Drive Error and Ready LEDs. The LTO–5 tape drive also has an Encryption LED that describes encryption status. This is described separately in "Encryption LED" on page 31. The meaning of different patterns of LEDs, without encryption enabled, is as follows:

<table>
<thead>
<tr>
<th>LED Sequence</th>
<th>Cause</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>All LEDs OFF.</td>
<td>Drive may not have power, may be faulty or may have been power cycled or reset during a firmware upgrade.</td>
<td>Check the power cord connection and replace the cable if necessary. If the power supply is present and all LEDs remain off, power cycle the server. If it still fails, call for service.</td>
</tr>
<tr>
<td>Ready and Clean OFF. Drive and Tape FLASH.</td>
<td>The drive has failed to execute power-on self test (POST).</td>
<td>Power cycle the server. If the error condition reappears, call for service.</td>
</tr>
<tr>
<td>Ready is ON.</td>
<td>The drive is ready for operation.</td>
<td>None. This is normal.</td>
</tr>
<tr>
<td>Ready FLASHES.</td>
<td>The drive is carrying out a normal activity (read, write).</td>
<td>None. If the drive is upgrading firmware, do not power cycle the server.</td>
</tr>
<tr>
<td>Ready FLASHES-steady ONFLASHES.</td>
<td>The drive is in OBDR mode. This mode is not supported by Fujitsu.</td>
<td>To leave OBDR mode, power cycle the server.</td>
</tr>
<tr>
<td>Ready FLASHES fast.</td>
<td>The drive is downloading firmware.</td>
<td>None. Do not power cycle the server.</td>
</tr>
</tbody>
</table>

Table 3: Clean, Tape, Drive and Ready LED sequences
### Understanding LED sequences

<table>
<thead>
<tr>
<th>LED Sequence</th>
<th>Cause</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="LEDs" /></td>
<td>Firmware is being reprogrammed.</td>
<td>None. Do not power cycle the server.</td>
</tr>
<tr>
<td><img src="image2" alt="LEDs" /></td>
<td>The drive requires cleaning.</td>
<td>Load the Ultrium cleaning cartridge. See &quot;Cleaning cartridges&quot; on page 17 for supported cartridges and instructions. If the Clean LED is still flashing when you load a new or known good data cartridge after cleaning, call for service.</td>
</tr>
<tr>
<td><img src="image3" alt="LEDs" /></td>
<td>Cleaning is in progress.</td>
<td>None. The cleaning cartridge will eject on completion. The cleaning cycle can take up to 5 minutes to complete.</td>
</tr>
<tr>
<td><img src="image4" alt="LEDs" /></td>
<td>The drive believes the current tape or the tape just ejected is faulty.</td>
<td>Unload the tape cartridge. Make sure that you are using the correct format cartridge; an Ultrium data cartridge or Ultrium Universal Cleaning Cartridge. (See &quot;Use the correct media&quot; on page 17.) Reload the cartridge. If the Tape LED still flashes or starts flashing during the next backup, load a new or known good cartridge. If the Tape LED is now off, discard the 'suspect' tape cartridge. If it is still on, call for service.</td>
</tr>
</tbody>
</table>

Table 3: Clean, Tape, Drive and Ready LED sequences
## Understanding LED sequences

<table>
<thead>
<tr>
<th>LED Sequence</th>
<th>Cause</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="LEDs" /></td>
<td>The tape cartridge memory (CM) may be faulty.</td>
<td>Write protect the cartridge by sliding the switch on the tape cartridge, see &quot;Write protecting cartridges&quot; on page 19. The tape can be loaded and the data read. Once the data is recovered, the cartridge must be discarded.</td>
</tr>
<tr>
<td><img src="image" alt="LEDs" /></td>
<td>The drive mechanism has detected an error.</td>
<td>Load a new cartridge. If the error persists, power cycle the server. If the Drive LED remains on, call for service.</td>
</tr>
<tr>
<td><img src="image" alt="LEDs" /></td>
<td>There is a firmware download problem.</td>
<td>Insert a cartridge to clear the LED sequence. If the condition persists, call for service.</td>
</tr>
<tr>
<td><img src="image" alt="LEDs" /></td>
<td>The drive has a firmware error.</td>
<td>Power cycle the server. Upgrade the firmware. If the condition persists, call for service.</td>
</tr>
</tbody>
</table>

Table 3: Clean, Tape, Drive and Ready LED sequences
Understanding LED sequences

6.2.1 Encryption LED

The encryption LED may be blue or amber, as described in the following table. The state of the other LEDs depends upon the activity, as described below.

<table>
<thead>
<tr>
<th>Encryption LED (Blue or Amber)</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>At power on</td>
</tr>
<tr>
<td>Off</td>
<td>The drive is idle and there is no encryption key.</td>
</tr>
<tr>
<td>Off with Ready flashing green</td>
<td>The tape drive is reading/writing unencrypted data from another host or unloading a cartridge.</td>
</tr>
<tr>
<td>On (solid blue)</td>
<td>The drive is idle but the encryption key is loaded. The drive is ready to read/write encrypted data.</td>
</tr>
<tr>
<td>On (solid blue) with Ready flashing green</td>
<td>The drive is reading/writing encrypted data.</td>
</tr>
<tr>
<td>Alternate flashing, blue and amber</td>
<td>There is an encryption related error. This is cleared after unload executes or successful encryption/decryption resumes.</td>
</tr>
</tbody>
</table>

Table 4: Encryption LED

NOTE:
The Encryption LED only functions if you are using backup software that supports hardware encryption and this feature is enabled in the backup application. See the software manual for the backup application.

Encryption troubleshooting

- Ensure that you are using an LTO-5 tape drive and LTO Ultrium 5 or LTO Ultrium 4 media.
- Ensure that your software supports hardware encryption. It may be necessary to update the software. Consult your software vendor for more information.
- Ensure that the correct key or pass phrase has been entered.
6.3 Problems with cartridges

If you experience any problems using cartridges, check:

- The cartridge case is intact and that it contains no splits, cracks or damage.
- The cartridge has been stored at the correct temperature and humidity. This prevents condensation. See the insert included with the tape cartridge for storage conditions.
- The write-protect switch is fully operational. It should move from side to side with a positive click.

6.3.1 The cartridge is jammed

If the cartridge is jammed or the backup application is unable to eject it, you can force eject the cartridge.

1. Attempt a drive unload/eject operation from the backup software.
   Many backup applications will issue a Prevent Media Removal (PMR) command to the drive robot in an attempt to prevent human interference during a backup job. If this occurs, the software that issued the PMR must be used to load and unload tapes.

2. Shut down backup software and, if in a Windows environment, stop removable storage services.

3. Press the Eject button on the front of the tape drive.
   Sometimes it is necessary to use the Eject button instead of software to unload a tape because software can lose communication with the product or a rogue application can prevent the software from unloading the tape.

   **IMPORTANT:**
   This can take several minutes in many cases. Ensure that drive activity has stopped before continuing on (waiting 10 minutes is a good rule of thumb). It is important that you allow sufficient time for the drive to complete rewinding the cartridge. If you interrupt it, you may damage the media or the tape drive.

4. Power down the server.

5. Disconnect the data cable.
6. After at least 15 seconds, power the drive back up and wait till the drive is idle/ready.

**CAUTION:**

Use care when disconnecting data cables to ensure that connectors are not reversed, pins are not bent, and so on.

**IMPORTANT:**

Powering up with a cartridge in the drive can take several minutes. It is important that you allow sufficient time for the drive to complete rewinding the cartridge. If you interrupt it, you may damage the media or the tape drive.

7. Ensure that drive activity has stopped (waiting 10 minutes after power up is a good rule of thumb). Push the Eject button.

This step attempts to overcome unload issues due to the drive being in an abnormal state or because Prevent Media Removal has been incorrectly left on after being set by a rogue application.

8. Initiate a force eject or emergency unload operation by pressing and holding the Eject button for 15 seconds. This step causes the drive to try everything possible to unload the tape.

**CAUTION:**

You may lose data if you force eject a cartridge that is in the middle of a backup. The tape may also become unreadable because an EOD (End of Data) mark may not be properly written.

9. If the cartridge is still jammed, the tape drive has failed. Please contact Fujitsu Customer Support.
### Problems with cartridges

#### 6.3.2 The drive will not accept the cartridge (or ejects it immediately)

The cartridge may have been damaged, for example dropped, or the drive may have a fault. If it is a cleaning cartridge, it has probably expired and should be discarded immediately. For data cartridges:

1. Check that the drive has power (the power cord is properly connected and the Ready LED is on).
2. Check that you are using the correct media. Use only LTO media.
3. Make sure that you have loaded the cartridge with the correct orientation (see "Loading a cartridge" on page 13).
4. Check for damage to your media and discard it, if it is damaged.
5. Use a new or known, good piece of media and see if it loads. If it does, the original cartridge is faulty and should be discarded.