Sun™ StorEdge™ MLR 25 Gbyte Tape Drive Specifications

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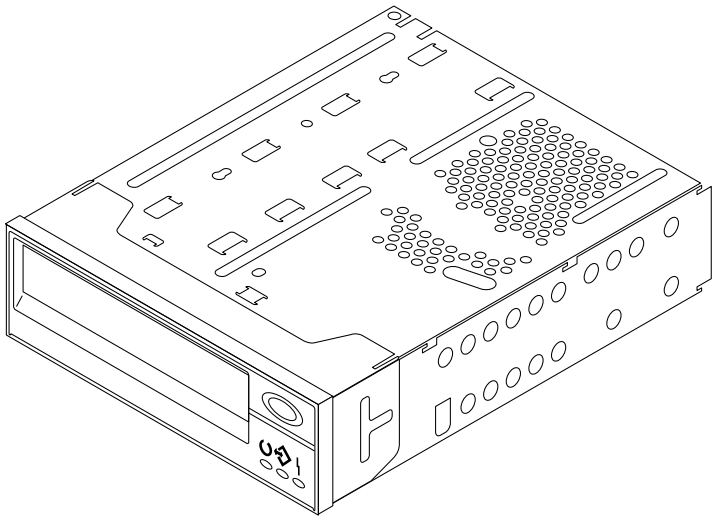
About the Tape Drive

The Sun™ StorEdge™ MLR 25 Gbyte tape drive is equipped with an intelligent controller and an embedded small computer system interface (SCSI). Data is transferred at 2 Mbytes per second from a 2 Mbyte buffer. The SCSI burst rate is 20 Mbytes per second. The tape rewind speed is approximately 2.67 m/s (105 ips).

This SCSI device is in compliance with ANSI X3.131 and QIC storage device format standards.



Installation

The procedure for installing this device is covered in your enclosure or system documentation.

Software Commands

For information about software commands, refer to the *Solaris Handbook for SMCC Peripherals* or the *AnswerBook* documentation for your operating system. The *Solaris Handbook for SMCC Peripherals* also describes how to determine which SCSI target IDs are available and how to configure your system after installation.

Operating System Modifications

Operating system modifications are required for the Solaris™ 2.5 and later environments. See the product notes which accompany this documentation.

Modifying Configuration Files

Depending upon the operating system you have, follow the appropriate procedures.

SunOS 5.x Operating Environments

For optimum performance on systems running SunOS releases 5.5, 5.5.1, 5.5.1 HW 4/97, 5.5.1 HW 8/97 and 5.6, you must modify the `st.conf` file.

Read this entire procedure before editing the `st.conf` file.

Note – The syntax is critical. Verify the placement of commas, semicolons, and beginning and ending quotation marks. Some numerical fields are preceded by `0x`.

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1. **Become superuser and make a copy of the original** `st.conf` **file**`/kernel/drv/st.conf` **as a backup (**`st.conf.old`**).**

```
%su
Password:

#cp /kernel/drv/st.conf st.conf.old
```

2. **Edit the** `st.conf` **file.**

   Using an editor, scroll through the `st.conf` file to the following line:

```
# tape-config-list=
```

   a. **Delete the # character that begins the line, if it has not already been removed. (# = comment line).**

   b. **Using the editor, continue to scroll until you come to the following line entry:**

```
# "TANDBERG TDC 4200",    "Tandberg 2.5 Gig QIC", "TAND-25G-
FIXED",
```

   c. **On the next lines, add the following entry exactly as shown**

```
"TANDBERGMLR3",  "Tandberg 50 Gig QIC",   "TAND-50G-VAR",
```

Note – Do not use a # character at the beginning of the line just added. The # character is used to comment-out a specific line entry.

Note – If multiple devices are enabled (lines uncommented), only the *last* uncommented line with this format needs to end with a semicolon. All previous lines with this format *must* end with a comma.

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   d. **Using the editor, continue to scroll until you come to the following line entry:**

```
TAND-25G-VAR   =   1,0x37,0,0x967b,1,0x00,0;
```

e. On the next line, add the following entry exactly as shown:

```
TAND-50G-VAR     =  1,0x37,0,0x963b,4,0xA0,0xD0,0xD0,0xD0,3;
```

Note – Do not begin this line with a # character.

Note – This should be the last line entry and *must* end with a semi-colon.

---

f. Save the file as `st.conf`**.**

3. **Halt the system following the normal procedure.**
4. **Reboot the system with the** `-r` **option to recognize the drive:**

```
ok boot -r
```

Watch the boot messages for any indications of problems with the `st.conf` entry.

Note any indicated line numbers. If any error messages occur, edit the `st.conf` file again and then reboot.

5. **Install a tape cartridge in the tape drive and allow the drive to fully load the cartridge.**
6. **Verify that the** `st.conf` **entry is correct.**

```
%mt -f /dev/rmt/0 status
```

Note – The following Solaris patches are required to get correct output from the `mt status` command for Solaris releases 2.5 and 2.5.1. No patch is required for Solaris releases 2.6 and later.
Solaris 2.5 Patch # - 103870-3, Solaris 2.5.1 Patch # - 103857-10

You may need to replace the 0 with 1, 2, and so on, until you find the number that the system has identified for this drive.

- `Tandberg 50 Gig QIC tape drive` indicates that the tape drive is correctly recognized. The specific Sense Key returned is usually not an issue.
- `No Additional Sense` indicates that there are no error conditions.
- `Unit Attention` indicates that the drive has just been powered on or that a tape has just been inserted.

Operation on a Narrow SCSI Bus

If you install the MLR 25 Gbyte tape drive on a narrow SCSI bus, and the bus is controlled by the glm SCSI device driver, you must modify certain configuration parameters for the glm device driver. Specifically, you must create a `glm.conf` configuration file that disables wide SCSI negotiation with the MLR tape drive. Otherwise, multiple SCSI error messages will occur during the operating system boot sequence and during subsequent operation of the tape drive.

Before using the MLR 25 Gbyte tape drive on such a system, become superuser and create the file `/kernel/drv/glm.conf` with the following contents:

```
name="glm" parent="/pci@1f,4000"
       unit-address="3"
       target5-scsi-options=0x5f8;
```

These settings disable wide SCSI negotiations for target 5 (the MLR tape drive) on the internal SCSI bus. For additional details about the glm driver and the `glm.conf` configuration file, please see the `glm(7d)` man page.

Undesired Responses from the Drive

- `SCSI tape drive` indicates the `st.conf` entry is incorrect. You must edit the `st.conf` file and reboot until you no longer see `SCSI Tape Drive`.
- `No tape loaded or drive offline` indicates there is no cartridge in the drive or that the cartridge is not yet loaded. Install a cartridge or wait for the cartridge load to complete and retry the `mt status` command.
- `No such file or directory` indicates there is no tape drive attached to that `rmt` (remote) number. Try another `rmt` number.
- `Tandberg 2.5 Gig QIC tape drive` indicates you need to install a Solaris patch to display the correct output.

Other Sources of Information

- Check the man pages for additional information on software commands.

The man page for the `mt` command lists numerous helpful commands. This is accessed by typing `man mt`.

Cleaning

To maintain reliable operation, clean the tape drive after every 50 hours of use, or when the yellow cleaning LED is lit. Clean the drive more often if you use it in a particularly dusty environment or operate it infrequently.

Caution – Do not use cleaning cartridges with the following part numbers as they do not perform an adequate cleaning of the tape drive:
Cleaning cartridge 5677
Cleaning cartridge 5678

Use the Tandberg cleaning cartridge (P/N 005678-1), or equivalent. Follow the instructions included with the kit.

Preventive Maintenance

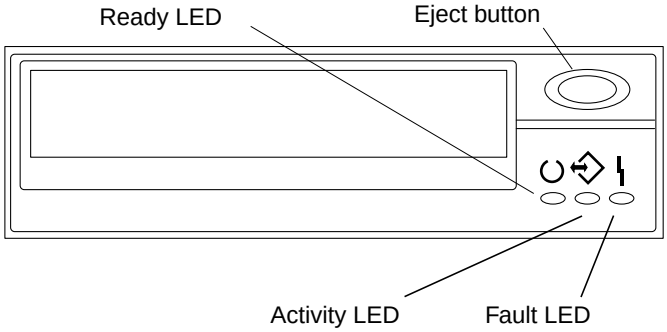
Using a New MLR 25 Gbyte Data Cartridge

When using a new MLR 25 Gbyte tape cartridge for the first time, the read/write head of the MLR tape drive should be cleaned:

- After the first full backup operation is performed; *or*
- After the first 6 to 8 hours of use.

Panel Descriptions

Front Panel Controls and Indicators



- Ready LED - Steady green indicates a cartridge is loaded.
- Activity LED - Flashes green during tape activity
- Fault LED - Steady amber indicate heads need cleaning
- Fault LED - Flashing amber indicates a hard failure

Back Panel Connections

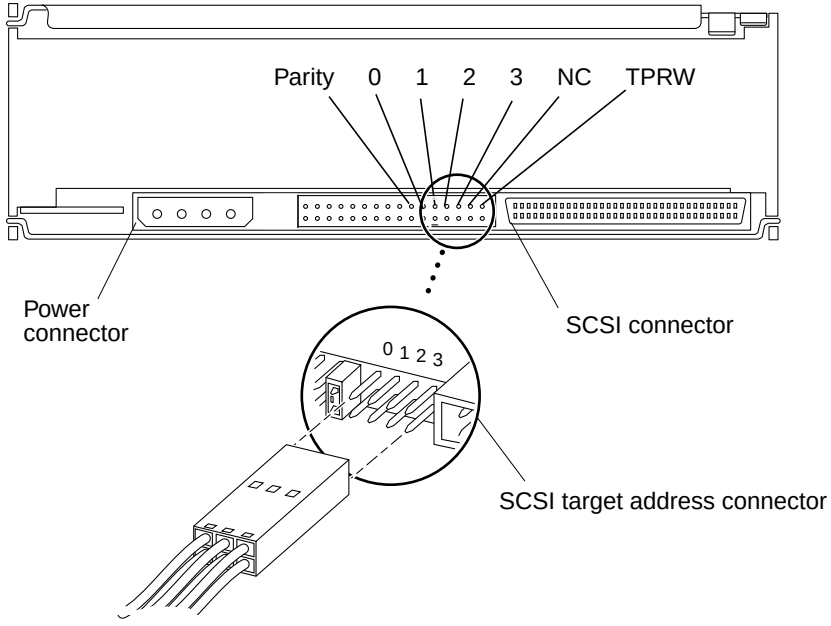


TABLE 1 Selecting the SCSI ID

ID	SEL 3	SEL 2	SEL 1	SEL 0
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON

Note – Typically SCSI ID7 is used by the SCSI host adapter card.

Inserting a Tape Cartridge

1. **Check that there is no drive activity.**

Caution – Use a software command such as `mt` to check for drive activity before ejecting the tape, or data might be corrupted. The front-panel LED indicates only that there is a tape in the drive.

2. **Push the eject button.**
3. **Verify that the tape cartridge write protect switch is set correctly.**

   If the arrow is pointed towards the lock symbol, the tape is write protected.
4. **Insert the cartridge face up into the drive.**
5. **Push the tape cartridge in and the drive will load the tape automatically.**

Tape Cartridge Information

This tape drive uses 25 Gbyte MLR tape cartridges, which have a maximum storage capacity of 25 Gbytes (non-compressed). The storage capacity can be up to 50 Gbytes with a 2:1 compression ratio. The compression ratio varies depending on the data pattern. The cartridges do not require preformatting.

Cartridge Storage Capacity

Format	Length	Capacity	Read/Write
QIC-25GB	457m (1500 ft.)	25.0 Gbytes	Read / Write
QIC-16GB	356m (1200 ft.)	16.0 Gbytes	Read / Write
QIC-4GB	457m (1500 ft.)	4.0 Gbytes	Read Only
QIC-2GB	356m (1200 ft.)	2.5 Gbytes	Read Only
QIC-1000	232m (760 ft.)	1.0 Gbytes	Read Only
QIC-525	311m (1020 ft.)	525 Mbytes	Read Only
QIC-150	183m (600 ft.)	155 Mbytes	Read Only
QIC-120	183m (600 ft.)	120 Mbytes	Read Only

Thermal Conditioning

To assure proper thermal conditioning, keep the cartridge at the actual operating temperature as the drive for 4 hours.

Caution – Tape is a very hygroscopic medium. If exposed to a high humidity environment over some period, it requires a special procedure to bring a cartridge back to normal humidity condition, even if the humidity level during this “dry-out” period is kept very low.
Please be aware that an environment with a high humidity may not only occur in areas with a natural high humidity, but also in areas with normal or even low humidity.
A typical example may be a cartridge placed in its packaging box and cooled down during transportation. The relative humidity inside the box may increase; and over time affect the relative humidity of the tape itself.
Running high humidity tapes over a long period of time may severely reduce the lifetime of the drive’s magnetic head. It may also drastically reduce the lifetime of the tape.
If in doubt, always let a cartridge “dry out” outside the packaging box in a normal humidity environment (<50-65% relative humidity at ±20°C) for at least 3 to 4 days prior to use.

Tensioning Pass

When you insert a blank tape cartridge for the first time, or if a tape has been stored for a long period of time, run it from one end to the other. This is called a tensioning pass and ensures an even distribution of tension throughout the tape.

Refer to the *Solaris Handbook for SMCC Peripherals* that corresponds to your operating system for more information.

For Solaris 2.x type:

```
% mt -f /dev/rmt/0 retension
```

Handling and Storage

- Keep cartridges away from anything magnetic.
- Store cartridges in a dust-free environment, upright on edge rather than flat.
- Keep cartridges away from direct sunlight and sources of heat, cold, or humidity.

Environmental Specifications

Temperature			
Operating[1]	5 to 40°C, 10°C / hr, 10°C / hour gradient		
Nonoperating	-30 to +60°C, 10°C / 30 min, 1°C / min gradient		
Relative Humidity			
Operating	20 to 80% (wet bulb temperature of 26°C)		
Nonoperating	5 to 90%		
Shock			
Operating	49 m/s^2 (5G), half sine wave, 11 ms duration		
Storage	490 m/s^2 (50G), half sine wave, 11 ms duration (IEC-68-2-27)		
Vibration			
Mode	**Frequency**	**Peak Displacement**	**Acceleration**
Operating	5-100 Hz 150-500Hz	-- --	0.5G 0.1G
Storage	5-58 Hz 58-500Hz	0.150 mm ±10% --	-- 2.0G
Transport	5-12 Hz 12-500Hz	3.5 mm ±10% --	-- 2.0G
Altitude			
Operating Nonoperating Storage	4000m (13,000 ft.) 13,000m (40,000 ft.) 13,000m (40,000 ft.)		

1. Due to additional heat coming from internal friction in the cartridge, the maximum surrounding temperature should not exceed 40 degrees Celsius.

Physical Characteristics

Height	43 mm (1.69 in)
Width	149 mm (5.87 in)
Depth	213 mm (8.38 in) (Including a bezel thickness of 8.0 mm (0.31 in)
Weight	1.1 kg (2.4 lbs)

Power Requirements

Standby	7 W
Operation	18.3 W