

**LTO Ultrium Data Capacity, Data Transfer Rate and Minimum Transfer Rate**

Fujifilm Linear Tape-Open (LTO) Ultrium Data Cartridge generations 1 – 3 employ Fujifilm’s World-renowned ATOMM technology. Fujifilm LTO Ultrium 4 media is the first midrange data storage tape product to employ Fujifilm’s NANOCUBIC technology, which powers Enterprise 3592 and T10000 tape products manufactured by Fujifilm. Also new to LTO-4 is drive-level data encryption capability.

<b>LTO Ultrium Tape Media</b>	<b>Drive Model</b>	<b>Data Capacity Native / Compressed</b>	<b>Data Transfer Rate Native / Compressed</b>	<b>Speed Matching Minimum Data Rate Native / Compressed</b>
LTO Ultrium 4 & Ultrium 4 WORM	IBM LTO-4	800/1600 GB	120 / 240 MB/sec	30 / 60 MB/sec
	HP LTO-4		120 / 240 MB/sec	40 / 80 MB/sec
	IBM LTO-4 [HH]		120 / 240 MB/sec	31 / 62 MB/sec
	Quantum LTO-4 [HH]		120 / 240 MB/sec	37 / 74 MB/sec
	HP LTO-4 [HH]		80 / 160 MB/sec	33 / 66 MB/sec
LTO Ultrium 3 & Ultrium 3 WORM	IBM LTO-3	400/800 GB	80 / 160 MB/sec	40 / 80 MB/sec
	HP LTO-3		80 / 160 MB/sec	27 / 54 MB/sec
	Quantum LTO-3		68 / 136 MB/sec	31 / 62 MB/sec
	Quantum LTO-3 [HH]		68 / 136 MB/sec	20 / 40 MB/sec
	Tandberg LTO-3 [HH]		60 / 120 MB/sec	30 / 60 MB/sec
	IBM LTO-3 [HH]		60 / 120 MB/sec	30 / 60 MB/sec
	HP LTO-3 [HH]		60 / 120 MB/sec	20 / 40 MB/sec
LTO Ultrium 2	IBM LTO-2	200/400 GB	35 / 70 MB/sec	17.5 / 35 MB/sec
	Quantum LTO-2		34 / 68 MB/sec	12 / 24 MB/sec
	HP LTO-2		30 / 60 MB/sec	10 / 20 MB/sec
	Quantum LTO-2 [HH]		26 / 52 MB/sec <sup>(1)</sup>	12 / 24 MB/sec
	HP LTO-2 [HH]		24 / 48 MB/sec	8 / 16 MB/sec
	IBM LTO-2 [HH]		24 / 48 MB/sec	12 / 24 MB/sec
	Tandberg LTO-2 [HH]		24 / 48 MB/sec	12 / 24 MB/sec
LTO Ultrium 1	Tandberg LTO-1 [HH]	100/200 GB	16 / 32 MB/sec	N/A
	Quantum LTO-1		16 / 32 MB/sec	8 / 16 MB/sec
	HP LTO-1 [HH] <sup>(2)</sup>		16 / 32 MB/sec	6.7 / 13.4 MB/sec
	HP LTO-1		15 / 30 MB/sec	6 / 12 MB/sec
	IBM LTO-1		15 / 30 MB/sec	N/A
	IBM LTO-1 [HH]		7.5 / 15 MB/sec	6 / 12 MB/sec

- Manufacturers’ drives shown; these same drives can be found marketed under many other hardware brands. Not all drive models represented above are currently shipping; some models are retired by the manufacturer.
- Certance (former Seagate Removable Storage Solutions Division) LTO drives now shown as Quantum drives. Quantum LTO Ultrium Drives: former Seagate RSS Division/Certance was acquired by Quantum 12/2004.
- (1) Enhanced speed (26 MB/sec Native) Quantum LTO-2 half-height drive; firmware revision upgrade 2005.
- (2) HP LTO-1 HH drive model 232 has a higher data transfer rate versus HP’s LTO-1 HH model 215 drive.
- Transfer Rate is drive dependent; where rate varies by drive interface – the faster model is shown. Current transfer rate may be different from shown due to model upgrade or model substitution.
- Speed Matching: as long as the data supply to the tape drive is ≥ the minimum, the tape drive will be able to stream. This can improve media and transport life by reducing repositions.
- HH indicates Half-Height form factor drives; all other drives are Full-Height models.

- Compressed values assume 2:1 compression. • Nominal Values Shown.
- One GB equals 1,000,000,000 bytes. One MB equals 1,000,000 bytes.

With the exception of IBM’s first generation Full-height LTO-1 Drive and the Tandberg Storage Half-height LTO-1 (introduced Q1-2006) Drive, LTO Ultrium drives offer “speed matching” features.

How the speed matching features function is different among manufacturers and their different drive models. In general, a speed matching feature will slow the drive’s read/write transfer rate speed with *various steps* to try to match the speed of a slower host’s data transfer, if a host is transferring slower than the drive’s data transfer rate. When the data is being transferred between the host and tape drive at a rate  $\geq$  the minimum speed shown, the drive will be able to stream.

This improves tape media life and drive transport life by reducing repositions that occur when the host cannot send data to the drive fast enough to keep the drive continuously writing (streaming) when data is being written, or cannot accept data from the drive fast enough when data is being read.

For more information on data transfer rate and a full explanation of “streaming” and its importance, see the Fujifilm Technical Support Flash “[Data Transfer Rate – Q & A](#)” in the Data Tape Technical Center. Go to: [www.fujifilmusa.com/tapestorage](http://www.fujifilmusa.com/tapestorage) → Resource Center → Technical Center.

### LTO ULTRIUM MEDIA AND DRIVE COMPATIBILITY

<b>Tape Media Capacity, Length</b>	<b>LTO-1 Tape Drive</b>	<b>LTO-2 Tape Drive</b>	<b>LTO-3 Tape Drive</b>	<b>LTO-4 Tape Drive</b>
<b>LTO Ultrium 1</b> 100/200 GB, 609m	Full Read/Write Compatibility	Full Read/Write Compatibility	Read-Only	NOT COMPATIBLE
<b>LTO Ultrium 2</b> 200/400 GB, 609m	NOT COMPATIBLE	Full Read/Write Compatibility	Full Read/Write Compatibility	Read-Only
<b>LTO Ultrium 3</b> 400/800 GB, 680m	NOT COMPATIBLE	NOT COMPATIBLE	Full Read/Write Compatibility	Full Read/Write Compatibility
<b>LTO Ultrium 4</b> 800/1600 GB, 820m	NOT COMPATIBLE	NOT COMPATIBLE	NOT COMPATIBLE	Full Read/Write Compatibility

### FUJIFILM LTO ULTRIUM PRODUCT CODES

Product <sup>(1)</sup>	Standard in Cases	Bar Code Labeled <sup>(3)</sup> in Cases	Library Pk Standard w/o Cases	Library Pk Labeled w/o Cases	Library Pk. Standard + Cases <sup>(4)</sup>	Library Pk. Labeled + Cases <sup>(4)</sup>
LTO Ultrium 1	26200010	26200070	26200012	26200072	26236584	26245321
LTO Ultrium 2	26220001	26220071	26220011	26220012	26221213	26220013
LTO Ultrium 3	26230010	26230013	26230012	26230159	26235463	26200129
LTO Ultrium 4	26247007	26247024	26247008	26247025	CALL	CALL
LTO Ultrium 3 WORM	26230014	26230002				
LTO Ultrium 4 WORM	26247009	26247026				
LTO UCC <sup>(2)</sup> Cleaning Tape	26200014	26200074	–	–	–	–

(1) Fujifilm LTO Data Tapes Ship in Factory Sealed 20-Pack Master Carton Quantities.

(2) Universal Cleaning Cartridge (UCC) for Cleaning all LTO-1, LTO-2, LTO-3 and LTO-4 Tape Drives.

(3) For help finding a correct bar code label for your tape system visit [www.Tri-Optic.com](http://www.Tri-Optic.com) or call Fujifilm at 800-488-3854.

(4) Cases shipped separately, on-the-side. Library Packs enable quick & easy unpacking and introduction into your Tape Library, while Individual Protective Cases are on hand for use later when storing tapes outside the Library, transporting and archiving.

**Not all LTO product configurations are shown.** Contact your dealer sales representative for other configurations or call Fujifilm’s Recording Media Division Customer Service Department at 1-800-488-3854.

For more Data Storage Tape Technical Support Documents and Product Information, go to: [www.fujifilmusa.com/tapestorage](http://www.fujifilmusa.com/tapestorage) → Resource Center → Technical Center.

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