Eurotech Tape Drive Information
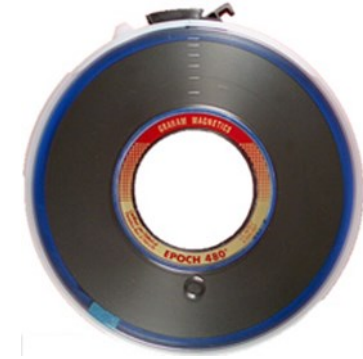

3592

3590

3480, 3490

9 Track

LTO

DLT

DDS/DAT

Exabyte

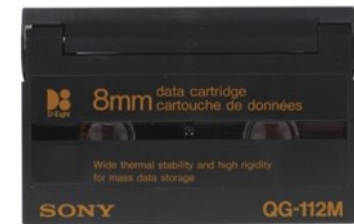**Eurotech Computer Services Ltd**
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There are five formats with different recording densities that yield different capacities per cartridge type:

Enterprise Format 1 (EFMT1)
Used by the 3592 J1A tape drive, and the 3592 E05 Tape Drive in both native and J1A emulation mode.
This format records 512 tracks on 8 channels.
The 3592 E06 and 3592 E07 tape drive (with code level D3I3_5CD or higher) reads data that is written in EFMT1 format but does not write in EFMT1.

Enterprise Format 2 (EFMT2)
Used by the 3592 E05 tape drive, and the 3592 E06 Tape Drive.
This format records 896 tracks on 16 channels.
When the drive is operating on encrypted data at this density, the recording format is Enterprise Encrypted Format 2 (EEFMT2).

Enterprise Format 3 (EFMT3)
Used by the 3592 E06 tape drive and the 3592 E07 Tape Drive.
This format records 1152 tracks on 16 channels.
When the drive is operating on encrypted data at this density, the recording format is Enterprise Encrypted Format 3 (EEFMT3).

Enterprise Format 4 (EFMT4)
Used by the 3592 E07 tape drive.
This format records 1664 tracks on JB and JX cartridges and 2560 tracks on JC, JK, and JY cartridges on 32 channels.
When the drive is operating on encrypted data at this density, the recording format is Enterprise Encrypted Format 4 (EEFMT4).

Enterprise Format 5 (EFMT5)
Used by the 3592 E08 tape drive.
This format records 5120 tracks on JC, JD, JK, JL, JY, and JZ cartridges on 32 channels.
When the drive is operating on encrypted data at this density, the recording format is Enterprise Encrypted Format 5 (EEFMT5).

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Drive Mode Setting	Formats read	Format that is used when writing and cartridge is at BOT	Format that is used when writing and cartridge is not at BOT	Model type reported to host in response to Inquiry command
J1A	EFMT1	EFMT1	EFMT1	J1A
E05 - native	EFMT1 or EFMT2	EFMT1 or EFMT2	EFMT1 or EFMT2	E05
E05 - emulating J1A	EFMT1	EFMT1	EFMT1	J1A
E06/EU6	EFMT1, EFMT2, or EFMT3	EFMT2 or EFMT3	EFMT2 or EFMT3	E06
E07 with code level D3I3_5CD or higher	EFMT1, EFMT2, EFMT3, or EFMT4	EFMT3 or EFMT4	EFMT3 or EFMT4	E07
E08 with code level D314_460 or higher	EFMT4 or EFMT5	EFMT4 or EFMT5	EFMT4 or EFMT5	E08

Emulation is only available on some E05 tape drives and is not available on E06, EU6, E07, or E08

The 3592 J1A tape drive - Read and write in EFMT1 format only
The 3592 E05 tape drive - Read and write in EFMT1 and EFMT2 formats
The 3592 E05 encryption-capable tape drive - Read and write in EFMT1, EFMT2, and EEFMT2 formats
The 3592 E06 tape drive - Read EFMT1, EFMT2, EEFMT2, EFMT3, and EEFMT3 and write EFMT2, EEFMT2, EFMT3, and EEFMT3 formats
      Operates in native mode only
The 3592 E07 tape drive - Read EFMT2, EEFMT2, EFMT3, EEFMT3, EFMT4, and EEFMT4 and write EFMT3, EEFMT3, EFMT4, and EEFMT4 formats
      Read support for EFMT2 and EEFMT2 and write support for EFMT3 and EEFMT3 is provided only with MEDIA9 and MEDIA10
      Support for EFMT4 and EEFMT4 is provided with MEDIA9, MEDIA10, MEDIA11, MEDIA12, and MEDIA13
      Operates in native mode only
The 3592 E08 tape drive - Read and write in EFMT4 and EFMT5 formats
      Operates in native mode only

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Supported Cartridge Types:

The 3592 E08 tape drive uses
The Advanced Type D read/write (type JD), the Advanced Type D WORM (type JZ) and the Advanced Type D economy (type JL) cartridges.
Both the type JD and JZ cartridges have a maximum capacity of 10TB (9313.23 GiB).
The Advanced Type D economy cartridges have a maximum capacity of 2TB (1862.65 GiB).

The 3592 E07 and E08 tape drives use
The Advanced Data (type JC) and Advanced WORM (type JY) cartridges with a maximum capacity of
4TB (3725.3 GiB) for E07 and 7TB (6519.26 GiB) for E08
The 3592 Advanced Economy (type JK) cartridge with a maximum capacity of
500GB (465.66 GiB) with EFMT4 format and 900GB (838.19 GiB) with EFMT5 format

The 3592 E07, E06 and E05 tape drives use
3592 Extended Data (type JB) and Extended WORM (type JX) with a maximum capacity of
1.6TB (1490.12 GiB) with EFMT4 format, 1TB (931.3 GiB) with EFMT3 format and 700 GB (651.93 GiB) with EFMT2 format
The 3592 E07 tape drive with code level D3I3_5CD or higher
Can read format EFMT2 but does not write EFMT2 format.
Can read only cartridge types JJ and JR.
Can read only cartridge types JA and JW

The 3592 E06, E05, and J1A tape drives use
3592 Standard Data (type JA) and Standard WORM (type JW) cartridges with a maximum capacity of
640GB (596.04 GiB) with EFMT3 format, 500GB (465.66 GiB) with EFMT2 format and 300GB (279.39 GiB) with EFMT1 format
3592 Economy Data (type JJ) and Economy WORM (type JR) cartridges with a maximum capacity of
128GB (119.21 GiB) with EFMT3 format, 100GB (93.13 GiB) with EFMT2 format and 60GB (55.88 GiB) with EFMT1 format.

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Model	EFMT1 512 tracks - 8 channels	EFMT2 896 tracks - 16 channels	EFMT3 1152 tracks - 16 channels	EFMT4 2560 tracks - 32 channels	EFMT5 5120 tracks - 32 channels
J1A	R/W	Not supported	Not supported	Not supported	Not supported
E05	R/W	R/W	Not supported	Not supported	Not supported
E06	R	R/W	R/W	Not supported	Not supported
E07	R	R	R/W *	R/W	Not supported
E08	Not supported	Not supported	Not supported	R/W *	R/W
			* Cartridge types JB and JX only		

The 3592 tape drive automatically reformats media when the tape is written while positioned at beginning of tape (BOT), such as when the tape label is written, if the tape does not match the drive format. In such a case, the tape is reformatted to match the 3592 tape drive.
The manual reformat process varies by operating system but usually includes running a program to issue the Mode Select command.

The 3592 J1A Tape Drive (or the **E05 emulating the J1A**) can reformat an EFMT2 or EFMT3 tape to an EFMT1.
The native 3592 E05 tape drive can reformat an EFMT1, EFMT3, or EFMT4 tape to EFMT2 and reformat an EFMT2 or EFMT3 tape to an EFMT1 when writing from beginning of tape (BOT).

The 3592 E06 tape drive does not support emulation but can read tapes in EFMT1, EFMT2, and EFMT3 format, and write in EFMT2 and EFMT3 format.
The 3592 E06 tape drive can reformat any EFMT1, EFMT2, EFMT3, and EFMT4 tape to EFMT3 format when writing from BOT.

The 3592 E07 tape drive does not support emulation but can read tapes in EFMT1 with code level D3I3_5CD or higher, EFMT2, EFMT3, or EFMT4 format and write in EFMT3 and EFMT4 format.
The 3592 E07 tape drive can reformat any EFMT2 or EFMT3 tape to EFMT4 format when it writes from BOT.

The 3592 E08 tape drive does not support emulation but can read tapes in EFMT3, EFMT4, or EFMT5, and write in EFMT4 and EFMT5 format.
The 3592 E08 tape drive can reformat any EFMT3 or EFMT4 tape to EFMT5 format when it writes from BOT

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Feature	3592 tape drives				
	TS1150 - E08	**TS1140 - E07**	**TS1130 - E06 or EU6**	**TS1120 - E05**	**J1A**
Native sustained data rate	360 MB/s (E08 format)	250 MB/s (E07 format)	160 MB/s (E06 format)	100 MB/s (E05 format)	40 MB/s (J1A format)
	250 MB/s (E07 format)	160 MB/s (E06 format)	140 MB/s (E05 format)	50 MB/s (J1A format)	
			70 MB/s (J1A format)		
Max compression sustained data rate	700 MB/s (E08 format)	650 MB/s (E07 format)	350 MB/s (E06 format)	280 MB/s (E05 format)	120 MB/s (J1A format)
Native Capacity	10 TB (9.1 TiB) JD/JZ media	4 TB (3.64 TiB) JC/JY media	1TB (931.32 GiB) JB/JX media	700GB (651.93 GiB) JB/ JX media	300GB (279.39 GiB) JA/ JW media
	7 TB (6.37 TiB) JC/JY media	1.6 TB (1.46 TiB) JB/JX media	640GB (596.05 GiB) JA/JW media	500GB (465.66 GiB) JA/ JW media	60GB (58.88 GiB) JJ/ JR media
	2 TB (1.82 TiB) JL media	500GB (465.66 GiB) JK media	128 GB (119.21 GiB) JJ/JR media	100 GB (93.13 GiB) JJ/ JR media	
	900 GB (838.19 GiB) JK media				
WORM capability	Yes				
Capacity scaling and short cartridge	Yes				

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Feature	3592 tape drives				
	TS1150 - E08	**TS1140 - E07**	**TS1130 - E06 or EU6**	**TS1120 - E05**	**J1A**
Read/write ca-pability	If encryption-enabled, reads and writes Model E08 and Model E07 en-crypted format	If encryption-enabled, reads and writes Model E07 and Model E06 en-crypted format	If encryption-enabled, reads and writes Model E06 and Model E05 en-crypted format	Reads and writes Model E05 for-mat	Reads and writes Model J1A format
	Reads and writes Model E08 and Model E07 for-mat	Reads and writes Model E07 and Model E06 for-mat	Reads and writes Model E06 and Model E05 for-mat	Reads and writes Model J1A for-mat	
		Reads Model E05	Reads Model J1A format		
Host (server) attachment	Supports dual-port, 8 Gbps Fibre Channel interface	Supports dual-port, 8 Gbps Fibre Channel interface	Supports dual-port, 4 Gbps Fibre Channel interface		Supports dual-port, 2 Gbps Fibre Channel in-terface
	Maximum interface burst transfer rate of 800 MB/s	Maximum interface burst transfer rate of 800 MB/s	Maximum interface burst transfer rate of 400 MB/s		Maximum interface burst transfer rate of 200 MB/s
	Supports N and L ports with autoconfigure				
Encryption	All TS1150 tape drives are encryption capable	All TS1140 tape drives are encryption capable	All TS1130 tape drives are encryption capable	With feature code 9592 or 5592	Not supported

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Media		Native capacity					Case colour	Label, door and write-protect switch colour	Part number
Label text	Type	E08 - TS1150	E07 - TS1140	E06/EU6 - TS1130	E05 - TS1120	J1A - 3592			
Data	JA	Not supported	E06 format 640GB (596.04 GiB)	E06 format 640GB (596.04 GiB)			Black	Dark blue	18P7534
			E05 format 500GB (465.66 GiB)	E05 format 500GB (465.66 GiB)	E05 format 500GB (465.66 GiB)				
			J1A format 300GB (279.39 GiB)	J1A format 300GB (279.39 GiB)	J1A format 300GB (279.39 GiB)	J1A format 300GB (279.39 GiB)			
Extended Data	JB	Not supported	E07 format 1.6TB (1490.12 GiB)			Not supported	Black	Dark green	23R9830
			E06 format 1TB (931.32 GiB)	E06 format 1TB (931.32 GiB)					
					J1A format 700GB (651.93 GiB)				
Advanced Data	JC	E08 format 7TB (6.37 TiB)	E07 format 4TB (3725.29 GiB)	Not supported	Not supported	Not supported	Black	Dark purple	46X7452
Advanced Type D read/write	JD	E08 format 10TB (9.1 TiB)	Not supported	Not supported	Not supported	Not supported	Black	Burnt orange	2727263

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Media		Native capacity					Case colour	Label, door and write-protect switch colour	Part number
Label text	Type	E08 - TS1150	E07 - TS1140	E06/EU6 - TS1130	E05 - TS1120	J1A - 3592			
Economy	JJ	Not supported	E06 format 128GB (119.21 GiB)	E06 format 128GB (119.21 GiB)			Black	Light blue	24R0316
			E05 format 100GB (93.13 GiB)	E05 format 100GB (93.13 GiB)	E05 format 100GB (93.13 GiB)				
			J1A format 60GB (58.88 GiB)	J1A format 60GB (58.88 GiB)	J1A format 60GB (58.88 GiB)	J1A format 60GB (58.88 GiB)			
Advanced Type C Economy	JK	E08 format 900GB (838.19 GiB)	E08 format 500GB (465.66 GiB)	Not supported	Not supported	Not supported	Black	Light purple	46X7453
Advanced Type D Economy	JL	E08 format 2TB (1.82 TiB)	Not supported	Not supported	Not supported	Not supported	Black	Apricot	2727264
Economy WORM	JR	Not supported	E06 format 128GB (119.21 GiB)	E06 format 128GB (119.21 GiB)			Platinum (silver grey)	Light blue	24R0317
			E05 format 100GB (93.13 GiB)	E05 format 100GB (93.13 GiB)	E05 format 100GB (93.13 GiB)				
			J1A format 60GB (58.88 GiB)	J1A format 60GB (58.88 GiB)	J1A format 60GB (58.88 GiB)	J1A format 60GB (58.88 GiB)			

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Media		Native capacity					Case colour	Label, door and write-protect switch colour	Part number
Label text	Type	E08 - TS1150	E07 - TS1140	E06/EU6 - TS1130	E05 - TS1120	J1A - 3592			
WORM	JW	Not supported	E06 format 640GB (596.04 GiB) E05 format 500GB (465.66 GiB) J1A format 300GB (279.39 GiB)	E06 format 640GB (596.04 GiB) E05 format 500GB (465.66 GiB) J1A format 300GB (279.39 GiB)	E05 format 500GB (465.66 GiB) J1A format 300GB (279.39 GiB)	J1A format 300GB (279.39 GiB)	Platinum (silver grey)	Dark blue	18P7538
Extended WORM	JX	Not supported	E07 format 1.6TB (1490.12 GiB) E06 format 1TB (931.32 GiB)	E06 format 1TB (931.32 GiB) J1A format 700GB (651.93 GiB)		Not supported	Platinum (silver grey)	Dark green	23R9831
Advanced Type C WORM	JY	E08 format 7TB (6.37 TiB)	E07 format 4TB (3725.29 GiB)	Not supported	Not supported	Not supported	Platinum (silver grey)	Dark purple	46X7454
Advanced Type D WORM	JZ	E08 format 10TB (9.1 TiB)	Not supported	Not supported	Not supported	Not supported	Platinum (silver grey)	Burnt orange	2727265
Cleaning		N/A	N/A	N/A	N/A	N/A	Black	Grey	18P7535

LTO - All Figures Based on Native Mode

Compatibility	LTO 7	LTO 6	LTO 5	LTO 4	LTO 3	LTO 2	LTO 1
LTO 7	R/W	R/W	R/O				
LTO 6		R/W	R/W	R/O			
LTO 5			R/W	R/W	R/O		
LTO 4				R/W	R/W	R/O	
LTO 3					R/W	R/W	R/O
LTO 2						R/W	R/W
LTO 1							R/W

	LTO 7	LTO 6	LTO 5	LTO 4	LTO 3	LTO 2	LTO 1
Capacity	6.0TB	2.5TB	1.5TB	800GB	400GB	200GB	100GB
Speed MB/s	300	160	140	120	80	40	20
Media		Thin Film	Thin Film	Thin Film	Metal Particle	Metal Particle	Metal Particle
Recording method	Linear serpentine	Linear serpentine	PRML	PRML	PRML	PRML	RLL 1.7
Encryption capable	Yes	Yes	Yes	Yes			
Worm capable	Yes	Yes	Yes	Yes	Yes		
Tape tracks	3584	2176	1280	896	704	512	384
Tracks written/ pass	32	16	16	16	16	8	8

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3590—All Figures Based on Native Mode

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	3590 B	3590 B-Ultra	3590 E	3590 H
Data Transfer Rate	13 MB/s	13MB/s	13 MB/s	13 MB/s
Read Formats	FMT3590	FMT3590	FMT3590 FMT3590E	FMT3590, FMT3590E, FMT3590H
Write Formats	FMT3590	FMT3590	FMT3590E	FMT3590H
Data Capacity - type J tape	10GB	10GB	20GB	30GB
Data Capacity - type K Tape	20GB	20GB	40GB	60GB
Type J tape	High Performance cartridges - have a blue leader block assembly and blue labels			
Type K tape	Extended High Performance cartridges - have a green leader block assembly and green labels.			

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DLT/SDLT - All Figures Based on Native Mode

Drive transfer rates

	DLT2000	DLT2000XT	DLT4000	DLT7000	DLT8000	DLT1	DLT-S4	DLT VS80	DLT VS160	SDLT220	SDLT320	SDLT600
Native Capacity	10	15	20	35	40	40	800	40	80	110	160	300
Transfer rate MB/s	1.25	1.25	1.5	5	6	3	60	3	8	11	16	36

Media Compatibility

	DLT2000	DLT2000XT	DLT4000	DLT7000	DLT8000	DLT1	DLT-S4	DLT VS80	DLT VS160	SDLT220	SDLT320	SDLT600
Super DLTI										Read/Write	Read/Write	Read
Capacity										110GB	160GB	
DLT Tape VS1									Read/Write			Read
Capacity									80GB			
DLT Tape IV			Read/Write	Read/Write	Read/Write			Read/Write	Read	Read	Read	
Capacity			20GB	35GB	40GB			40GB				
DLT Tape III XT		Read/Write	Read/Write	Read/Write	Read/Write							
Capacity		15GB	15GB	15GB	15GB							
DLT Tape III	Read/Write	Read/Write	Read/Write	Read/Write	Read/Write							
Capacity	10GB	10GB	10GB	10GB	10GB							

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Tape Length	Density/Capacity			
	800 NRZI	**1600 PE**	**3200 PE**	**6250 GCR**
1200'	10 MB	20 MB	40 MB	80 MB
2400'	20 MB	40 MB	80 MB	160 MB
3600'	30 MB	60 MB	120 MB	220 MB

800 NRZI	Non return to zero, inverted
1600 PE	Phase Encoded
3200 PE	Phase Encoded
6250 GCR	Group Code Recording

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Working on a capacity of 200MB for a 3600ft (1100m) long 9 track tape written at 6250bpi.
The table below shows how many tapes it would take to fill alternative capacities and how high that pile of 9 track tapes (at 1/2in each) would be.
The height could be up to twice the figures below if the tape container is included.
Examples:
1GB would take 5 tapes at 1/2in making the stack of tapes 2.5in high ….
A 1TB disk would be the equivalent of 5,000 tapes forming a stack 208ft or 63.5m high!

9 Track media comparison					
	Size (B)	No of 9 track media	Metric height	Imperial height	Comment
Byte	1				One character
Kilobyte	10^3				
Megabyte	10^6				
1/2in tape drive	200MB	1	12.7 mm	1/2 inch	~4 encyclopaedias
Gigabyte	10^9	5	63.5 mm	2.5 inches	~10m of books on shelf
Terabyte	10^{12}	5,000	63.5 m	208 feet	~1000 copies of the Encyclopaedia Britannica
Petabyte	10^{15}	5,000,000	63.5 Km	39.5 miles	~20 million 4-door filing cabinets full of text
Exabyte	10^{18}	5,000,000,000	63,500 Km	39,500 miles	5 Exabytes - all of the words ever spoken by mankind?
Zettabyte	10^{21}	5,000,000,000,000	63,500,000 Km	39,500,000 miles	
Yottabyte	10^{24}	5,000,000,000,000,000	63,500,000,000 Km	39,500,000,000 miles	11 trillion years to download a Yottabyte ?
Brontobyte	10^{27}	5,000,000,000,000,000,000	63,500,000,000,000 Km	39,500,000,000,000 miles	
Geopbyte	10^{30}	5,000,000,000,000,000,000,000	63,500,000,000,000,000 Km	39,500,000,000,000,000 miles	Lost for words …….

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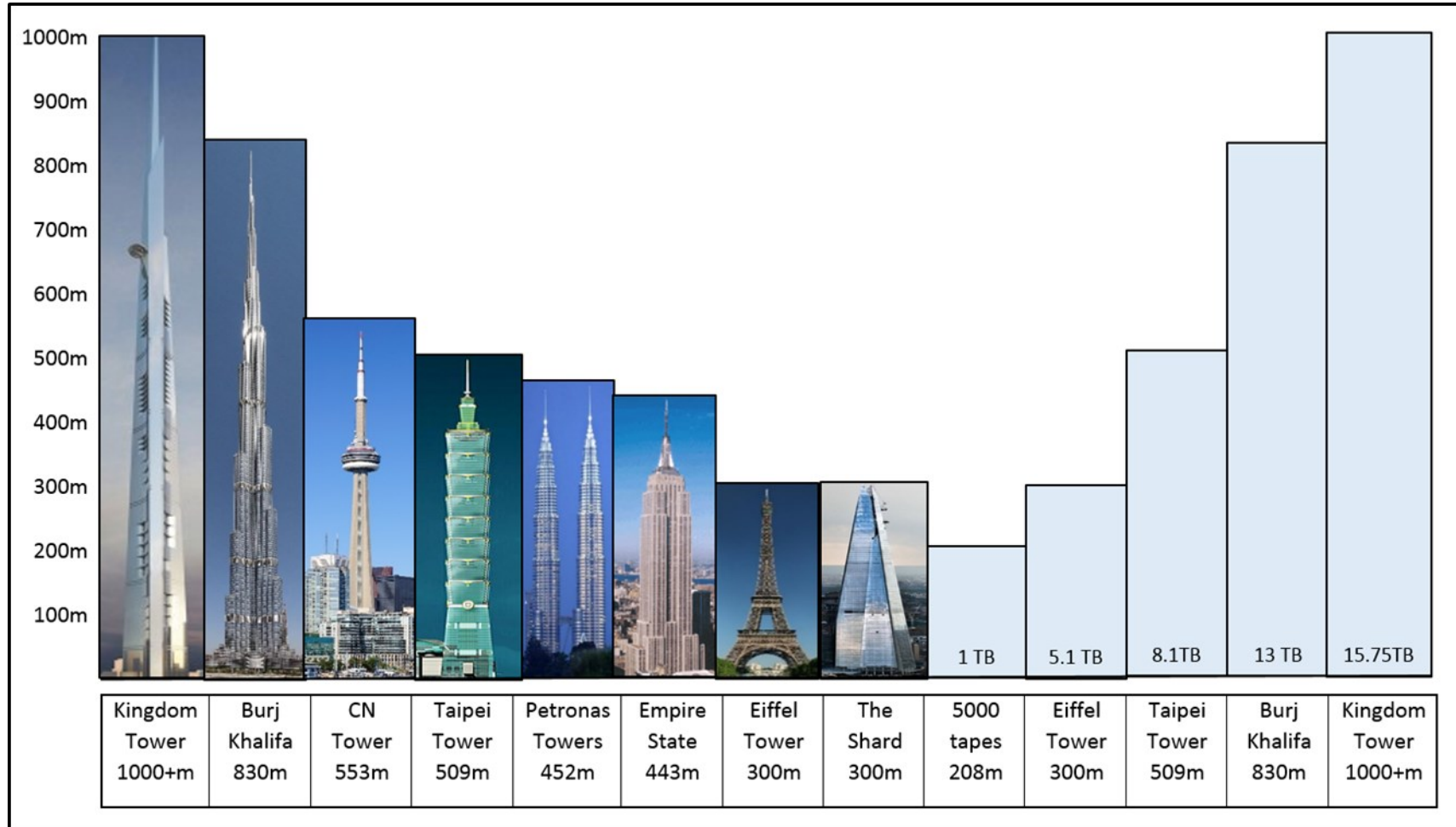
3480/3490 - Example Compatibilities

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Model	18-Track		18-Track (compressed)		36-Track		128-Track	
	Read	Write	Read	Write	Read	Write	Read	Write
IBM - 3490-F11	X	X	X	X	X	X		
IBM - 3490-F01	X	X	X	X	X	X		
IBM - 3490-F00	X	X	X	X	X	X		
IBM - 3490-E11	X		X		X	X		
IBM - 3490-E01	X		X		X	X		
Fujitsu - M8100							X	X
Fujitsu - M2485K/N	X		X		X	X		
Fujitsu - M2483K/N	X		X		X	X		
Fujitsu - M2488C	X		X		X	X		
Fujitsu - M2488E	X	X	X	X	X	X		
Fujitsu - M2485H	X	X	X	X				
Fujitsu - M2483H	X	X	X	X				
Fujitsu - M2485B	X	X						
Fujitsu - M2483B	X	X						
Fujitsu - M2481B	X	X						

Density	3480	3490	3490E
Approx capacity	200 - 300 MB	600 MB - 900 MB	800 MB - 1.2 GB

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DDS/DAT

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Drive	Media						
	DAT320	**DAT160**	**DAT72**	**DDS4/DAT40**	**DDS3**	**DDS2**	**DDS1**
DAT320 Drive	R/W	R/W					
DAT160 Drive		R/W	R/W	R/W			
DAT72 Drive			R/W	R/W	R/W		
DDS4 Drive				R/W	R/W	R/W	R
DDS3 Drive					R/W	R/W	R/W
DDS2 Drive						R/W	R/W
DDS1 Drive							R/W

Format	Native capacity	Data transfer speed
DAT-320	160 GB	12 MB/s
DAT-160	80 GB	6.9 MB/s
DAT-72	36 GB	3.2 MB/s
DDS-4	20 GB	3.2 MB/s
DDS-3	12 GB	1.1 MB/s
DDS-2	4 GB	0.6 MB/s
DDS-1	2 GB	0.18 MB/s

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Exabyte

Drive	Native capacity	Transfer rate	Compatibility				
			Mammoth	8500c	8500	8200c	8200
Mammoth 2	45GB	12MB/s	R/W	R			
Mammoth (8900)	20GB	3MB/s	R/W	R	R		R
Eliant 820 (8500 mode)	7GB	1MB/s		R/W	R/W		R
EXB-8505	5GB	2MB/s		R/W	R/W	R/W	R/W
EXB-8205	2.5GB	1MB/s				R/W	R/W

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