

EMC SYMMETRIX VMAX 40K STORAGE SYSTEM



VMAX 40K high-density configurations support up to 3,200 drives, consuming 33 percent less space, 35 percent less weight, and 27 percent less power compared with 3.5-inch drives.

The EMC® Symmetrix® VMAX® 40K storage system delivers unmatched scalability and high availability for the enterprise while providing market-leading functionality to accelerate your transformation to the hybrid cloud.

Specifications

ARCHITECTURE

The EMC Virtual Matrix Architecture™ is a unique way to build storage systems that transcends the physical constraints of all existing architectures by scaling system resources through common building blocks called EMC Symmetrix VMAX 40K engines.

A single VMAX 40K engine provides the complete foundation for a high availability Symmetrix VMAX 40K system. Each VMAX 40K engine contains two Symmetrix VMAX 40K directors and redundant interfaces to the EMC Virtual Matrix™ interconnect. Each Symmetrix VMAX 40K director consolidates front-end, global memory, and back-end functions, enabling direct memory access to data for optimized I/O operations.

VMAX 40K engines are interconnected via a set of multiple active fabrics that provides scalable performance and high availability. VMAX 40K engines can be added non-disruptively to provide linear scale-out of Symmetrix system resources. The Virtual Matrix is architected to scale to dozens of engines, geographically dispersed throughout a data center, delivering unprecedented scale of infrastructure services under a single point of management.

VMAX 40K ENGINE MAXIMUM SPECIFICATIONS

- Four six-core 2.8 GHz Intel® Xeon® processors
- Up to 256 GB of cache memory
- Virtual Matrix bandwidth: 50 GB/s
- PCI Gen 2 I/O interconnect

VMAX 40K SYSTEM MAXIMUM SPECIFICATIONS

- Eight VMAX 40K engines
- 2 TB of cache memory
- Virtual Matrix bandwidth: 400 GB/s

VMAX 40K INTERCONNECT

- Industry-standard RapidIO® fabric (Dual Redundant fabric interconnect; Virtual Matrix Architecture is extensible to other standard interconnects)

CONNECTIVITY

Symmetrix VMAX 40K systems are available in configurations supporting up to eight VMAX 40K engines with a maximum of 128 front-end ports. Optimized hardware logic and data protection encoding ensures end-to-end data integrity with automated channel failover for maximum availability and load balancing. Symmetrix VMAX 40K systems support all popular hardware and operating system platforms, storage area networks (SANs), and high-availability cluster environments. IPv6, IPsec, and compression support are available with 1 Gb/s Ethernet ports. IPv6 support is available with 10 Gb/s Ethernet. Compression support is also available on 8 Gb/s Fibre Channel SRDF ports.

PROTOCOL USABLE SYSTEM PORTS

8 Gb/s Fibre Channel Host/SAN Ports	4–128 per array, 4–16 ports per engine
8 Gb/s Fibre Channel Remote Replication Ports	2–32 per array, 2–4 ports per engine
8 Gb/s FICON Host Ports	4–64 per array, 4–8 ports per engine
10 Gb/s 10 GigE Remote Replication Ports	2–32 ports per array, 2–4 ports per engine
10 Gb/s FCoE Host Ports	4–64 ports per array, 4–8 ports per engine
10 Gb/s iSCSI Host Ports	4–64 ports per array, 4–8 ports per engine
1 Gb/s GigE Remote Replication Ports	2–32 ports per array, 2–4 ports per engine
1 Gb/s iSCSI Ports	4–64 per array, 4–8 ports per engine

Mixed combinations of the above port types depend upon the configuration. Refer to the EMC Support Matrix at www.EMC.com, or contact your local EMC sales representative for specific configuration support. EMC Symmetrix VMAX 40K systems are available in two to 11-bay configurations for up to four petabytes of usable storage capacity in a single system. With incremental tiered storage capability for maximum TCO value, Symmetrix VMAX 40K arrays are the highest capacity, fastest, most-scalable, and most-capable storage systems available, and serve as the foundation of today's most-demanding intelligent information infrastructures.

SYSTEM BAY DISPERSION



System bay dispersion allows customers to separate a single Symmetrix VMAX 40K array utilizing two system bays dispersed by up to 82 feet (25 meters, measured from system bay to system bay) to solve floor-loading problems or to work around obstacles in the data center.

DISK DRIVE AND ENTERPRISE FLASH DRIVE CONNECTIVITY

The Symmetrix VMAX 40K drive infrastructure is architected with 4 Gb/s dual-ported Fibre Channel drives, Enterprise Flash drives, and SAS drives, each supported by two independent I/O channels with automatic failover and fault isolation.

3.5" DISK DRIVES

CAPACITY	300 GB	600 GB	300 GB	600 GB	2 TB
Rotational Speed (rpm)	10,000	10,000	15,000	15,000	7,200
Form Factor	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in
Internal Data Rate (Mb/s)	1,010-1,840	1,010-1,840	1,051-2,225	1,051-2,225	470-1,070
Average Seek Time (read/write)	3.8/4.4 ms	3.8/4.4 ms	3.4/3.9 ms	3.4/3.9 ms	8.2/9.2 ms
Raw Capacity	292.6 GB	585.4 GB	292.6 GB	585.4 GB	2000.3 GB
FORMATTED CAPACITY					
Open Systems	288.1 GB	576.3 GB	288.1 GB	576.3 GB	1882.7 GB
Mainframe	279.7 GB	559.5 GB	279.7 GB	559.5 GB	1827.6 GB
IBM i	288.2 GB	580.1 GB	288.2 GB	580.1 GB	1912.1 GB

2.5" DISK DRIVES (SAS)

Capacity	300 GB	600 GB
Rotational Speed (rpm)	10,000	10,000
Form Factor	2.5 in	2.5 in
Internal Data Rate (Mb/s)	1219–2029	1219–2029
Average Seek Time (read/write)	3.7/4.2 ms	3.7/4.2 ms
Raw Capacity	292.6 GB	585.4 GB
Formatted Capacity		
Open Systems	288.1 GB	576.3 GB
Mainframe	279.7 GB	559.5 GB
IBM i	288.2 GB	580.1 GB

ENTERPRISE FLASH DRIVES

Capacity	100 GB	200 GB	400 GB	200 GB	400 GB
Form Factor	3.5 in	3.5 in	3.5 in	2.5 in	2.5 in
Internal Data Rate (Mb/s)	800–1,600	800–1,600	800–1,600	800–1,600	800–1,600
Raw Capacity	100.0 GB	200.0 GB	400.0 GB	200.0 GB	400.0 GB
Formatted Capacity					
Open Systems	98.4 GB	196.9 GB	393.8 GB	196.9 GB	393.8 GB
Mainframe	95.6 GB	191.2 GB	382.3 GB	191.2 GB	382.3 GB
IBM i	98.5 GB	197.0 GB	389.8 GB	197.0 GB	389.8 GB

Configurations with mixed drive capacities and speeds are allowed depending upon the configuration. 64 GB of total capacity will be reserved for internal Symmetrix file system use. All capacities are based on 1 GB = 1,000,000,000 bytes. Actual usable capacity may vary depending upon the configuration.

SYSTEM CAPACITIES IN TERABYTES

	100 GB min	2 TB max
# of Drives	42*	2,400
Mirrored		
Open Systems	1.9	2,214
Mainframe	1.9	2,149
RAID-5 3+1		
Open Systems	2.9	3,321
Mainframe	2.8	3,224
RAID-5 7+1		
Open Systems	3.4	3,874
Mainframe	3.3	3,761
RAID-6 6+2		
Open Systems	2.9	3,321
Mainframe	2.8	3,224
RAID-6 14+2		
Open Systems	4.1	3,874
Mainframe	4.0	3,761

* Minimum is 42 drives for an all-Flash drive configuration.

* For RAID-6 14+2 the minimum number of drives is 50.

DATA AT REST ENCRYPTION

Data at Rest Encryption is delivered through a unique Symmetrix VMAX 40K engine model with built-in, hardware-based data encryption. Data is encrypted when written to drives and decrypted when read from the drives with no impact on performance or local and remote replication. Symmetrix Data at Rest Encryption addresses security and compliance concerns regarding data exposure when drives are removed or arrays are replaced.

PHYSICAL AND COOLING SPECIFICATIONS

FRONT AND REAR SERVICE

	Height* (in/cm)	Width (in/cm)	Depth (in/cm)	Area (in/cm)	Weight (lb/kg)	Power (kVA)	Cooling (BTU/hr)
4-Engine System Bay	76.6/194.7	30.2/76.7	41.88/106.4	42.0/106.7	1,703/850	3.9	12,900
8-Engine System Bay	76.6/194.7	30.2/76.7	41.88/106.4	42.0/106.7	2,617/1279	7.2	24,000
Storage Bay	76.6/194.7	30.2/76.7	41.88/106.4	42.0/106.7	2,144/972.5	5.3	16,900
Storage Bay (Dense)	75.0/190.5	24.02/61.0	41.88/106.4	42.0/106.7	1,674/759.3	4.9	15,200

All dimensions are cabinet/enclosure size without shipping brackets or securing brackets. Weight, power, and cooling are maximum for a full configuration. Cooling is front to rear for system bay and front to top for storage bays.

*An additional 18 in. (45.7 cm) is recommended for ceiling/top clearance.

POWER SPECIFICATIONS—STORAGE BAY AND SYSTEM BAY

	North America	International	North America	International
	3-phase (Delta 4-wire)	3-phase (Wye 5-wire)	Single-phase	Single-phase
Input Voltage (VAC)	200-240	200-240	200-240	200-240
Frequency (Hz)	50-60	50-60	50-60	50-60
Circuit Breaker (Amps), Recommended	50	32	30	32
AC Power Connections	2 per bay	2 per bay	4 per bay	4 per bay
Power Connector*	CS-8365C	S52.30	L6-30P	L6-30P
User Connector*	See Note 1	See Note 1	See Note 1	See Note 1

* Specifications given are for the power connectors located inside the Symmetrix VMAX 40K system and storage bays. EMC offers a selection of power cable extensions with different power connectors for connection to the customer's power source. Refer to the "VMAX 40K Series Physical Planning Guide" for details. The power cable extension type desired must be verified at the time of quotation and ordering.

Note 1: Refer to the "VMAX 40K Series Physical Planning Guide."

ENVIRONMENTAL SPECIFICATIONS (OPERATING)

Temperature (°F/°C)	50–90/10–32
Altitude (ft/m), max.	7,500/2,286
Humidity (%), Non-condensing	20–80
Raised Floor Recommended	

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