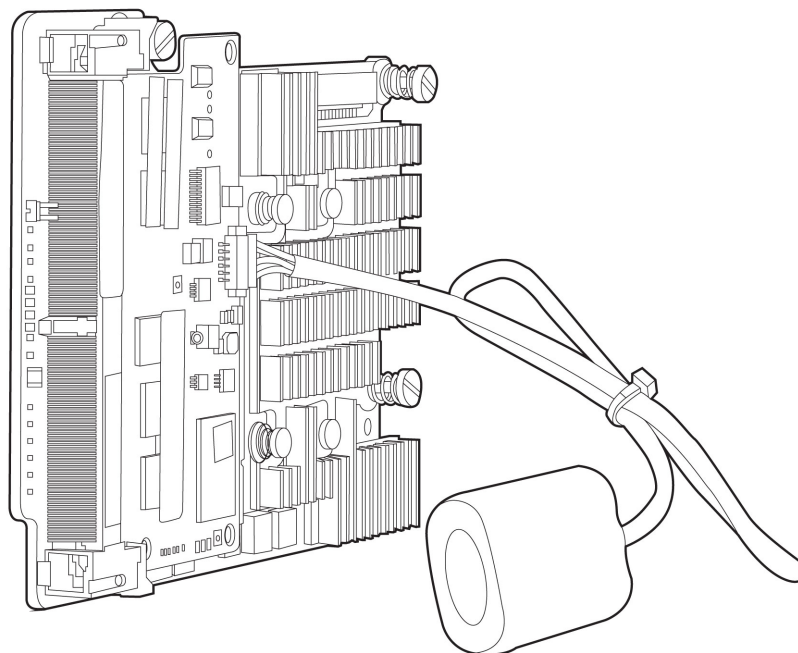


### Overview

The HP Smart Array P731m is a PCI-Express (PCIe) 3.0 mezzanine card supporting direct attached storage for the HP ProLiant Gen8 BladeSystem servers. It is one of the highest performing controllers in the HP 6 Gb/s SAS portfolio and provides new levels of reliability, connectivity, and storage performance for HP Gen8 Blade servers through its support of the latest SCSI technology and advanced RAID capabilities. The P731m can support up to 227 zoned direct attached SAS or SATA drives, tape drives, and can connect to D2600, D2700 and D6000 Disk Enclosures.



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### Models

HP Smart Array P731m/2GB FBWC 6Gb 4-ports Ext Mezzanine SAS Controller

698535-B21

### Standard Features

#### The Smart Array Advantage

HP's innovative design and integration work within the Smart Array family of products creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HP Smart Array family brings an unparalleled return on investment through:

**Data Compatibility** among most current shipping Smart Array controllers allows simple and easy upgrades any time as needs for higher performance, capacity, and availability increase. Even successive generations of Smart Array controllers understand the data format of other Smart Array Controllers.

**Consistent Configuration and Management Tools.** Most current shipping Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain HP server storage.

**Pre-Failure Warranty** means HP Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HP Support Center or refer to your HP Server documentation.

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#### Key Features

- Storage interface (SAS/SATA)
    - Eight (8) 6 Gb/s SAS physical links distributed equally across 4 external 2x ports to support up to four 6 Gb/s SAS Switches
    - 6 Gb/s SAS technology delivers up to 600 MB/s theoretical bandwidth per physical lane
    - 6 Gb/s SATA technology delivers up to 600 MB/s theoretical bandwidth per physical lane for directly attached SATA drives.
    - Mix-and-match SAS and SATA drives to the same controller. Deploy drive technology as needed to fit the computing environment.
    - Support for SAS tape drives, SAS tape autoloaders and SAS tape libraries.
  - RAID controller features
    - RAID 0, 1, 10, 5, 50, 6, 60, 1 ADM, 10 ADM
    - Recovery ROM protects against ROM corruption
    - HP Smart Cache (HP Smart Cache license is not required on P731m with 2 GiBytes FBWC)
    - HP SSD Smart Path
  - PCI Express Gen3 x8 link
  - 2 GiBytes Flash Backed Write Cache (FBWC) provides read ahead caching and write back caching with indefinite write cache data retention in the case of unexpected power outage.
  - Software consistency on most current shipping Smart Array family products: HP SmartStorage Administrator, HP Systems Insight Manager, and HP Intelligent Provisioning. The HP Smart Storage Administrator configures and manages a host of Smart Array controllers and other storage devices using a single interface. It replaces the HP Array Configuration Utility (ACU) with an updated design and configuration enhancements.
-

### Standard Features

#### Online Management Features

- Online array expansion
  - Online capacity expansion
  - Online logical drive extension
  - Online RAID level migration
  - Online stripe size migration
  - Online mirror split, recombine, and rollback
  - Online and high performance offline Rapid Parity Initialization (RPI)
  - Unlimited global online spares assignment
  - User selectable expand and rebuild priority
  - User selectable RAID level and stripe size
  - User selectable read and write cache sizes
  - Supports Predictive Spare Activation
- 

#### Performance

- Eight (8) 6 Gb/s SAS physical links distributed across 4 external 2x ports which supports up to four 6 Gb/s SAS Switches
  - 6 Gb/s SAS (600 MB/s theoretical bandwidth per physical lane)
  - PCIe 3 x8
  - 2 GiBytes Flash Backed Write Cache
- 

#### Availability

Provides increased server uptime by providing advanced storage functionality:

- Online RAID level migration between any RAID levels
  - Online stripe size migration
  - Online capacity expansion
  - Online logical drive extension
  - Online active drive replacement
  - Online drive firmware upgrade
  - Unlimited global online spare
- 

#### Fault Prevention

The following features offer detection of possible failures before they occur, allowing preventive action to be taken:

- S.M.A.R.T.: Self Monitoring Analysis and Reporting Technology first developed at HP detects possible hard disk failure before it occurs, allowing replacement of the component before failure occurs.
  - Drive Parameter Tracking monitors drive operational parameters, predicting failure and notifying the administrator.
  - Dynamic Sector Repairing continually performs background surface scans on the hard disk drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.
  - Smart Array Cache Tracking monitors integrity of controller cache, allowing pre-failure preventative maintenance.
-

### Standard Features

#### Fault Tolerance

Keeps data available and server running while a failed drive is being replaced; several fault tolerance configurations are supported including:

- **RAID 6** (Advanced Data Guarding): Supported with a minimum of 4 drives. This allocates two sets of parity data across drives. This level of fault tolerance can withstand a double drive failure without downtime or data loss.
  - **RAID 60**: Supported with a minimum of 8 drives. This volume is composed of two or more RAID 6 sub-volumes (parity groups) where data is striped across each parity group as if it were a single physical drive. Each RAID 6 parity group can sustain up to two drive failures without incurring data loss.
  - **RAID 5** (Distributed Data Guarding): Supported with a minimum of 3 drives. This allocates one set of parity data across drives. This level of fault tolerance can withstand a single drive failure without downtime or data loss.
  - **RAID 50**: Supported with a minimum of 6 drives. This volume is composed of two or more RAID 5 sub-volumes (parity groups) where data is striped across each parity group as if it were a single physical drive. Each RAID 5 parity group can sustain a single drive failure without incurring data loss.
  - **RAID 1 & 10** (Drive Mirroring): Supported with a minimum of 2 drives. This allocates half of the drive array to the data and the other half to the mirrored data, providing two copies of the data.
  - **RAID 1 ADM & 10 ADM** (Advanced Data Mirroring): Supported with a minimum of 3 drives. RAID 1 ADM creates redundant copies of the data using 3 drives. RAID 10 ADM stripes data across two or more sets of RAID 1 ADM volumes. This level of fault tolerance can withstand a double drive failure within a RAID 1 ADM volume without downtime or data loss.
- 

#### Fault Recovery

Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure:

- **Recovery ROM**: This feature protects the user from a firmware image corruption by storing a redundant copy of the firmware image. If the active firmware image becomes corrupt, the controller will use the redundant firmware image and continue operating.
  - **On-Line Spares**: There is no limit to the number of spare drives that can be installed prior to drive failure. If a failure occurs, recovery begins with an On-Line Spare and data is reconstructed automatically.
  - **DRAM ECC** detects and corrects data bit errors.
- 

#### Ease of Use

Consistency and upgradeability on most shipping Smart Array products make them unique in the industry:

- GUI based configuration, management and diagnostic software tools with the HP Smart Storage Administrator
  - Common data format between generations of products
  - Data migration between servers and external Modular Smart Array enclosures and disk enclosures
-

### Standard Features

#### HP SSD Smart Path

The HP SSD Smart Path feature included in the Smart Array software stack improves Solid State Disk (SSD) read performance. With up to 4x better SSD read performance, HP SSD Smart Path chooses the optimum path to the SSD and accelerates reads for all RAID levels and RAID 0 writes. HP SSD Smart Path requires updated firmware, drivers, and configuration utility available at: [www.hp.com/go/ssdsmartpath](http://www.hp.com/go/ssdsmartpath). HP SSD Smart Path is ideal for read intensive workloads and is included as a base feature on HP Smart Array P-series controllers. The following operating systems are supported by the HP SSD Smart Path feature:

- Microsoft Windows Server 2008
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2012

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#### HP SmartCache

The HP SmartCache feature is a controller-based read caching solution in a DAS environment that caches the most frequently accessed data ("hot" data) onto lower latency SSDs to dynamically accelerate application workloads. The HP SmartCache architecture is flexible and supports any HP ProLiant Gen8 supported HDD for bulk storage and any HP ProLiant Gen8 supported SSD as an accelerator.

HP SmartCache is deployed and managed using the HP SmartStorage Administrator (HP SSA).

The basic HP SmartCache architecture is comprised of the following three elements:

- **Bulk storage:** The first element is the bulk storage device, which is any supported HDD attached to the HP Smart Array controller.
- **Accelerator:** The second element, the accelerator, is a faster/lower latency SSD device that caches data.
- **Metadata:** The final element is metadata, information held in a relatively small storage area that maps the location of information residing on the accelerator and bulk storage devices.

For more information please visit: [www.hp.com/go/smartcache](http://www.hp.com/go/smartcache).

### Compatibility

#### Server Support

HP ProLiant BL420c Gen8  
HP ProLiant BL460c Gen8  
HP ProLiant BL465c Gen8  
HP ProLiant BL660c Gen8

#### NOTE:

- For BL420c Gen8 & BL460c Gen8 - P731m is a Type B mezzanine .It can only be installed on mezzanine slot 2 which requires a second processor for functionality. The BL420c, BL465c, and BL460c Gen8 can only support one Type B mezzanine.
- For BL465 Gen8 - P731m is a Type B mezzanine and can only be installed on mezzanine slot 2
- For BL660c Gen8 - P731m is a Type B mezzanine. It can only be supported on mezzanine slot 2 and mezzanine slot 3. The BL660c Gen8 can support up to two Type B mezzanines.

**NOTE:** For more information on internal vs external connections, please refer to proper blade QuickSpecs please visit: <http://h18000.www1.hp.com/products/quickspecs/division/12534.html>

#### Operating Systems and Virtualization Software Support for ProLiant Servers

Microsoft Windows Server 2008 R2  
Microsoft Windows Server 2012  
Red Hat Enterprise Linux 5 (x64 & x86)  
Red Hat Enterprise Linux 6 (x64 & x86)  
SUSE Linux Enterprise Server 11 (x64 & x86)  
VMware ESXi 5.0 U2  
VMware ESXi 5.1 U1  
VMware vSphere 5.5

**NOTE:** For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <http://www.hp.com/go/ossupport>.

#### Software Suite

Most current shipping Smart Array products share a common set of configuration, management and diagnostic tools, including HP Smart Storage Administrator and HP Systems Insight Manager. This software consistency of tools reduces the cost of training for each successive generation of product and takes much of the guesswork out of troubleshooting field problems. These tools lower the total cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage.

#### HP Systems Insight Manager

- Powerful server and server options/storage manager tool
- Monitors over 1200 system wide parameters
- Configuration/Diagnostic Utilities

#### HP Smart Storage Administrator

- Comprehensive management for HP Smart Storage products
- Simplified and intuitive interface and functionality
- Advanced scripting and diagnostic features

For more information please visit: [www.hp.com/go/hpssa](http://www.hp.com/go/hpssa)

### Compatibility

#### **HP Storage Management Utility**

- Initial System Configuration Wizard is the easiest and simplest method for configuring the storage system.
- Command Line Interface (CLI) for command level method of configuring and managing the storage
- Main User Interface for multi server environments that need customization for creation of storage LUNs and targets.

### Service and Support

#### Service and Support

##### HP Technology Services

Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

##### Protect your business beyond warranty with HP Care Pack Services

When you buy HP Options, it's also a good time to think about what level of service you may need. HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HP Foundation Care services offer scalable reactive support-packages for HP servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.

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### Recommended HP Care Pack Services for your HP product

#### Optimized Care

##### 3-Year HP 6 hour Call to Repair Response, Proactive Care

Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf>

##### HP Installation of ProLiant Add On Options Service

This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations

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#### Standard Care

##### 3-Year HP 24x7 4 hour Response, Proactive Care

This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HP's vast global resources.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf>

##### HP Installation of ProLiant Add On Options Service

This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.



### Service and Support

#### Related Services

##### **HP Proactive Care Personalized Support - Environmental Option**

The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HP Proactive Care Support.

##### **HP Proactive Select Service**

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. <http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf>

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#### **Insight Online/Insight Remote Support**

HP Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HP solution. Learn more about Insight Remote Support <http://www.hp.com/go/insightremotesupport> and Insight Online <http://h18013.www1.hp.com/products/servers/management/insight-online/index.html>

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#### **HP Support Center**

Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more <http://www.hp.com/go/hpsc>

HP's Support Center Mobile App\* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement.

\* HP's Support Center Mobile App is subject to local availability

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#### **Parts and materials**

HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction.

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#### **For more information**

To learn more on HP BladeSystem services, please contact your HP sales representative or HP Authorized ServiceOne Channel Partner. Or visit: [www.hp.com/services/bladeSystem](http://www.hp.com/services/bladeSystem)

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### Service and Support

#### Warranty

The warranty for this device is 3 years parts only.

**Pre-Failure Warranty:** Drives attached to the Smart Array Controller and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. For complete details, consult the HP Support Center or refer to your HP Server Documentation.

Enhancements to warranty services are available through Care Pack services.

**NOTE:** For more information, visit HP Care Pack Services at:  
<http://www.hp.com/services>

### Related Options

<b>HP SAS Switches</b>	HP 6Gb SAS Switch Single Pack for HP BladeSystem c-Class	BK763A
	HP 6Gb SAS Switch Dual Pack for HP BladeSystem c-Class	BK764A
	<b>NOTE:</b> Please see the QuickSpecs for Technical Specifications and additional information at: <a href="http://h18000.www1.hp.com/products/quickspecs/13960_div/13960_div.html">http://h18000.www1.hp.com/products/quickspecs/13960_div/13960_div.html</a>	

<b>HP BladeSystem c Class Server Blade Enclosures</b>	HP BLc7000 Configure-to-order 3 In LCD ROHS Enclosure	507019-B21
	HP BLc7000 Enclosure with 1 Phase 2 Power Supply 4 Fan ROHS ICE License	507014-B21
	HP BLc7000 Enclosure with 1 Phase 6 Power Supply 10 Fan ROHS ICE License	507015-B21
	HP BLc7000 Enclosure with 3 Phase 6 Power Supply 10 Fan ROHS ICE License	507016-B21
	HP BLc7000 Enclosure with 3 Phase 6 Power Supply 10 Fan ROHS ICE License	507017-B21
	HP BLc3000 Platinum Enclosure with 4 AC Power Supplies 6 Fans ROHS 8 Insight Control Licenses	696908-B21
	HP BLc3000 Platinum Enclosure with 4 AC Power Supplies 6 Fans ROHS Trial Insight Control License	696909-B21
	HP BLc3000 Enclosure with 4 AC Power Supplies 6 Fan Full ICE License	508664-B21
	HP BLc3000 Enclosure with 4 AC Power Supplies 6 Fan Trial ICE License	508665-B21
	HP BLc3000 Enclosure with 2 AC Power Supplies 4 Fan Trial ICE License	536841-B21

<b>HP Disk Enclosures</b>	<b>Disk Enclosures</b>	
	<b>HP D2000 Disk Enclosures</b>	
	HP D2600 Disk Enclosure	AJ940A
	<b>NOTE:</b> Supports 12 LFF drives, and SAS 6Gb/s and SATA 3Gb/s.	
	HP D2700 Disk Enclosure	AJ941A
	<b>NOTE:</b> Supports 25 SFF drives, and SAS 6Gb/s and SATA 3Gb/s.	
	<b>NOTE:</b> Please see the supported Disk Enclosure QuickSpecs for a list of compatible hard drives: <a href="http://h18000.www1.hp.com/products/quickspecs/13404_div/13404_div.html">http://h18000.www1.hp.com/products/quickspecs/13404_div/13404_div.html</a> (HP D2000 Disk Enclosure)	
<b>HP D6000 Disk Enclosure</b>		
HP D6000 Dual I/O Module Disk Enclosure	QQ695A	
<b>NOTE:</b> Please see the supported Disk Enclosure QuickSpecs for a list of compatible hard drives: <a href="http://h18000.www1.hp.com/products/quickspecs/14419_div/14419_div.html">http://h18000.www1.hp.com/products/quickspecs/14419_div/14419_div.html</a> (HP D6000 Disk Enclosure)		

### Related Options

#### HP Tape Backup

#### Tape Autoloaders

HP StoreEver 1/8G2 LTO-6 Ultrium 6250 SAS Tape Autoloader	COH18A
HP StoreEver 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377B
HP StoreEver 1/8 G2 LTO-5 Ultrium 3000 SAS Tape Autoloader	BL536B

#### Tape Libraries

HP StoreEver MSL2024 1 LTO-6 Ultrium 6250 SAS Tape Library	COH20A
HP StoreEver MSL2024 2 LTO-6 Ultrium 6250 SAS Tape Library	COH21A
HP MSL2024 1 LTO-5 Ultrium 3000 SAS Tape Library	BL537B
HP MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library	AK378B
HP StoreEver MSL4048 2 LTO-6 Ultrium 6250 SAS Tape Library	COH23A
HP MSL4048 2 LTO-5 Ultrium 3000 SAS Tape Library	BL538B
HP MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library	AK380B
HP MSL4048 0-Drive Tape Library	AK381A
HP MSL8048 0-drive Tape Library	AU300A
HP StoreEver MSL8096 2 LTO-6 Ultrium 6250 SAS Tape Library	COH25A
HP MSL8096 2 LTO-5 Ultrium 3000 SAS Tape Library	BL539B

### Technical Specifications

<b>Disk Drive and Enclosure Protocol Support</b>	SAS protocol: 6 Gb/s, 3 Gb/s SATA protocol: 6 Gb/s, 3 Gb/s
<b>SAS Connectors</b>	4 external 2x ports to support up to four 6 Gb/s SAS Switches
<b>SAS Port Link Rate</b>	6 Gb/s per physical link
<b>PCIe Link Rate</b>	PCIe3 x8
<b>Memory Bus Speed</b>	DDR3-1600MHz, 72-bit wide bus at 12.8GB/s (2 GiBytes cache module)
<b>Physical Drives Supported</b>	Up to 227 zoned physical drives
<b>Logical Drives Supported</b>	64 logical drives
<b>Memory Addressing</b>	64-bit, supporting servers memory space greater than 4 GiB (4.4 GB)
<b>RAID Support</b>	RAID 6, 60 (Advanced Data Guarding) RAID 5, 50 (Distributed Data Guarding) RAID 1, 10 (Drive Mirroring) RAID 1 ADM, 10 ADM (Advanced Data Mirroring) RAID 0 (Striping)
<b>Upgradeable Firmware</b>	Flashable ROM with redundant firmware images

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<b>Environment-friendly Products and Approach</b>	<b>End-of-life Management and Recycling</b>	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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