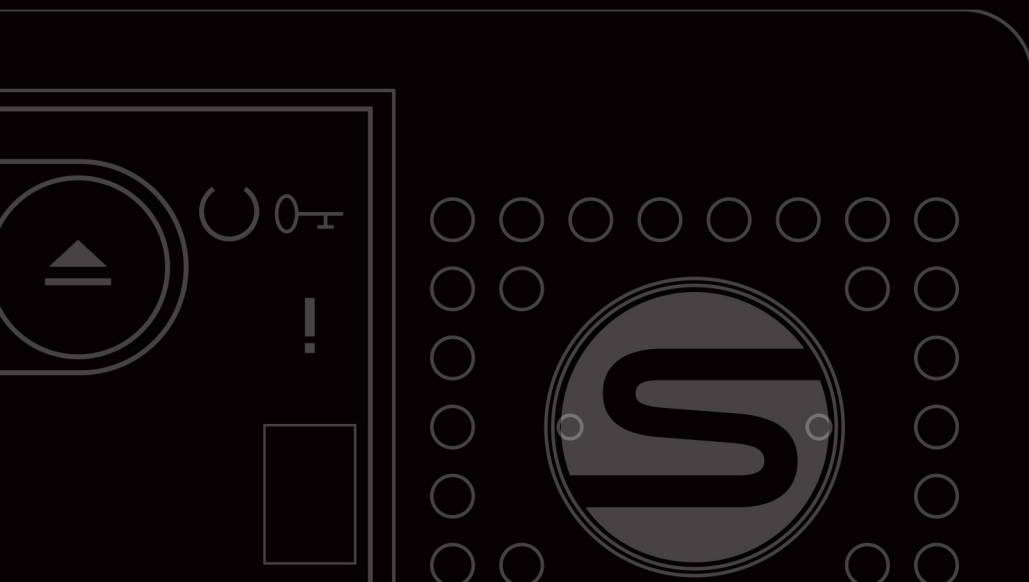


# SYMPLYLTO SAS

WORLDWIDE MANUAL v1.08



## Thank you for purchasing SymplyLTO Desktop SAS

If you have any support questions that are not addressed in this document then please check our extensive FAQs or submit a support ticket on our [support site](#).

Your feedback is important to us, so please let us know what you think of our products via email [hello@gosymply.com](mailto:hello@gosymply.com)

SYMPPLY provides this publication “as is” without warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose. SYMPPLY may revise this publication from time to time without notice.

### COPYRIGHT STATEMENT

© 2021 SYMPPLY. All rights reserved.

Your right to copy this manual is limited by copyright law. Making copies or adaptations without prior written authorization of SYMPPLY is prohibited.

LTO and Ultrium are trademarks of HP, IBM, and Quantum in the U.S. and other countries. All other trademarks are the property of their respective companies.

# CONTENTS

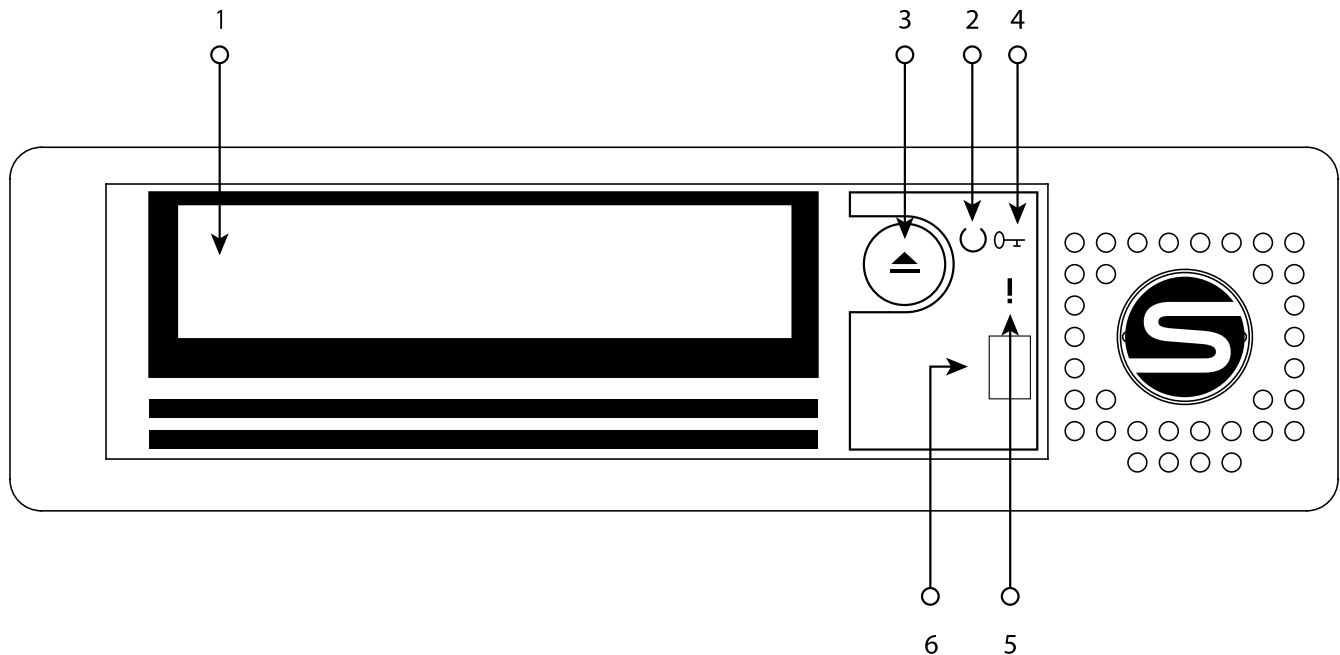
<b>System Requirements</b>	<b>4</b>
<b>SymplyLTO SAS: FRONT</b>	<b>4</b>
<b>LTO Drive and Data Cartridge Compatibility Guide</b>	<b>6</b>
<b>Introducing LTO-9</b>	<b>6</b>
<b>LTO-9 Media Optimization</b>	<b>6</b>
<b>System Specifications</b>	<b>7</b>
Physical	7
Environmentals	7
SymplyLTO sas and Data Cartridge Transport and Storage	7
SymplyLTO Desktop SAS and Data Cartridge Acclimatization Time	8
Encryption	8
IBM Spectrum Archive	8
<b>Installation</b>	<b>9</b>
Unpacking the SymplyLTO Desktop SAS	9
<b>What's in the box</b>	<b>9</b>
<b>Situating your SymplyLTO Desktop SAS</b>	<b>9</b>
Before powering on	9
Connect the SAS Interface Cable	10
Configuring the SymplyLTO Desktop SAS system with a Server/Host	10
<b>Quick Start - Mac</b>	<b>10</b>
<b>Quick Start - Windows 10, Windows Server</b>	<b>10</b>
<b>About Linear Tape File System (LTFS)</b>	<b>11</b>
SymplyATOM (Admin Tape Operation and Management)	11
Third-Party LTFS software support	11
<b>Operating the Tape Drive</b>	<b>12</b>
Loading and Unloading LTO Data Cartridge in the SymplyPRO LTO	12
Write Protect	13
Cleaning the SymplyLTO Desktop SAS drive mechanism	13
<b>LTO Archive Best Practices</b>	<b>14</b>
<b>Troubleshooting</b>	<b>15</b>
Error code on Single-Character Display (SCD)	15
Status Light Information	17
<b>Warranty</b>	<b>18</b>

# SYSTEM REQUIREMENTS

The SymplyLTO Desktop SAS requires a server / host computer that has a SAS interface with a compatible driver. The SymplyLTO Desktop SAS is compatible with Microsoft Windows, RHEL 7.8 and 8.2, SLES 12, Ubuntu 18.04 LTS, macOS Microsoft Windows, RHEL 7.8 and 8.2, SLES 12, Ubuntu 18.04 LTS, macOS\*

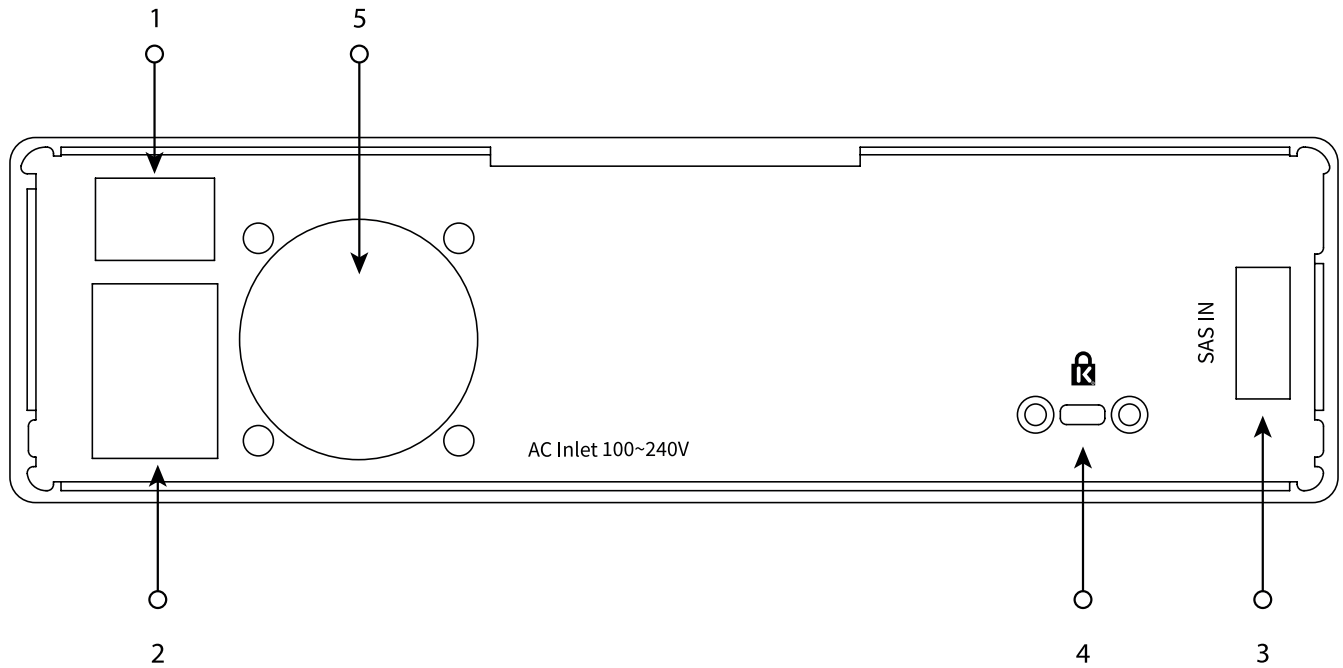
\* Not all of the compatible operating systems listed support LTFs provided by IBM Spectrum Archive. Please check IBM's website for further details.

## SYMPLYLTO SAS: FRONT



Number	Description
1	Half Height LTO Drive
2	Ready Light (Green)
3	Eject Cartridge Button
4	Key Symbol = Encryption Light (Amber)
5	Exclamation Symbol = Fault Light (White)
6	Single-Character Display (SCD) = Error Codes

# SYMPPLYLTO SAS: REAR



Number	Description
1	Power Switch (On/Off)
2	Power Inlet
3	SAS IN Port (used to connect to a SAS host)
4	Kensington Lock
5	Fan

# LTO DRIVE AND DATA CARTRIDGE COMPATIBILITY GUIDE

	LTO-5 Data Cartridge	LTO-6 Data Cartridge	LTO-7 Data Cartridge	LTO-8 Data Cartridge	LTO-9 Data Cartridge
SymplyLTO Desktop SAS-7	Read Only	Read / Write	Read / Write	n/a	n/a
SymplyLTO Desktop SAS-8	n/a	n/a	Read / Write	Read / Write	n/a
SymplyLTO Desktop SAS-9	n/a	n/a	n/a	Read / Write	Read / Write

## INTRODUCING LTO-9

The latest generation of LTO-9 Full Height tape drives provide even higher capacity and performance, and Symply are the first company to offer the drive technology in a variety of form factors including Thunderbolt 3 and SAS connectivity in desktop and rackmount configurations. LTO-9 offers a native capacity of up to 18TB and up to 45TB compressed (assuming 2:5:1 compression). The Full Height drive boasts an uncompressed data transfer rate of up to 400 MBps, 100MBps or 11% faster than the LTO-8 Half Height drives.

The Full Height drives also have advantages over their Half-Height counterparts, supporting much higher load and unload cycles as well as faster seek times. The new LTO-9 tape drive technology is designed to optimize tape performance with the introduction of Open Recommended Access Order (oRAO), this means the Full-Height LTO 9 Tape drives can obtain data up to 73% faster\*. LTO-9 is fully compatible with Linear Tape File System (LTFS), and the LTO-9 drive mechanisms can read and write to the previous generation LTO-8 cartridges.

*\*Based on IBM internal testing of like User Data Sets. Not all users will see these levels of performance improvements as optimization varies according to the number of segments retrieved.*

## LTO-9 MEDIA OPTIMIZATION

LTO-9 media optimization is a new feature introduced for LTO-9 tape drives with LTO-9 media. It is not required for LTO-9 tape drives using LTO-8 media. The increased number of tracks used to write data on tape requires greater precision. Media optimization creates a referenced calibration for each cartridge that enables the tape drive's intelligent alignment to optimize data placement. LTO-9 media optimization enhances LTO tape long-term media durability.

- Media optimization will be performed on the first load only of LTO-9 media during initialization.
- Media optimization is a one-time operation that can be completed on any drive, enabling the media to be used across all tape drives without further optimization.
- Media optimization averages 40 minutes per first load of a cartridge to a tape drive. Although most media optimization will complete within 60 minutes some media optimization may take up to two hours.
- The differing amount of time taken for the one-time optimization to complete has no impact on the performance or functionality of the data cartridge.
- Interruption of the media optimization process is not recommended.
- All LTO-9 media supplied by Symply in-the-box with our LTO-9 product is pre-optimized to save you time.
- Symply offer LTO-9 media for purchase via our network of resellers, this is available with or without pre-optimization performed.

# SYSTEM SPECIFICATIONS

## PHYSICAL

	Form Factor	Drives	LTO Generation	Host Interface	Dimms L x W x H	Weight	Power
SymplyLTO Desktop SAS	Desktop	1	LTO-7 and 8 Half Height	SFF-8088	26.3 x 21.1 x 6.3cm (10.4 x 8.3 x 2.5in)	2.9 kg (6.3 lb)	Internal 75 W (110 V~240 V) Typical 40 W
SymplyLTO Desktop SAS XTH	Desktop	1 or 2	LTO-7 and 8 Half Height	SFF-8088	30.0 x 21.1 x 13.6 cm (11.8 x 8.3 x 5.4 in)	5.0 kg (11.0 lb)	Internal 275 W (110 V~240 V) Typical 80 W
SymplyLTO Desktop SAS XTF	Desktop	1	LTO-9 Full Height	SFF-8088	30.0 x 21.1 x 13.6 cm (11.8 x 8.3 x 5.4 in)	5.8 kg (12.7 lb)	Internal 200 W (110 V~240 V) Typical 50 W

## ENVIRONMENTALS

	Temperature	Humidity	Altitude
Operating	15°C to 35°C (59°F to 95°F)	20% to 80% (non-condensing)	3048 m (10,000 ft)
Non-operating	-40°C to 60°C (-40°F to 140°F)	0% to 90% (non-condensing)	12192 m (40,000 ft)

## SYMPPLYLTO SAS AND DATA CARTRIDGE TRANSPORT AND STORAGE

	LTO-9	LTO-8	LTO-7	LTO-6
Operating Conditions	Recommend: 15°C - 25°C; 20% - 50% RH Allowable: 15°C - 35°C; 20 - 80% RH; 22°C dew point maximum	10°C - 40°C; 10% - 80% RH; 26 C wet bulb maximum		
Short-term Storage condition	See operating conditions	16°C - 35°C; 10% - 80% RH; 26°C wet bulb maximum		
Long-term Storage condition	See operating conditions	16°C - 25°C; 20% - 50% RH; 26°C wet bulb maximum		
Shipping Conditions	-23°C - 49°C; 10% - 90% non-condensing RH; 22°C dew point maximum	-23°C - 49°C; 5% - 80% RH; 26°C wet bulb maximum	-23°C - 49°C; 20% - 80% RH; 26°C wet bulb maximum	

**IMPORT** - Data cartridges stored at a temperature in excess of 52°C (125.6 °F) may suffer permanent damage. It is important that both temperature and humidity should be kept constant, as rapid changes in either are not good for the data cartridges or LTO drives.

## SYMPPLYLTO DESKTOP SAS AND DATA CARTRIDGE ACCLIMATIZATION TIME

Acclimatization time is required if the temperature of the SymplyLTO Desktop SAS drive when opened is different from the temperature of the environment it will be operated in. The recommended initial acclimation time is four hours after the drive has been unpacked.

If there is no danger of condensation (the air is dry) then the drive temperature may be increased more quickly by powering the drive on for a half hour before using the tape drive. If the SymplyLTO Desktop SAS drive is hotter than the maximum allowed operating temperature (35°C / 95°F) there is a danger that the tape may adhere to the read/write head. In this case the Symply LTO drive should be allowed to cool to within the operating temperature range.

It is recommended that the SymplyLTO Desktop SAS product and LTO data cartridges are stored together for 24 hours before use in the environment that they will be used in. This will ensure the correct acclimatization.

## ENCRYPTION

The SymplyLTO Desktop SAS drive is fully compatible with host Application Managed Encryption (AME), using T10 encryption methods. Data encryption is supported with LTO Ultrium 4 and later data cartridges only.

The encryption-enabled drive contains the necessary hardware and firmware to encrypt and decrypt host tape application data. Encryption policy and encryption keys are provided by the host application. A drive digital certificate is installed at manufacturing time. Each drive receives a unique serial number and certificate. The T10 Application can validate each drive instance by checking the drive's digital certificate.

## IBM SPECTRUM ARCHIVE

IBM Spectrum Archive LTFS is a file system that works with LTO tape generation five onwards to access data stored on an IBM tape cartridge. IBM Spectrum Archive uses the file system's format and resources of the operating system (OS) on which it is running to graphically display the contents of a tape cartridge in the OS's graphical user interface (GUI) format – typically a folder/tree structure. Using the host operating system's graphical file manager, reading data on a LTO tape cartridge is as easy as dragging and dropping. Users can run any application designed for disk files against tape data without concern for the fact that the data is physically stored on tape.

IBM Spectrum Archive is integrated into SymplyATOM, for an intuitive user experience.



# INSTALLATION

## UNPACKING THE SYMPPLYLTO DESKTOP SAS

Carefully unpack the SymplyLTO Desktop SAS and store the packaging for future transport. If you need to return the unit for service please make sure you do so in the original or equivalent packing material, or the warranty may be invalidated.

Please inspect the unit for shipping damage. If there is damage, do not install the unit, please report the damage immediately by contacting your place of purchase.

## WHAT'S IN THE BOX

Item	Description
SymplyLTO Desktop SAS	Desktop Half Height LTO-7 or LTO-8 drive with 1 x SAS SFF-8088 interface
SYCBL-ESAS-111-200A	Symply SAS SFF-8088 to SFF-8088 Cable 2m
Power cable	2m (6.5ft) IEC power cord for local region
SYMED-IBM	SymplyLTO Media - Ultrium Data Cartridge Tape
SYMED-IBM-35L2086	SymplyLTO Media - Ultrium Universal Cleaning Cartridge

## SITUATING YOUR SYMPPLYLTO DESKTOP SAS

It is important that the SymplyLTO Desktop SAS is located in a clean environment away from sources of dust. The unit should be orientated in a horizontal position with enough space around the unit for airflow and to insert and eject the data cartridge. The unit should also be kept away from

- Areas with high-traffic footfall, especially if the floor is carpeted
- Areas with moving air such as air conditioners, open windows, fans, and doorways
- The unit should be located off the floor

## BEFORE POWERING ON

Before powering on the system, ensure that none of the ventilation holes are blocked, that there are no obstructions around the system blocking air-flow, that the environment is within the specified operating conditions and that acclimatization time has been allowed.

**Power On Note:** When initially powered on the SymplyLTO Desktop SAS, the drive will perform a hardware Power On Self-Test (POST). The POST checks to make sure that the LTO drive is functioning properly. During POST, the Single Character Display (SCD) flashes several segmented characters. Each character represents a test performed during POST. When POST finishes, the SCD will momentarily light all segmented characters and will then go blank. POST takes approximately 15 seconds.

**Never** turn off or remove power from the SymplyLTO Desktop SAS while a data cartridge is loaded. If the SymplyLTO Desktop SAS is powered off while a data cartridge is installed, then when the system is powered on again, the system will perform a much more intensive POST while the system verifies the integrity of the data on the tape. This extended POST process can take up to 10 minutes, at the end the data cartridge will be ejected.

## CONNECT THE SAS INTERFACE CABLE

Each tape drive is required to have a dedicated bus to the initiator (on the host computer), referred to as point-to-point connection. SAS architecture does not support multiple tape drives connected to a single host adapter port. The maximum SAS cable length that can be used to connect the host adapter to the tape drive is 5.0 m (16.4 ft)

The SAS IN Port is used to connect the SymplyLTO Desktop SAS to the host computer via a SAS cable. Note that the host computer would need a compatible SAS host adapter, SAS cable, and driver to connect to the SymplyLTO Desktop SAS. To connect the device to the host:

1. Ensure the SymplyLTO Desktop SAS is powered OFF
2. Correctly cable the system
3. Ensure the host adapter and the server are configured correctly
4. Connect the local power cord and power on the tape drive

**NOTE** The SymplyLTO Desktop SAS ships with a SFF-8088 to SFF-8088SAS cable, but you may require a SFF-8644 to SFF-8088 cable to connect to your host computer. These are available to purchase via Symply resellers, the part number is SYCBL-ESAS-221-200A.

## CONFIGURING THE SYMPLYLTO DESKTOP SAS SYSTEM WITH A SERVER/HOST

To configure the SymplyLTO Desktop SAS with your Server/Host please refer to the documentation provided by your Server/Host vendor and application software information.

## QUICK START - MAC

Depending on the Mac computer being used, a PCIe SAS Host Bus Adapter (HBA) or a Thunderbolt to SAS adapter would need to connect the SymplyLTO Desktop SAS to the Mac. Once this is installed, along with the required drivers you can connect the SymplyLTO Desktop SAS to the Mac. Power on the tape drive wait 30 seconds, then power on the Mac.

Symply recommend ATTO for providing unrivalled driver and technical support for SAS HBAs and Thunderbolt to SAS adapters for the macOS .

## QUICK START - WINDOWS 10, WINDOWS SERVER

Once the Server/Host and HBA have been configured correctly, then please follow these instructions to configure the SymplyLTO Desktop SAS in Windows 10:

1. Navigate to "Device Manager"
2. Under the "Other devices" category you will see "IBM ULTRIUM-XXX SCSI Sequential Device"
  - a. Right-click and select "Update Driver"
  - b. Click "Browse my computer for drivers"
  - c. Click "Let me pick from a list of available drivers on my computer"
  - d. Select "LTO Tape drive" and click "Next"
  - e. The Windows LTO driver will install

For Windows Server 2016 and 2019 you will need to download and install the IBM LTO Tape driver for the relevant version of Windows Server. These can be downloaded from the Symply [support website](#). Follow the instructions in the installer.

# ABOUT LINEAR TAPE FILE SYSTEM (LTFS)

LTFS makes viewing and accessing tape files easier than ever before. The LTFS format is used with LTO data tapes to allow you to share your data with others as it is supported on the Mac, Windows and Linux operating systems and doesn't use a proprietary data format. With LTFS, the LTO data tape is partitioned in two. One partition holds the content and the other holds the content's index, so the tape can be self-describing to improve archive management.

SymplyLTO Desktop SAS ships with SymplyATOM, a free, intuitive and informative LTFS tape management and operations toolset.

**NOTE:** \* ? < > " | \ are illegal characters in LTFS and are not usable in file names, folder names, or file extensions. Most commercially available LTFS software will handle these illegal characters for you. However, to keep your archives software independent it is best to remove any illegal characters from file and folder names prior to writing them to tape.

## SYMPLYATOM (ADMIN TAPE OPERATION AND MANAGEMENT)

ATOM is an advanced, intuitive and informative tape management and operations toolset specially designed to provide casual and expert-level users equal access to the essential features needed for daily tape operations without resorting to cumbersome and overblown full applications. Additionally ATOM contains extensive easy-to-use single button troubleshooting and diagnostic capabilities along with complete contextual help and assistance tools.

SymplyATOM is available for macOS and Windows. It is designed to work with the SymplyLTO Desktop SAS family of products, and be an out-of-the-box solution for:

- Formatting, mounting reading and writing LTFS tapes
- Diagnostic control
- Log gathering
- Firmware update operations

## THIRD-PARTY LTFS SOFTWARE SUPPORT

While many users with simple LTFS needs may choose to use SymplyATOM as their daily go to. It is good to know that SymplyLTO Desktop SAS is compatible with a wide-range of 3rd party LTFS software applications. If however, you are in a busy professional LTFS archiving environment then we would recommend opting to purchase a LTFS archiving application such as Archiware P5, Hedge Canister, Imagine Products Inc., storageDNA, Tiger Technology Bridge, XenData, or YoYotta LTFS (among others).

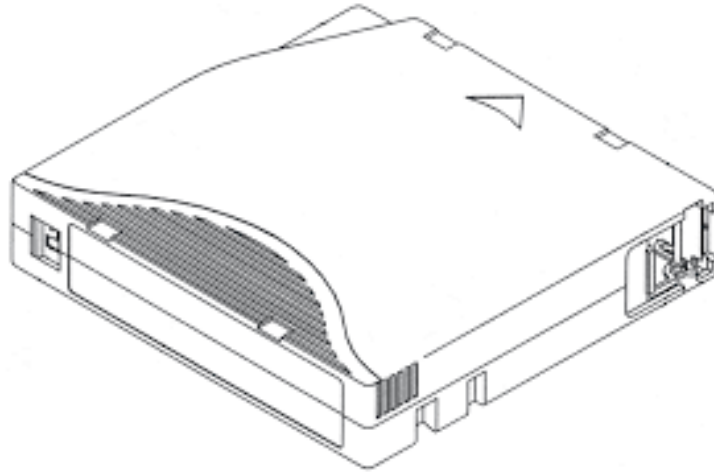
What sets these LTFS applications apart is their use of a database to allow the applications to keep track of your precious digital assets, provide checksums of data archives, managing illegal characters that are not supported by LTFS, and copy the data to the LTFS tape in the most efficient manner. All-in-all this adds up to a much smoother tape archiving experience.

# OPERATING THE TAPE DRIVE

## LOADING AND UNLOADING LTO DATA CARTRIDGE IN THE SYMPPLYPRO LTO

Make sure the SymplyLTO Desktop SAS has completed its Power On Self-Test (POST). When the system is ready the Green Ready Light is illuminated. Do not try to insert a data cartridge if the POST has not been completed and the ready light is not illuminated.

Before inserting the data cartridge check that it is compatible with the LTO generation tape drive, see LTO Drive and Data Cartridge Compatibility Guide (page 6). Insert the compatible LTO tape into the drive in the direction of the arrow on the top of the data cartridge.

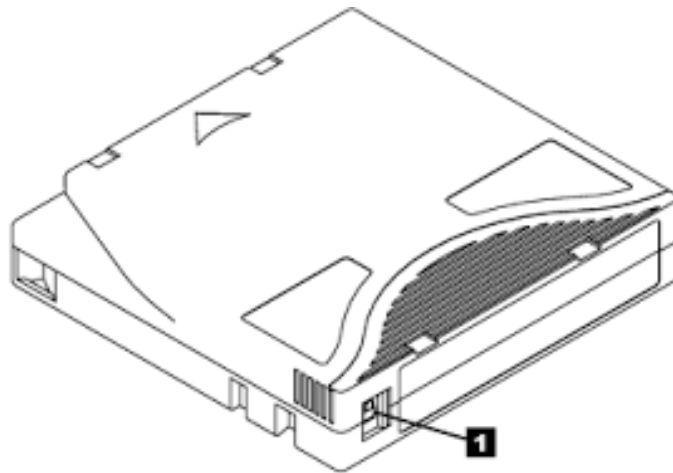


The drive will grab the data cartridge and move it into the LTO mechanism. If an incompatible data cartridge is inserted the Single-Character Display (SCD) will display the error code J. If this occurs, press the Eject cartridge button.

In normal operation to eject the cartridge, press the cartridge eject button. Note that this operation will fail if the data cartridge is in use, for example if the tape is currently mounted. You will need to unmount to the tape from your computer before trying to eject the cartridge from the drive. It is best practice to use an LTFS application such as SymplyATOM provided with the SymplyLTO Desktop SAS, or other applications such as Hedge Canister, YoYotta LTFS, and Archiware P5 to control the tape drive. Always make sure the tape is unmount from the OS before the cartridge is ejected.

**NOTE** Leaving an LTO data cartridge in the SymplyLTO Desktop SAS for long periods of time without use can damage both the data cartridge and the tape drive mechanism.

**IMPORTANT** Do not power the SymplyLTO Desktop SAS off with a data cartridge in the tape drive mechanism. This can damage both the data cartridge and the LTO mechanism. If the SymplyLTO Desktop SAS is powered off with a cartridge inside it will take longer to complete the Power On Self-Test (POST) when the SymplyLTO Desktop SAS is turned back on.



## WRITE PROTECT

All LTO data cartridges have a write protection feature. This is a RED tab that displays a lock symbol when it is moved to the write protected position. Once this is set the data cartridge can only be read from, so it is a very useful feature that prevents accidental overwriting or formatting of a data cartridge. It is generally considered best practice to write-protect each cartridge after you have finished an archiving job.

1	Write protect On / Off
---	------------------------

If an application tries to write to a data cartridge with this feature enabled, the then Single-Character Display (SCD) on the front of the SymplyLTO Desktop SAS will display the error code P.

## CLEANING THE SYMPPLYLTO DESKTOP SAS DRIVE MECHANISM

It is important to remember not to use the SymplyLTO Desktop SAS system in dusty and dirty environments, this can cause damage to the LTO data cartridges and the LTO mechanism itself. In normal operation the drive heads will need to be cleaned periodically, when cleaning is required the Single-Character Display (SCD) on the front of the SymplyLTO Desktop SAS will display the error code C.

**NOTE** This is a capital “C” not a lowercase “c” which indicates a LTO-9 tape optimization is in progress.

The SymplyLTO Desktop SAS ships with a cleaning cartridge. When and only when the SCD displays C, you should insert the cleaning cartridge into the mechanism, only ever in the direction of the arrow on the top of the cleaning cartridge. The SymplyLTO Desktop SAS will automatically start the cleaning process and the cleaning cartridge will be ejected when the cleaning is complete. In the unlikely event that after the cleaning has completed the SCD still shows a C error code, then [raise a support ticket](#), do not use the cleaning cartridge again.

It is important to clean the SymplyLTO Desktop SAS system when prompted to do so, but it is equally important only to do this when prompted by the SymplyLTO Desktop SAS. Cleaning the drive without being prompted to so will actually reduce the lifespan of the LTO mechanism and may invalidate your warranty.

Cleaning cartridges have a finite life span, cleaning cartridges supplied with the SymplyLTO Desktop SAS will last for a maximum of 50 cleaning cycles. If you need additional cleaning cartridges they can be purchased via Symply authorized .

# LTO ARCHIVE BEST PRACTICES

- Always make at least two archive copies and keep them in different locations to protect against loss or damage
- Once you have written the LTO tape we recommend to slide the tab on the LTO tape cartridge to closed, this will write protect the tape
- If you have intermittent power, make sure both the computer and tape drive are on an Uninterruptible Power Supply (UPS)
- Do not unplug the Thunderbolt cable while the system is in use as this can lead to data corruption.
- **Type-M** (also known as M8): We do not recommend using Type-M for archiving, the tapes are only readable in an LTO-8 drive (not in an LTO-7 or LTO-9 drive). The format was a short-term solution to historical availability problems with LTO-8 media.
- **Compression:** Using tape compression is recommended internally the LTO drive will compress files that are uncompressed. The compression is lossless and varies from 1:1 to 2.5:1. Note that the LTFS application you are using needs to support compression. Typically only text documents, spreadsheets and other office type documents can be compressed to the 2:5:1, it is unlikely that you will see the advertised compressed capacities of data cartridges.
- **Source media:** The speed of the source media may affect the performance of the tape drive. Data sources such as slower NAS systems or USB connected drives might not perform to the recommended minimum sustained speed of 100MB/sec to allow the SymplyPRO LTO drives to function optimally.

If the connection to the SymplyLTO Desktop SAS drive is too slow, the drive will run out of data and the tape will have to keep rewinding and start writing again. This is sometimes called “Shoe Shining” and you will be able to hear the behaviour if you listen to the sound the tape drive is making. Shoe Shining will mean the average transfer time to the LTO drive will drop drastically. This behavior will not damage the LTO data cartridge, but if it is a constant issue it will increase the wear on the LTO drive heads in the mechanism and reduce the life-span of the LTO drive.

- **TAR / PAX Format:** TAR and PAX are both older methods of storing files as a bundle on a LTO tape. There is no directory like LTFS and so the tapes cannot be mounted on the desktop as they can be with LTFS. The SymplyPRO LTO family is compatible with applications that use these formats, but they are rare these days.
- **WORM Tapes:** LTFS does not support WORM (Write Once Read Many times), but the SymplyLTO Desktop SAS does support WORM media if you have an application that supports this feature of LTO.
- **LTFS Formatting and Labels:** SymplyATOM uses the current version of the open standard which is version 2.4.4. LTFS tapes must be formatted with a unique six character label that should match the barcode label on the tape for ease of tracking media.
  - The code can have the letters A-Z and numbers 0-9. For example: 123456, ABCDEF, SY1234 etc.
  - After formatting an LTFS tape you cannot change the label. To change the label you have to reformat the LTFS tape.
  - The tape barcode label is eight characters. This comprises the user selectable six characters followed by the LTO generation identifier L5, L6, L7, L8, and L9. For example: 123456L8, ABCDEFL9, SY1234L7 etc.
  - We recommend not to use / \* ? < > “ | \ : characters or spaces in file and directory naming as these are not supported across all operating systems. This is best practice for file and path naming.
  - We recommend to keep the file names less than 250 characters and a path name of less than 1024 characters.
- **Deleting files from LTFS tapes:** If files or folders are deleted from the LTFS tape using Windows Explorer, the macOS Finder, or via command line they will be removed from the tape directory. Note, however, that deleted space is not recovered in this process. Once any changes are made to the LTFS tape it is recommended the tape is unmounted.

If a large number of files need to be removed from the LTFS tape it is best to reformat the tape and start again. But make sure you have copies of the tape media you need first.

- **Moving files from LTFS tapes:** Files can be moved using the OS (Finder/Explorer), and files and folders can be renamed. However, folders cannot be moved on tape. Once any changes are made to the LTFS tape it is recommended the tape is unmounted.

- **Cleaning SymplyLTO drives:** It is important to remember not to use the LTO drives in dusty and dirty environments, this can cause damage to the LTO data cartridge and the LTO mechanisms. In normal operation the drive heads will need to be cleaned periodically, when cleaning is required the tape drive will display “C” on the front display. When this happens simply insert an approved cleaning cartridge into the tape drive and the cleaning process will start automatically.

It is important not to clean the LTO mechanism routinely, only do so when you are prompted to do so by the “C” message on the front of the tape drive. If you clean the LTO mechanism without being prompted this will damage the LTO drive head over time and void the warranty.

- **LTO cartridge health and errors:** LTO cartridges are designed to be read and re-written hundreds of times in their lifetime. For most archive applications there should never be any issues.

When an LTFS tape is mounted by SymplyATOM, and indeed some other LTFS applications, the application queries the tape and gets the information regarding any errors on the tape media, as described here.

- **Recovered Write Errors:** This is when the LTO drive rewrites data when retries have occurred. This can have the effect of slightly reducing the amount of capacity available on the tape and can commonly occur on new LTO media. It is nothing to be concerned about if the rates are low, but large counts in the hundreds or thousands can indicate poor tape quality or a potential problem with the tape drive
- **Recovered Read Errors:** This indicates that the tape drive has had to retry a read again. It is nothing to be concerned about if the rates are low, but large counts in the hundreds or thousands can indicate poor tape quality or a potential problem with the tape drive
- **Permanent Read and Write Errors:** These happen when the tape drive fails to read or write to the LTO tape. These errors can be caused if an LTO drive is powered off or disconnected while a tape is loaded. They can also be caused by a faulty tape drive, or damage to the tape itself caused by improper handling.

## TROUBLESHOOTING

For more information and FAQs please visit [support.gosymply.com](http://support.gosymply.com)

### ERROR CODE ON SINGLE-CHARACTER DISPLAY (SCD)

Error Code	Description
1	The SymplyLTO Desktop SAS has detected system temperature outside the operational range. Please ensure that room temperature is between 15°C and 35°C (59°F to 95°F). Also check for a blocked fan or other obstructions blocking air flow. If the fan is operating correctly and room temperature is within parameters, please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a>
2	The SymplyLTO Desktop SAS has detected a problem with either the incoming power or an internal power issue. Please ensure the system is connected to clean wall power using the power cord supplied. To ensure incoming power is good, connect the system to a different outlet or power strip. Do not connect using extension cords. If the problem still persists please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a>
3	The SymplyLTO Desktop SAS has detected an internal microcode or drive problem. This may require a simple power cycling, but before doing so please open SymplyATOM and choose Retrieve Log. Then power off the system after ejecting any data cartridge (if there is one in the drive), wait 20 seconds, then power back on. If the problem still persists please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a>
4	The SymplyLTO Desktop SAS has detected an internal microcode or drive problem. This may require a simple power cycling, but before doing so please open SymplyATOM and choose Retrieve Log. Then power off the system after ejecting any data cartridge (if there is one in the drive), wait 20 seconds, then power back on. If the problem still persists please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a>
5	The SymplyLTO Desktop SAS has detected a drive error. This may require a simple power cycling, but before doing so, please open SymplyATOM and choose Retrieve Log. Then power off the system after ejecting any data cartridge (if there is one in the drive), wait 20 seconds then power back on. If the problem still persists please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a>

Error Code	Description
6	<p>The SymplyLTO Desktop SAS has detected an internal error drive or media error. This may require a simple power cycling, but before doing so please open SymplyATOM and choose Retrieve Log. Then power off the system after ejecting any data cartridge (if in the drive), wait 20 seconds, then power back on.</p> <p>Once the drive has powered back on, re-insert the same data cartridge that has the potential issue. If the drive displays an Error 6 please try a new data cartridge to see if the Error 6 code persists. If the error does not clear when using a new data cartridge then please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
7	<p>The SymplyLTO Desktop SAS has detected a media error due to a faulty tape cartridge or an invalid tape cartridge. Ensure the tape cartridge is the correct media type. If the tape cartridge is the correct media type, try another tape cartridge. If the problem occurs with multiple tape cartridges, use the following procedure:</p> <p>If possible, run the tape cartridge in a different tape drive. If the operation in the other unit fails and 6 or 7 displays, replace the media.</p> <p>If the problem persists, please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
8 or E	<p>Internal Communication Error. The SymplyLTO Desktop SAS drive has determined that there is either an internal or external SAS port interface problem. Error will clear after 10 seconds or power cycle. If the problem persists, please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
A	<p>Drive Error. The SymplyLTO Desktop SASdrive has determined that a drive hardware failure has occurred, most likely as a result of performance degradation. This may be linked to degraded data cartridges. The error condition will clear when the drive is powered off. Please try an alternative data cartridge. If the problem persists, please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
C	<p>Drive needs to be cleaned. The SymplyLTO Desktop SAS drive has determined that the tape drive needs to be cleaned. When this message is displayed please insert the Cleaning Tape that was supplied along with the SymplyLTO Desktop SAS into the tape drive. Once the Cleaning Tape has been inserted the cleaning process will start automatically. At the end of the process the Cleaning Tape will be ejected and the error will be cleared.</p> <p>It is possible that dirty or faulty tapes can cause the Cleaning Error to be displayed. If the Cleaning Error is coming on regularly it is likely that you have one or more bad or dirty tapes and they should be retired and new media used.</p> <p>Do not routinely use a Cleaning Tape in the SymplyLTO Desktop SAS as this will damage the tape heads over time and may void your warranty. Only insert a Cleaning Tape when prompted to do so by the SymplyLTO Desktop SAS drive.</p> <p>If the Error C persists after the drive has been cleaned do not clean the drive again. Please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
J	<p>Incompatible Media. The SymplyLTO Desktop SAS drive has determined that the drive has been loaded with a data cartridge that is not supported. For example, LTO-6 media loaded into a LTO-8 drive mechanism. Always make sure that you purchase your media from a trusted source. Symply recommends using Barium Ferrite (BaFe) LTO media where possible.</p> <p>If the problem persists and you are confident you are using the correct media, please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
P	<p>Write Protect. A write operation has been attempted on an LTO data cartridge that has write protection enabled. If you want to write to the LTO data cartridge, then unload the LTO cartridge (making sure the tape is unmounted from the OS) and disable write protection (move the red switch so the graphic lock sign is no longer visible).</p> <p>If the red switch is not covering the hole, but the drive is still reporting the error P, please submit a support ticket at <a href="http://support.gosymply.com">support.gosymply.com</a></p>
u	<p>Microcode update is in progress. The SymplyLTO Desktop SAS drive is in the process of uploading and flashing new firmware code to the tape drive. SymplyATOM allows you to upgrade firmware on the SymplyLTO Desktop SAS tape drive, but please only do this when you have been instructed to do so by a member of the Symply Support Team.</p>
c	<p>Characterization (Optimization) is in progress on an LTO-9 tape drive with an LTO-9 data cartridge inserted. Media optimization will be performed on the first load of LTO-9 media during initialization.</p> <p>Media optimization averages 40 minutes per first load of a cartridge to a tape drive. Although most media optimization will complete within 60 minutes some media optimization may take up to two hours. Interruption of the media optimization process is not recommended.</p> <p>For further information please see <a href="#">FAQs</a></p>



## STATUS LIGHT INFORMATION

Display	Single-Character Display (SCD)	Ready LED (Green)	Fault LED (Amber)
Standby Operation	Blank	On	Off
Activity Operation (tape in movement)	Blank	Flashing	Off
Error	Solid Character	Off	Flashing
Power On, or Power Cycle	POST Display Sequence	Off	On

Display	Fault Light Status	Encryption status light (key symbol)	Single-Character Display (SCD)	SCD Dot	Description
Off	Off	Off	Off	Off	The drive is powered off
Solid Green	Off	On or Off	Off	Off	The drive is powered on but is idle
Flashing Green @ 1Hz	Off	On or Off	Off	Off	The drive is carrying out standard operations
Flashing Green @ 1Hz	Off	Off	Off	Off	If the drive contained a data cartridge when powered off, the drive undergoes an extended POST process when turned back on as the tape rewinds slowly. This can take up to 10 minutes. The light stops blinking and becomes solid when the drive completes the recovery process and is ready for standard operations. To eject the cartridge press the eject button.
Off	Solid Amber	Off	Displaying Error Code	On or Off	The drive is displaying an error code on the SCD. See SCD Error code table.
On or Off	On or Off	On or Off	Displaying random characters, then blank, then displaying random characters	On or Off	During power on or a drive reset, the SCD displays the following: 1) SCD will display random characters (no LEDs on) 2) SCD will display random characters (LEDs - green on, amber off) 3) SCD will display random characters (LEDs - green off, amber on) 4) SCD will display [8] (LEDs - green off, amber on). 5) SCD will go blank (LEDs - green on, amber off) after the power is turned on or after the drive is reset. If an error is detected during the POST process it is displayed on the SCD. See SCD Error code table.
Off	Flashing Amber @ 1Hz	Off	Displaying Error Code	Off	An error has occurred and the drive or media may require attention, or cleaning. See SCD Error code table.
Off	Flashing amber @ 2Hz	Off	Off	Off	The drive detected an error and is performing a recovery. It will be reset automatically

# WARRANTY

The SymplyLTO Desktop SAS system comes with a limited three (3) year warranty, but with the option to purchase an upgrade to a five (5) year warranty at the time of purchase, or within thirty (30) days of the original purchase. Terms and conditions apply.

Warranty and technical support service can be accessed at [support.gosymply.com](https://support.gosymply.com)

SYMPLY ("the Company") warrants its products will be free from defects in material and workmanship for three years from the date of purchase of the product.

This Limited Warranty only applies to the original purchaser of the product and is not transferable to subsequent owners.

This Limited Warranty is void if the product is subjected to abuse, misuse, abnormal, excessive or improper conditions (including, without limitation, attempts to utilize the product under any condition that exceeds its design capabilities, or any other use beyond the use specified in any product instructions), or if the product is altered or modified in any manner. This Limited Warranty does not cover damage to the product due to external causes (including, without limitation, accident, liquids, chemicals, oxidation, corrosion, or exposure to the elements), or problems caused by use of parts and components not supplied by the Company.

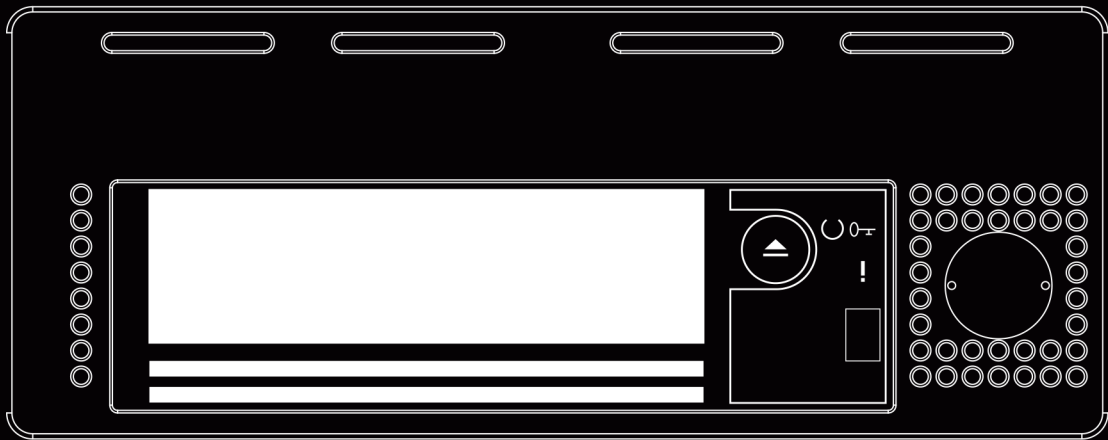
The sole remedy under this Limited Warranty is product repair, replacement, or refund of the purchase price, at the sole discretion of the Company. In order to make a claim the purchaser must ship the product to the Company at the purchaser's expense, together with proof of purchase and a description of the nature of the defect. The Company will not be held responsible for any product that is damaged or lost in transit to the Company.

PURCHASER AGREES THAT SYMPLY SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, SECONDARY OR CONSEQUENTIAL DAMAGES, OR FOR THE DAMAGE, INJURY, OR LOSS OF LIFE, PROPERTY OR OTHER PRODUCTS THE PURCHASER CONNECTS TO THE PRODUCT, OR LOSS OF REVENUE OR DATA, WHETHER BASED ON CONTRACT, TORT, PRODUCTS LIABILITY OR ANY OTHER LEGAL THEORY, EVEN IF THE DAMAGE, INJURY OR LOSS IS CAUSED BY THE NEGLIGENCE OR OTHER FAULT OF SYMPLY. THE FOREGOING WARRANTY IS THE ONLY WARRANTY MADE BY SYMPLY, AND SYMPLY MAKES NO OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This Limited Warranty shall be governed by the laws of England and each party hereby submits to the non-exclusive jurisdiction of the English courts.







[www.gosymply.com](http://www.gosymply.com)  
[support.gosymply.com](mailto:support.gosymply.com)  
[hello@gosymply.com](mailto:hello@gosymply.com)