

QUICKSPECS

MODELS

MA8000/EMA12000 CI
Computer Interconnect (CI)
storage solutions, with CI
HSJ80 controller(s), in easy to
configure building blocks;
provides data protection, high
availability, exceptional
performance, and OpenVMS
Cluster System support for the
most demanding storage
requirements

MA8000/EMA12000 Models

MA8000
175992-B21 (60Hz)
175992-B22 (50Hz)

EMA12000 D14
175990-B21 (60Hz)
175990-B22 (50Hz)

EMA12000 S10
175994-B21 (60Hz)
175994-B22 (50Hz)

EMA12000 S14
175991-B21 (60Hz)
175991-B22 (50Hz)

EMA12000 Blue
175993-B21 (60Hz)
175994-B22 (50Hz)

See the options section for
platform software, CI host
adapters, and disk options for
complete solutions.

OVERVIEW

The MA8000/EMA12000 CI are a family of fully integrated Computer Interconnect storage systems that support the new universal drives in the new *StorageWorks* enclosure architecture with CI HSJ80 controllers for OpenVMS Cluster Systems. They are the outgrowth of years of *StorageWorks* experience, successfully delivering quality solutions into applications with mission-critical requirements.

The MA8000/EMA12000 CI storage systems with CI HSJ80 controllers will replace the *StorageWorks*500 and *StorageWorks*800 storage solutions with the HSJ80 controllers. The new storage systems, while continuing to provide a CI interface with the HSJ80 controller (and associated features), add the benefits of universal drives, higher density of drives per enclosure, flexible configurations and higher capacity per storage system.

In addition to disk RAID controller operations, the CI HSJ80 controllers will also support legacy tape drives mounted in external tape libraries or in external storage systems outside of the MA8000/EMA12000 storage systems. The HSJ80 will "pass through" tape library commands from CI host applications. (See the supported tape drive and tape library list later in this document.) In some cases, SCSI extenders or SCSI extender / translators are required to interconnect to the tape drives and/or tape libraries. (See the configuration information later in this document.)

MA8000/EMA12000 CI is designed for the data center where there is a need to configure high capacity systems with application-specific demands for high performance. MA8000/EMA12000 CI components offer the flexibility to configure solutions to provide high capacity and scalable performance in a small footprint. The solutions include support for OpenVMS Cluster environments, and stringent data center availability requirements. Configure-To-Order is available for the creation of customized solutions using the modular storage components.

For data centers with continuously increasing capacity requirements, high performance demands, increasing business continuance needs, and the need to stay with the CI interface, MA8000/EMA12000 CI is the clear choice.

- Highest storage packaging density in the industry
- Scales from a few Gigabytes to multi Terabytes
- Supports Compaq Universal disk drives and Modular Storage Systems

MA8000/EMA12000 Models are modular, scalable, no single point of failure solutions with disaster tolerance and business continuance support for storage consolidation on OpenVMS Cluster Systems

- MA8000 (50 or 60Hz) 1 controller enclosure, 3 Dual Bus 14 bay drive enclosures, 22U Modular Storage System (opal)
- EMA12000 D14 (50 or 60Hz) 3 controller enclosures, 9 Dual Bus 14 bay drive enclosures, 42U Modular Storage System (opal)
- EMA12000 S10 (50 or 60Hz) 1 controller enclosure, 6 Single Bus 10 bay drive enclosures, 42U Modular Storage System (opal)
- EMA12000 S14 (50 or 60Hz) 1 controller enclosure, 6 Single Bus 14 bay drive enclosures, 36U Modular Storage System (opal)
- EMA12000 Blue (50 or 60Hz) 1 controller enclosure, 3 Dual Bus 14 bay drive enclosures, 41U Modular Storage System (blue)

Note: Controllers are not included in predefined models.

KEY FEATURES

Computer Interconnect (CI) Technology

MA8000/EMA12000 CI takes advantage of the benefits of the CI (Computer Interconnect) OpenVMS Cluster system. CI flexibility provides many ways to configure cluster systems to maximize both availability and performance. Visit http://www.openvms.digital.com/openvms/WHITEPAPERS/ci_connect/ciconfig_webpage_contents.html for a white paper titled: "OpenVMS Cluster Computing: Configuring CI-Connected OpenVMS Clusters for Availability and Performance."

MA8000/EMA12000 Product Packaging

MA8000/EMA12000 solutions are built with the new *StorageWorks* Enclosure packaging. The packaging consists of a 4U high RAID controller enclosure (Compaq *StorageWorks* Enclosure Model 2200: visit <http://www.compaq.com/products/storageworks/raidstorage/enc2200quickspec.html> for details – Please note this Web site is available in English only.) and the 3U high 14 bay drive enclosures (Compaq *StorageWorks* Enclosure Model 4200: visit <http://www.compaq.com/products/storageworks/raidstorage/enc4200index.html> for details – Please note this Web site is available in English only.). The controller and drive enclosures are independent of each other to allow for a wide range of configuration options. The MA8000/EMA12000 models were designed to address medium to high capacity needs, as well as high-performance options. The models are assembled in the Modular Storage Systems.

The Modular Storage Systems are also available under Configure-To-Order. The systems are completely assembled with side panels, redundant Power Distribution Units (with 16 outlets each) and power cables. The PDUs are 2U high.

KEY FEATURES *(continued)*

OpenVMS Platform Support

Support for industry leading Alpha and VAX OpenVMS™ platforms; visit <http://www.compaq.com/products/storageworks> for the latest support information. Please note that this Web site is available in English only.

High Availability

All MA8000/EMA12000 models provide redundant cooling, N+1 power redundancy and environmental monitoring. Drives and most solution components are hot pluggable. Each solution can be configured with dual redundant controllers that can operate in dual active mode. Each controller has a pair of CI host ports. In the event of a path failure, the controllers can automatically failover to the remaining path.

No Single Point Of Failure

The MA8000/EMA12000 CI redundant architecture eliminates no single points of failure from server to storage in clustered or single server configurations. Dual redundant CI controllers, dual CI ports per controller, dual Star Couplers, dual CI host bus adapters, all used in multi-node cluster configurations can provide a high availability configuration with no-single-point-of-failure. See the white paper mentioned above and also: <http://www.openvms.digital.com:8000/721final/6318/6318pro.html> for the document titled: "Guidelines for OpenVMS Cluster Configurations."

OpenVMS Cluster Software Functions

The OpenVMS operating system, which runs on each node in the OpenVMS cluster, includes several software components that facilitate resource sharing and dynamic adjustments to changes in the underlying hardware configuration. Mass Storage Control Protocol (MSCP) is one key component, which makes disk drives available to all nodes that do not have direct access to those disk drives. Tape Mass Storage Control Protocol (TMSCP) is another key component, which makes tape drives available to all nodes that do not have direct access to those tape drives.

Visit <http://www.openvms.compaq.com:8000/72final/4477/4477pro.html> for a copy of "OpenVMS Cluster Systems" for additional information on these functions.

PRODUCT HIGHLIGHTS

Capacity

The MA8000/EMA12000 provides the highest per-enclosure density in the industry. You may choose a 14 or a 10 bay drive enclosure. The 14 bay enclosure supports up to 14 - 1" drives for a maximum enclosure capacity of 504 GB, using 36GB drives. The 10 bay enclosure supports up to 10 - 1" drives with 0.6" drive extenders or 10 - 1.6" drives for a maximum enclosure capacity of 728GB using 72.8GB 1.6" drives. A fully configured storage system supports up to 60 drives installed in one storage system for a maximum capacity of 4.4TB, using 72.8GB drives.

72.8-GB Drive Support

Current controller firmware (ACS 8.5) limits the maximum storage set (RAID) size to 512 GB (no more than 7 members per RAID set) - up to 20 sets using RAID 5, up to 30 sets using RAID 5 + 1, and 45 sets using RAID 0, 1, 5 - per controller pair for the single bus 10 bay drive enclosure (Model 4310) when using 72.8-GB drives. This restriction will be relieved with the next release of ACS.

Easy Installation

MA8000/EMA12000 predefined models ship fully configured - inside the storage system! CTO models (configure-to-order) also ship fully configured and shipped in the storage system. The easiest installations ever, simply plug it in.

Scalability

You may choose a 14 or 10 bay drive enclosure. The 14 bay enclosure supports up to 14 - 1" drives and the 10 bay enclosure supports up to 10 - 1.6" drives or 10 - 1" drives with 0.6" drive extenders. The EMA12000 S14 features nine 14 bay drive enclosures which house up to 72 drives (1" form factor). A single storage system populated with 36-GB Ultra3 SCSI 10K RPM 1" drives gives you 2.5 TB of raw capacity. The EMA12000 S10 can support a maximum of 4.3TB (60 drives per controller pair). You may also install 36GB Ultra3 SCSI 10K RPM 1" drives with 0.6" drive extenders for use in the 10 bay enclosure; thus, any number of configurations can be used in these storage systems. Any number of storage systems can be used in a configuration for unlimited capacity.

PRODUCT HIGHLIGHTS *(continued)*

Performance

The HSJ80 includes two active dual CI ports resident on each controller as opposed to one CI port on earlier HSJ50 and HSJ40 CI controllers. This will have the effect of doubling the performance (data rate) and connectivity (data paths) of the storage system when connected to two separate star couplers.

The HSJ80 also has a larger cache size of 512 MB per controller compared to the HSJ50 (128 MB) and the HSJ40 (32 MB). The HSJ80 also has improved caching functionality over the earlier HSJ50 and HSJ40 with:

- Mirrored Cache to protect against cache failure on either controller;
- Pre-fetch Cache to pre-fetch data from the disk when a sequential I/O stream is detected,
- Write-Back Caching which holds write data in cache until a disk is available but signals the server that the write operation is complete when the data gets into cache.

Visit http://spdinline1.shr.dec.com/menu_products.asp for a copy of: "Upgrading to the HSJ80," a white paper that explains the performance benefits to be gained with the HSJ80.

Bandwidth

The MA8000/EMA12000 CI has two CI ports per storage controller. Each port has A and a B path with a bandwidth of 8.75MB/sec per path, or 17.5MB/sec per port. Each dual port controller has a bandwidth of 35MB/sec. A redundant controller pair provides up to 70MB/s of data.

Manageability

StorageWorks Command Console (SWCC) provides a graphical user interface (GUI) to set up/configure, monitor, and troubleshoot storage subsystems from a single, centralized, location.

Servers - Single and clustered systems

- VAX Servers
- Alpha Servers

Check <http://www.compaq.com/products/storageworks> for up to date platform information and specific operating system version support. Please note that this Web site is available in English only.

Fault Tolerance

Redundant power supplies, fans, controllers, cache battery backup, hot global spare drives and a multi-level RAID architecture (0, 1, 3/5, 1+0) ensure fault tolerance against system outages and data loss.

High Availability

All MA8000/EMA12000 models provide redundant cooling, N+1 power redundancy and environmental monitoring. Drives and most solution components are hot pluggable. Each solution can be configured with dual controllers that operate in dual redundant mode. Each controller has a pair of FC host ports. In the event of a path failure the controllers can automatically fail over to the remaining path.

Hot Pluggable Support

Hot Pluggable SCSI backplane allows drives to be added and removed without powering down the system.

Manageability

SWCC provides a graphical user interface (GUI) to setup/configure, monitor, and troubleshoot storage subsystems.

Scalability

You may choose a 14 or 10 bay drive enclosure. The 14 bay enclosure supports up to 14 - 1" drives and the 10 bay enclosure supports up to 10 - 1.6" drives or 10 - 1" drives with 0.6" drive extenders. The EMA12000 S14 features nine 14 bay drive enclosures which house up to 72 drives (1" form factor). A single storage system populated with 36-GB Ultra3 SCSI 10K RPM 1" drives gives you 2.5 TB of raw capacity. The EMA12000 S10 can support a maximum of 4.3 TB (60 drives per controller pair). You may also install 36-GB Ultra3 SCSI 10K RPM 1" drives with 0.6" drive extenders for use in the 10 bay enclosure; thus, any number of configurations can be used in these storage systems. Unlimited capacity is achieved by adding more subsystems to the SAN.

QUICKSPECS

Compaq StorageWorks
MA8000/EMA12000 CI
(Cluster Interconnect)

PRODUCT HIGHLIGHTS *(continued)*

CarePaq (service & support)

Software Product Services (recommended for all installations)

- Telephone support
- New version update services, including license and media/documentation subscription services

Hardware Product Services

- Installation services
- On-site Maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work

Rack Density

MA8000/EMA12000 is available in four different rack sizes – 22U Modular Storage System 50/60Hz (Opal), 36U Modular Storage System 50/60Hz (Opal), 42U Modular Storage System 50/60Hz (Opal), and 41U Modular Storage System 50/60Hz (blue).

Total Cost of Ownership

The new MA8000/EMA12000 architecture has the highest enclosure density in the industry. Higher enclosure capacity translates into a smaller floor-space footprint. Example: the EMA12000 D14 will house up to 4.5TB in a single 42U storage system using 36GB drives.

FAMILY INFORMATION

	EMA12000 D14	EMA12000 S10	EMA12000 S14	EMA12000 Blue
Announce Date with HSJ80	Sept 2000	Sept 2000	Sept 2000	Sept 2000
Drive Interface	Wide Ultra2 / Wide Ultra3			
Controller Software	ACS 8.5J-2	ACS 8.5J-2	ACS 8.5J-2	ACS 8.5J-2
Cache	512 MB	512 MB	512 MB	512 MB
RAID Support	0,1, 3/5	0,1, 3/5	0,1, 3/5	0,1, 3/5
Channels	6	6	6	6
Maximum Drives per Model	126	60	72	42
Maximum Capacity per Model	4.5 TB	4.3 TB	2.5 TB	1.5 TB
Redundant Controllers	Yes	Yes	Yes	Yes
Drive Capacities	9, 18, 36	72*	9, 18, 36	9, 18, 36

*Also supports 1-inch 9, 18, 36 drives using 0.6" drive extenders.

PRODUCT SPECIFICATIONS

Model	MA8000/EMA12000 CI
Controller Model	HSJ80
Controller Cache	512 MB per controller standard
Battery Backup for Cache	Standard
Array Controller Software (ACS)	CI support ACS V8.5J-2
Host Interface	CI
Host Ports per Controller	2
Drive Interface	SE Wide Ultra SCSI, 6 channels
RAID Levels	0, 1, 0+1, 3/5 and Partitioning
Maximum Disks Supported	72 per Controller Pair
Non-RAID JBOD Support	Yes
Disks	Compaq Universal Drives
O/S Support	OpenVMS
Sustained I/O Rate	Over 9K IOPS per Controller Pair
Redundant Fans	Yes. N+1
Environmental Monitoring Unit	Yes. Monitors Power and Temperature
Regulatory approvals	UL, CSA, TUV, FCC, CE MARK, CTICK, BCIO
Management Software	<i>StorageWorks</i> Command Console (SWCC)
Power requirements (North America / Europe / Japan)	
AC plug type	North America – 3 wire NEMA No L6-30 (208-240V 60Hz 30A) Europe – 3 wire, 2 pole IEC 309 (220-240V 50Hz 32A) Japan – 3 wire IEC 309 (202-210V 50/60Hz 32A)
Number of phases	Single
Rated current	30A North America, 32A Europe / Japan
BTU rating	5,113 per hour
Nominal airflow	400 cubic ft/minute
Wattage	1,800 Watts maximum (input)
Nominal Line Voltage	North America - 208 or 230V Europe - 230V Japan - 206V
Range Line Voltage	202-240V
Line Frequency	North America 60Hz, Europe 50Hz, Japan 50 or 60Hz
Typical Input Current	8.9A
Operating environment	
Temperature	50° to 95°/10° to 35°C – Reduce rating by 1°F for each 1,000 ft altitude (1.8°C/1,000 m)
Shipping Temperature	–40°C (–40°F) to 66°C (151°F)
Humidity	10% to 90% at maximum wet bulb temp of 90°F/32°C and minimum dew point of 36°F/2°C
Shipping Humidity	Up to 95% relative humidity
Altitude	Up to 8,000 ft /2,438.4 m
Air Quality	Not to exceed 500,000 particles per cubic foot of air at a size of 0.5 micron or larger
Regulatory approvals	UL, CSA, TUV, FCC, CE MARK, C TICK, BCIO

QUICKSPECS

Compaq StorageWorks
MA8000/EMA12000 CI
(Cluster Interconnect)

PRODUCT SPECIFICATIONS *(continued)*

Rack Physical Dimensions

	Height in / mm	Width in / mm	Depth in / mm	Max Wt lbs / kg	Req. Front Clearance in / mm	Req. Rear Clearance in / mm
MA8000 (22U)	43.0 / 1092	23.7 / 602	35.8 / 909	510 / 232	21.3 / 542	22.8 / 580
EMA12000 D14 (42U)	78.75 / 2000	23.7 / 602	35.8 / 909	1073 / 487	21.3 / 542	22.8 / 580
EMA12000 S10 (42U)	78.75 / 2000	23.7 / 602	35.8 / 909	798 / 362	21.3 / 542	22.8 / 580
EMA12000 S14 (36U)	68.6 / 1743	23.7 / 602	35.8 / 909	755 / 343	21.3 / 542	22.8 / 580
EMA12000 Blue (41U)	78.75 / 2000	23.62 / 600	36.1 / 917	604 / 274	21.3 / 542	22.8 / 580
42U Modular	78.75 / 2000	23.7 / 602	35.8 / 909	433 / 197	21.3 / 542	22.8 / 580
36U Modular	68.6 / 1743	23.7 / 602	35.8 / 909	390 / 177	21.3 / 542	22.8 / 580
22U Modular	43.0 / 1092	23.7 / 602	35.8 / 909	291 / 132	21.3 / 542	22.8 / 580
41U Modular	78.75 / 2000	23.7 / 602	35.8 / 909	385 / 175	21.3 / 542	22.8 / 580

Storage System Shipping Dimensions

	Height in / mm	Width in / mm	Depth in / mm	Max Wt lbs / kg
MA8000 (22U)	52.25 / 1327	32.0 / 813	48.0 / 1220	613 / 278
EMA12000 D14 (42U)	83.38 / 2118	32.0 / 813	48.0 / 1220	1190 / 540
EMA12000 S10 (42U)	83.38 / 2118	32.0 / 813	48.0 / 1220	915 / 415
EMA12000 S14 (36U)	75.25 / 1911	32.0 / 813	48.0 / 1220	867 / 393
EMA12000 Blue (41U)	85.0 / 2159	36.0 / 915	48.0 / 1220	707 / 321
42U Modular	83.38 / 2118	32.0 / 813	48.0 / 1220	550 / 249
36U Modular	75.25 / 1911	32.0 / 813	48.0 / 1220	501 / 227
22U Modular	52.25 / 1327	32.0 / 813	48.0 / 1220	394 / 179
41U Modular	85.0 / 2159	36.0 / 915	48.0 / 1220	488 / 221

Models

Pre-configured Model

MA8000 60Hz	720591397487
MA8000 50Hz	720591399689
EMA12000D14 60Hz	720591397036
EMA12000D14 50Hz	720591399412
EMA12000 S10 60Hz	720591307609
EMA12000 S10 50Hz	720591399719
EMA12000S14 60Hz	720591397333
EMA12000S14 50Hz	720591399443
EMA12000Blue 60Hz	720591397548
EMA12000Blue 50Hz	720591399702

UPC Code

Modular Storage Systems (for CTO)

42U Modular Storage System 60Hz (opal)	720591398378
42U Modular Storage System 50Hz (opal)	720591398590
36U Modular Storage System 60Hz (opal)	720591398606
36U Modular Storage System 50Hz (opal)	720591398644
22U Modular Storage System 60Hz (opal)	720591398651
22U Modular Storage System 50Hz (opal)	720591398668
41U Modular Storage System 60Hz (blue)	720591398880
41U Modular Storage System 50Hz (blue)	720591398897

UPC Code

PRODUCT SERVICE OPTIONS

Software Product Services

- Standalone telephone support
- Rights to new license version
- Media and documentation updates

Hardware Product Services

- Installation services
- On-site Maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work

For additional hardware installation and maintenance information please refer to the URL's listed below:

http://www.compaq.com/services/hardware/hw_installation.html

http://www.compaq.com/services/hardware/hw_maintenance.html

Please note that these Web sites are available in English only.

Warranty Upgrade Options

- Response - Upgrade on-site response from next business day to same day 4-hours
- Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days
- Duration - Select duration of coverage for a period of 1, 3, or 5 years

CarePAQ Information

Sample part numbers:

- FM-******XHW-36 3 year, uplift to 5x9, Next Day Response
- FM-******4HR-36 3 year, uplift to 5x9, 4-hours Response
- FM-******724-36 3 year, uplift to 7x24, 4-hours Response

****** represents a two digit product specific code

- CarePAQ is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.
- CarePAQ is not available for less than the products warranty duration.
- CarePAQ is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- CarePAQ services are prepaid.

For additional CarePAQ (hardware & software) information, as well as, orderable part numbers please refer to the URL listed below:

<http://www.compaq.com/services/carepag/index.html> Please note that this Web site is available in English only.

Components

The following brick level options/components do not have individual CarePAQ's. These items will be included in product CarePAQ's which they are installed into.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs	Adapters
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling	Fans

QUICK SPECS

CONFIGURATION INFORMATION

The MA8000/EMA12000 CI is a scalable, no singular point of failure, modular solution with disaster tolerance and business continuity for storage consolidation on OpenVMS Cluster Systems.

STEP 1—MODULAR SOLUTIONS—BASE CONFIGURATION

Select one:

<u>Pre-configured Model</u>	<u>Part #</u>	<u>Model Description:</u>
MA8000 60Hz	175992-B21	1 Controller enclosure, 3 Dual Bus 14 bay drive enclosures, 22U Modular Storage System (opal)
MA8000 50Hz	175992-B22	1 Controller enclosure, 3 Dual Bus 14 bay drive enclosures, 22U Modular Storage System (opal)
EMA12000D14 60Hz	175990-B21	3 Controller enclosures, 9 Dual Bus 14 bay drive enclosures, 42U Modular Storage System (opal)
EMA12000D14 50Hz	175990-B22	3 Controller enclosures, 9 Dual Bus 14 bay drive enclosures, 42U Modular Storage System (opal)
EMA12000 S10 60Hz	175994-B21	1 Controller enclosure, 6 Single Bus 10 bay drive enclosures, 42U Modular Storage System (opal)
EMA12000 S10 50Hz	175994-B22	1 Controller enclosure, 6 Single Bus 10 bay drive enclosures, 42U Modular Storage System (opal)
EMA12000S14 60Hz	175991-B21	1 Controller enclosure, 6 Single Bus 14 bay drive enclosures, 36U Modular Storage System (opal)
EMA12000S14 50Hz	175991-B22	1 Controller enclosure, 6 Single Bus 14 bay drive enclosures, 36U Modular Storage System (opal)
EMA12000Blue 60Hz	175993-B21	1 Controller enclosure, 3 Dual Bus 14 bay drive enclosures, 41U Modular Storage System (blue)
EMA12000Blue 50Hz	175993-B22	1 Controller enclosure, 3 Dual Bus 14 bay drive enclosures, 41U Modular Storage System (blue)

STEP 2 – REQUIRED OPTIONS (FOR PRE-DEFINED MODELS)

<u>Controller Model</u>	<u>Part #</u>
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(one or two required per MA8000/EMA12000 CI package)

HSJ80 Controller with 512MB cache	204305-B21
External Cache Battery (one required per controller)	135823-B21

<u>Controller Software</u>	<u>Part #</u>
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(one required per controller: redundant controllers must use the same version of ACS)

ACS v8.5J-2 Controller CI software.	203693-B21
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<u>OS Software/Platform Kits</u>	<u>Part #</u>
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(one kit required per operating system type)

HSJ80 Array Controller OpenVMS Solution Kit, v8.5J-2	203694-B21
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<u>StorageWorks Drives</u>	<u>Part #</u>
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72-GB Ultra3 SCSI 10K RPM 1.6" drive	176494-B21
36-GB Ultra3 SCSI 10K RPM 1" drive	176496-B22
18-GB Ultra3 SCSI 10K RPM 1" drive	142673-B22
9-GB Ultra3 SCSI 10K RPM 1" drive	142671-B22
18-GB Ultra2 SCSI 10K RPM 1" drive	128418-B22
9-GB Ultra2 SCSI 10K RPM 1" drive	328939-B22
18G-B Ultra2 SCSI 7200 RPM 1" drive	338144-B22
9-GB Ultra2 SCSI 7200 RPM 1" drive	123065-B22
0.6" Drive Extenders (package of 4)	148649-B21

Note: drive extenders are attached to 1" drives so they can be used in 1.6" drive bays.

CONFIGURATION INFORMATION *(continued)*

STEP 3 – CONFIGURE-TO ORDER

Configure-to-Order (for customized solutions: full details for creating Configure-to-Order solution can be found in the Configuration Guide at URL: <http://www.compaq.com/products/storageworks/modulararray/index.html> - Please note that this Web site is available in English only.) – requires a rack, Model 2200 controller enclosure, Model 4200 or 4300 drive enclosures, and required options as noted for predefined models.

Configure-To-Order (for customized solutions: full details for creating Configure-To-Order solutions can be found in the Configuration Guide at URL: <http://www.compaq.com/products/storageworks/modulararray/index.html> Please note that this Web site is available in English only.

Indicates that parts on the order are to be assembled at the factory 118102-888

Note: Each order represents one customized solution.

Storage Systems

<u>Storage Systems</u>	<u>Part #</u>	<u>Description with parts shipped</u>
42U Modular Storage System 60Hz (opal)	180311-B21	MODULAR STORAGE CAB,60HZ PDU, 208-240V, OPAL, REDUNDANT PDU
42U Modular Storage System 50Hz (opal)	180312-B22	MODULAR STORAGE CAB,50HZ PDU, 208-240V, OPAL, REDUNDANT PDU
36U Modular Storage System 60Hz (opal)	180313-B21	MODULAR STORAGE CAB,60HZ PDU, 208-240V, OPAL, REDUNDANT PDU
36U Modular Storage System 50Hz (opal)	180314-B22	MODULAR STORAGE CAB,50HZ PDU, 208-240V, OPAL, REDUNDANT PDU
22U Modular Storage System 60Hz (opal)	180315-B21	MODULAR STORAGE CAB,60HZ PDU, 208-240V, OPAL, REDUNDANT PDU
22U Modular Storage System 50Hz (opal)	180316-B22	MODULAR STORAGE CAB,50HZ PDU, 208-240V, OPAL, REDUNDANT PDU
41U Modular Storage System 60Hz (blue)	180317-B21	MODULAR STORAGE CAB,60HZ PDU, 208-240V, BLUE, REDUNDANT PDU
41U Modular Storage System 50Hz (blue)	180318-B22	MODULAR STORAGE CAB,50HZ PDU, 208-240V, BLUE, REDUNDANT PDU

Controller Enclosure

<u>Controller Enclosure</u>	<u>Part #</u>
Model 2200	135820-B21

Drive Enclosures

<u>Drive Enclosures</u>	<u>Part #</u>	<u>Description</u>
Model 4214R	103381-001	Single bus 14 bay drive enclosure (N. America)
	103381-B31	(International)
	103381-291	(Japan)
Model 4254R	138151-001	Dual bus 14 bay drive enclosure (N. America)
	138151-B31	(International)
	138151-291	(Japan)
Model 4314R	190209-001	Single bus 14 bay drive enclosure (N. America)
	190209-B31	(International)
	190209-291	(Japan)
Model 4354R	190210-001	Dual bus 14 bay drive enclosure (N. America)
	190210-B31	(International)
	190210-291	(Japan)
Model 4310R	174631-B21	Single bus 10 bay drive enclosure (N. America)
	174631-B31	(International)
	174631-291	(Japan)
Model 4350R	174630-B21	Dual bus 10 bay drive enclosure (N. America)
	174630-B31	(International)
	174630-291	(Japan)

CONFIGURATION INFORMATION *(continued)*

STEP 3 – CONFIGURE-TO ORDER *(continued)*

<u>Drive Enclosure Options</u>	<u>Part #</u>	<u>Description</u>
4200 power supply	119826-B21	4214 Redundant power supply, single IEC-320-C13 Plug X NEMA
Ultra3 Single Bus I/O Module	190212-B21	
Ultra3 Dual Bus I/O Module	190213-B21	

SCSI Cables, Drive Enclosure to Controller

<u>Enclosure</u> (for CTO configurations)	<u>Part#</u>
1 meter SCSI Cable – VHDCI to VHDCI	168257-B21
2 meter SCSI Cable – VHDCI to VHDCI	189505-B21
3 meter SCSI Cable – VHDCI to VHDCI	400983-005
5 meter SCSI Cable – VHDCI to VHDCI	400983-005
10 meter SCSI Cable – VHDCI to VHDCI	400985-010

STEP 4 – ADDITIONAL OPTIONS

<u>Host Bus Adapters</u>	<u>Part #</u>
PCI to CI Host Adapter	CIPCA-AA
PCI to CI Host Adapter, for Alpha server 4000 series and new systems	CIPCA-BA
VAX 6000 CI Interface	CIXCD-AB
XML to CI Adapter	CIXCD-AC

<u>Computer Interconnect Cables</u>	<u>Part #</u>
CI cable, 10meter	BNCIA-10
CI cable, 20meter	BNCIA-20
CI cable, 45meter	BNCIA-45

<u>SCSI Extender / Extender-converter</u> (for external tape drive / tape library connection; max SE cable length is 3 meters)	<u>Part #</u>
SE Ultra SCSI 68-pin VHDCI to SE Ultra SCSI 68-pin VHDCI	DWZZC-AA
SE Ultra SCSI 68-pin VHDCI to Differential Ultra SCSI 68-pin VHDCI	DWZZC-DA

Supported Tape Drives and Tape Libraries (All tape drives and libraries are outside of the MA8000/EMA12000)

<u>Tape Drives</u>	
4GB 4mm DAT	TLZ06-VA
4/8GB 4mm DAT	TLZ07-VA, TLZ09-VA
1600/6250 bpi PE/GCR reel-to-reel	TSZ07-AA
25/50GB AIT	DS-TZS20-VW
35/70GB AIT	DS-AIT35-VW
6GB DLT	TZ86-VA
10/20GB DLT	TZ87-TA, TZ87-VA
20/40GB DLT	TZ88N-TA/VA
35/70GB DLT	TZ89N-AV
IBM 3480 Compatible	TKZ60
IBM 3480 Compatible	TKZ61
IBM 3490E Compatible	TKZ62
IBM 3480/3490/3490E Compatible	TKZ63

QUICKSPECS

CONFIGURATION INFORMATION *(continued)*

STEP 4 – ADDITIONAL OPTIONS *(continued)*

Supported Tape Drives and Tape Libraries (All tape drives and libraries are outside of the MA8000/EMA12000)
(continued)

Tape Drives with Cartridge Loaders

TLZ06 with 4 cartridge loader	TLZ6L-VA
TLZ07 with 4 cartridge loader	TLZ7L-VA
TLZ09 with 8 cartridge loader	TLZ9L-VA
TZ86 with 7 cartridge loader	TZ867
TLZ87 with 5 cartridge loader	TZ875
IBM 3480/3490/3490E Compatible with 60 cartridge loader	2T-TKZ64

Tape Libraries

TZ87 with 7 cartridge mini-library	TZ877
TZ88 with 5 cartridge mini-library	TZ885
TZ88 with 7 cartridge mini-library	TZ887
(4) TZ87 – 52 cartridge	TL810
(4) TZ88 – 52 cartridge	TL812
(3) TZ87 – 264 cartridge	TL820
(3) TZ88 – 264 cartridge	TL822
(6) TZ88 – 176 cartridge	TL826
Expansion unit for TL891 series – 16 cartridge, no drives	DS-TL890
(1) TZ89 – 10 cartridge	DS-TL891
(2) TZ89 – 10 cartridge	DS-TL892
(3) TZ89 – 264 cartridge	DS-TL893
(4) TZ89 – 52 cartridge	DS-TL894
(5) TZ89 – 100 cartridge	DS-TL895
(6) TZ89 – 176 cartridge	DS-TL896
(16) TZ89 – 326 cartridge	161268-B21 (ESL9362D)