

# EMC VMAX 40K



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<sup>®</sup> VMAX<sup>®</sup> 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. The EMC Quad 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 VMAX engines.

A single VMAX 40K engine provides the complete foundation for a high availability VMAX 40K system. Each VMAX 40K contains two VMAX 40K directors and redundant interfaces to the EMC Quad Virtual Matrix™ interconnect. Each 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 provide scalable performance and high availability. VMAX 40K engines can be added non-disruptively to provide linear scale-out of VMAX system resources. The Quad 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.

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## 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
- PCIe® Gen 2 I/O interconnect

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## VMAX 40K MAXIMUM SYSTEM SPECIFICATIONS

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

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## VMAX 40K INTERCONNECT

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

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## CONNECTIVITY

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. VMAX 40K systems support all popular hardware and operating system platforms, storage area networks (SANs), and high-availability cluster environments. IPv6 and compression support are available with 10Gb/s Ethernet. Compression support is also available on 8 Gb/s Fibre Channel SRDF Ports.

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## PROTOCOL

## USABLE SYSTEM PORTS

8 Gb/s Fibre Channel Host/ SAN Ports	4-128 per array, 4-16 ports per engine
16 Gb/s FC SAN Connect	8-64 per array, 4-8 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
10Gb/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](http://www.EMC.com), or contact your local EMC sales representative for specific configuration support. EMC 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, 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

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## SYSTEM BAY DISPERSION



System bay dispersion allows customers to separate a single 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.

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## DISK DRIVE AND ENTERPRISE FLASH DRIVE CONNECTIVITY

The 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

<b>CAPACITY</b>	<b>300/600 GB</b>	<b>300/600 GB</b>	<b>900 GB</b>	<b>2 TB</b>	<b>3TB</b>	<b>4TB</b>
Rotational Speed (rpm)	10,000	15,000	10,000	7,200	7,200	7,200
Form Factor	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in
Internal Data Rate (Mb/s)	1219-2232	1,051-2225	1219-2232	470-1070	470-1070	470-1070
Average Seek Time (read/write)	3.74.2 ms	3.4/3.9 ms	3.7/4.2 ms	8.2/9.2 ms	8.2/9.2 ms	8.2/9.2 ms
Raw Capacity (GB)	292.6/584.4	292.6/585.4	894.9	2000.3	3,000.5	4,000.5
<b>FORMATTED CAPACITY</b>						
Open Systems	288.1/576.3 GB	288.1/576.3 GB	881.1 GB	1882.7 GB	2,954.4 GB	3,939.2 GB
Mainframe	279.7/559.5 GB	279.7/559.5 GB	855.3 GB	1827.6 GB	2,868.0 GB	3,824.0 GB
IBM i	288.2/580.1 GB	288.2/580.1 GB	870.2 GB	1912.1 GB	2,955.1 GB	3,940.1 GB

## 2.5" DISK DRIVES

<b>CAPACITY</b>	<b>146/300 GB</b>	<b>300/600 GB</b>	<b>900 GB</b>	<b>1 TB</b>
Rotational Speed (rpm)	15,000	10,000	10,000	7,200
Form Factor	2.5 in	2.5 in	2.5 in	2.5 in
Internal Data Rate (Mb/s)	1,554-2,267	1219-2232	1219-2232	673-1304
Average Seek Time (read/write)	2.8/3.3 ms	3.7/4.2 ms	3.7/4.2 ms	7.7/8.7 ms
Raw Capacity	145.7/292.6 GB	292.6/585.4 GB	894.9 GB	1,000.2 GB
<b>FORMATTED CAPACITY</b>				
Open Systems	143.5/288.1 GB	288.1/576.3 GB	881.1 GB	984.8 GB
Mainframe	139.3/279.7 GB	279.7/559.5 GB	855.3 GB	956.0 GB
IBM i	141.7/288.2 GB	288.2/580.1 GB	870.2 GB	985.0 GB

## FLASH DRIVES

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

## SYSTEM CAPACITY IN TERABYTES

		<b>100 GB MIN</b>	<b>4 TB MAX</b>
<b># OF DRIVES</b>		42	2,400
<b>MIRRORED</b>	Open Systems	1.9	2,214
	Mainframe	1.9	2,149
<b>RAID-5 3+1</b>	Open Systems	2.9	3,321
	Mainframe	2.8	3,224
<b>RAID-5 7+1</b>	Open Systems	3.4	3,874
	Mainframe	3.3	3,761
<b>RAID-6 6+2</b>	Open System	2.9	3,321
	Mainframe	2.8	3,224
<b>RAID-6 14+2</b>	Open System	4.1	3,874

\*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 (D@RE) is delivered through a unique VMAX 20K engine model with built-in, hardware-based data encryption. Data is encrypted when written to drives and decrypted when read from drives with no impact on performance or local and remote replication. D@RE addresses security and compliance concerns regarding data exposure when drives are removed or arrays are replaced.

## PHYSICAL AND COOLING SPECIFICATIONS

	<b>HEIGHT*</b> <b>(IN/CM)</b>	<b>WIDTH</b> <b>(IN/CM)</b>	<b>DEPTH</b> <b>(IN/CM)</b>	<b>WEIGHT</b> <b>(LB/KG)</b>	<b>POWER</b> <b>(KVA)</b>	<b>COOLING</b> <b>(BTU/HR)</b>
4-Engine System Bay	76/194.7	30/76.2	42/106.7	1,703/850	3.9	12,900
8-Engine System Bay	76/194.7	30/76.2	42/106.7	2617/1,279	7.2	24,000
Storage Bay	76/194.7	30/76.2	42/106.7	2,278/1,033	5.3	16,900
Storage Bay (High Density)	75/190.5	24/61	42/106.7	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 the 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)

	<b>NORTH AMERICA 3-PHASE (DELTA 4-WIRE) (3L+1G)</b>	<b>INTERNATIONAL 3-PHASE (WYE 5-WIRE) (3L+1N+1G)</b>	<b>NORTH AMERICA SINGLE-PHASE 3-WIRE (2L+1G)</b>	<b>INTERNATIONAL SINGLE-PHASE 3-WIRE (1L,1N,1G)</b>
<b>INPUT VOLTAGE (VAC)</b>	200-240	200-240	200-240	200-240
<b>FREQUENCY (HZ)</b>	50-60	50-60	50-60	50-60
<b>CIRCUIT BREAKER (AMPS), RECOMMENDED</b>	50	32	30	32
<b>AC POWER CONNECTIONS</b>	2 per bay	2 per bay	4 per bay	4 per bay
<b>POWER CONNECTOR</b>	CS-8365C	S52.30	L6-30P	L6-30P
<b>USER CONNECTOR</b>	See Note 1	See Note 1	See Note 1	See Note 1

Specifications given are for the power connectors located inside the 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. The power cable extension type desired must be verified at the time of quotation and ordering.

\* L = line or phase, N= neutral, G= ground

Note 1: Refer to EMC® Symmetrix® VMAX® Family Physical Planning Guide for details.

## RADIO FREQUENCY INTERFERENCE (RFI)

Electro-magnetic fields which include radio frequencies can interfere with the operation of electronic equipment. EMC Corporation products have been certified to withstand radio frequency interference in accordance with standard EN61000-4-3. In Data Centers that employ intentional radiators, such as cell phone repeaters, the maximum ambient RF field strength should not exceed 3 Volts /meter.

<b>REPEATER POWER LEVEL (WATTS)</b>	<b>RECOMMENDED MINIMUM DISTANCE (FEET/METERS)</b>
1	9.84 ft (3m)
2	13.12 ft (4 m)
5	19.69 ft (6m)
7	22.97 ft (7m)
10	26.25 ft (8m)
12	29.53 ft (9m)
15	32.81 ft (10m)

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## ENVIRONMENTAL SPECIFICATIONS

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

### CONTACT US

To learn more about how EMC products, services, and solutions can help solve your business and IT challenges, contact your local representative or authorized reseller—or visit us at [www.EMC.com](http://www.EMC.com).

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