

Additional Options

HPE Flash Media Kits for USB Drives	HPE Flash Media Kits for USB Drives	
	HPE Enterprise Mainstream Flash Media Kits for Memory Cards	
	HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit	737953-B21
	HPE 8GB microSD Enterprise Mainstream Flash Media Kit	726116-B21
	HPE 32GB microSD Mainstream Flash Media Kit	700139-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04123175		

HPE Care Pack Services	Proactive Care Services	
	HPE 3 year Proactive Care 24x7 BL4xxc Gen9 Service	U7BN8E
	HPE 3 year Proactive Care 24x7 with DMR BL4xxc Gen9 Service	U7BN9E
	HPE 3 year Proactive Care Advanced 24x7 BL4xxc Gen9 Service	U7BT6E
	HPE 3 year Proactive Care Advanced 24x7 with DMR BL4xxc Gen9 Service	U7CF8E
	Installation Services	
	HPE Install c-Class Server Blade Service	UE493E
NOTE: Additional HPE Care Pack services can be found at: http://www.hp.com/go/cpc		

Memory

For detailed memory configuration rules and guidelines, please use the Online DDR4 Memory Configuration Tool <http://h22195.www2.hp.com/MemoryTool/Home/Legal>

Memory Subsystem Architecture

Each Intel® Xeon® E5-2600 v3 family or Intel® Xeon® E5-2600 v3 family processor socket contains four memory channels that support two DIMMs each for a total of eight (8) DIMM per installed processor or a grand total of sixteen (16) DIMMs for the server. Up to 64GB capacity DIMMs are supported for 1TB of memory (16 DIMM slots 64GB per DIMM).

NOTE: 64GB DIMM support available in early 2015.

Memory Population Rules and Guidelines:

- A minimum of one DIMM is required per processor.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- DIMM sizes can be mixed in channel. To maximize performance, it is recommended to balance the total memory capacity between all installed processors and to load the channels similarly whenever possible.
- LRDIMM and RDIMMs are all distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen9 servers support RDIMM and LRDIMM.
- DIMMs of different speeds may be mixed in any order; the server will select a common optimal speed.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- HPE memory from previous generation servers is not compatible with the BL460c Gen9 Server Blade.
- To realize the performance memory capabilities listed in this document, HPE SmartMemory is required.

For additional information, please see the HPE SmartMemory QuickSpecs at:

<https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111535>

- For memory population rules and additional memory guidelines, please see the BL460c Gen9 user guide at <http://www.hp.com/support>.

Supported Memory Bandwidth on Intel® Xeon® E5-2600 v3 series Processors

DIMM Rank	Register DIMM (RDIMM)			Load Reduced (LRDIMM)	
	Single Rank (1R)	Dual Rank (2R)		Dual Rank (2R)	Quad Rank (4R)
DIMM Capacity	8GB	16GB	8GB	16GB	32GB
Voltage	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V
SLOTS THAT CAN BE POPULATED					
12 slot servers	12	12	12	12	12
16 slot servers	16	16	16	16	16
MAXIMUM CAPACITY (GB)*					
12 slot servers	96	192	96	192	384
16 slot servers	128	256	128	256	512
POPULATED DIMM SPEED (MT/s)					
1 DIMM Per Channel	2133	2133	2133	2133	2133

Memory

2 DIMM Per Channel	2133	2133	2133	2133	2133
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*Maximum Capacity will vary based on individual serve platform qualification schedule

Memory Speed by E5-2600 v3 Series Processor Model

Processor Models	Supported Memory Speeds
E5-2690 v3, E5-2695 v3, E5-2697 v3, E5-2698 v3, E5-2699 v3, E5-2687W v3, E5-2683 v3, E5-2680 v3, E5-2670 v3, E5-2667 v3 , E5-2660 v3, E5-2650 v3, E5-2650L, E5-2643 v3, E5-2637 v3	2133MHz
E5-2640 v3, E5-2630 v3, E5-2630L v3, E5-2623 v3, E5-2620 v3	1866MHz
E5-2609 v3, E5-2603 v3	1600MHz

Standard and Maximum Memory Capacity (Pre-configured Models) for E5-2600 v3 Series

Pre Configured Models	Standard Memory	Maximum Memory Plus Optional Memory	Standard Memory Replaced with Optional Memory
Intel Xeon E5-2670 v3	128GB (4x 32GB)	896GB (4x 32GB + 12x 64GB)	1TB (16x 64GB)
Intel Xeon E5-2660 v3	64GB (4x 16GB)	256GB (4x 16GB + 12x 16GB)	1TB (16x 64GB)
Intel Xeon E5-2650 v3, E5-2640 v3	32GB (2x 16GB)	256GB (2x 16GB + 14x 16GB)	1TB (16x 64GB)
Intel Xeon E5-2620 v3, E5-2609 v3	16GB (2x 8GB)	240GB (2x 8GB + 14x 16GB)	1TB (16x 64GB)

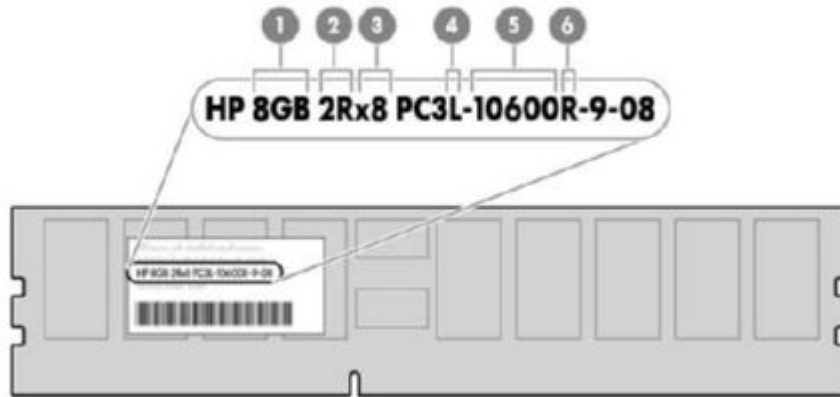
NOTE: Support for 64GB LRDIMMs and 32GB RDIMMs to be available by early 2015.

NOTE: Capacity references are rounded to the common gigabyte (GB) values.

- 2GB = 2,048MB
- 4GB = 4,096MB
- 8GB = 8,192MB
- 16GB = 16,384MB
- 32GB = 32,768MB

Memory options part number decoder

Memory



Item	Description	Definition
1	Capacity	8 GByte 16 GByte 32 GByte
2	Rank	1R = Single-rank 2R = Dual-rank 4R = Quad-rank
3	Data width	x4 = 4-bit x8 = 8-bit
4	Memory generation	DDR4
5	Max. Memory speed	2133MT/s
6	CasLatency	P = 15
6	DIMM type	R = RDIMM (registered) L = LRDIMM (load reduced)

Following are memory options available from HPE:

HPE Memory

NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this server. HPE SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HPE SmartMemory QuickSpecs at:

<http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535>

NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 2133MHz, 1866MHz, or 1600MHz.

HPE SmartMemory

Registered DIMMs (RDIMMs)

Registered DIMMs (RDIMMs) - E5-2600 v3 series Processors

Memory

HP 8GB (1x8GB) Single Rank x4 DDR4-2133 CAS-15-15-15 Registered Memory Kit 726718-B21

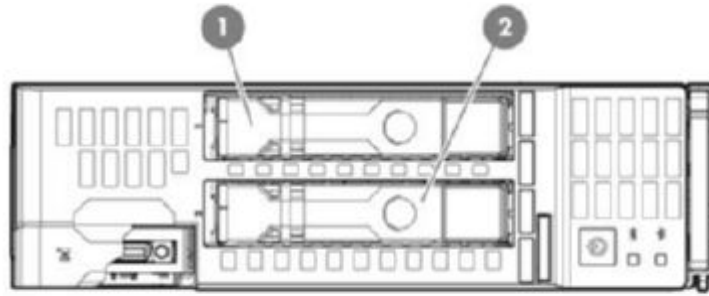
HP 16GB (1x16GB) Dual Rank x4 DDR4-2133 CAS-15-15-15 Registered Memory Kit 726719-B21

Load Reduced DIMMs (LRDIMMs) - E5-2600 v3 series Processors

HP 32GB (1x32GB) Quad Rank x4 DDR4-2133 CAS-15-15-15 Load Reduced Memory Kit 726722-B21

NOTE: Depending on the memory configuration and processor model, 2133MHz memory may operate at a lower speed. Please see the "Memory" section later in this document.

Storage



1-2 2 x SFF hot-plug SAS, SATA, SAS SDD, and SATA SSD hard drives

Technical Specifications

System Unit	Dimensions (H x W x D) (with bezel)	7.11 x 2.18 x 20.37 in (18.07 x 5.54 x 51.76 cm)
	Weight (approximate)	<p>Maximum: all processors, 16 DIMMs, hard drives, mezzanine cards, and two flash cache batteries installed) 14.00 lb (6.33 kg)</p> <p>Minimum: one processor and 2 DIMMs installed 10.50 lb (4.75 kg)</p>
	Power Specifications	<p>For power specifications including input requirements, BTU rating, and power supply output, please see the:</p> <ul style="list-style-type: none"> • HPE BladeSystem c3000 Enclosure QuickSpecs at https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123379 • HPE BladeSystem c7000 Enclosure QuickSpecs at https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04229580 <p>To review typical system power ratings use the HPE Power Advisor which is available via the online tool located at http://www.hp.com/go/hppoweradvisor.</p> <p>NOTE: For optimal cooling and system performance the BL460c Gen9 Server Blade requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.</p>
	System Inlet Temperature	<p>Operating 10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1,000 ft) above sea level to a maximum of 3,050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).</p> <p>Non-operating -30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).</p>
	Extended Ambient Operating Support	<p>For Approved hardware configurations, the supported system inlet range is extended to be: 5° to 10°C (41° to 50°F) and 35° to 40°C (95° to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 90 m (2953 ft) to a maximum of 3050 m (10,000 ft)</p> <p>NOTE: Qualifications for extended ambient configurations are detailed at: https://www.hp.com/servers/ASHRAE</p>
	Relative Humidity	<p>Operating 10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-</p>

Technical Specifications

	(non-condensing)	condensing.
	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non condensing.
Altitude	Operating	3,050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1,500 ft/min).
	Non-operating	9,144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1,500 ft/min).
Acoustic Noise	For acoustic noise specifications, please see the HPE BladeSystem c-Class Enclosures QuickSpecs located at:	
	<ul style="list-style-type: none"> • HPE BladeSystem c3000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/QuickSpecs/12790_div/12790_div.html • HPE BladeSystem c7000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/QuickSpecs/12810_div/12810_div.html 	

HPE Smart Array P244br Controller	Disk Drive Interface	12Gb/s SAS (Serial Attached SCSI) 6Gb/s SATA (Serial ATA)
	Server Interface	x8 5G PCIe 3.0 provides 8GB/s maximum bandwidth
	Cache Memory	1GB flash backed write cache (FBWC) cache standard
	Logical Drives Supported	64 (with included 1GB cache)
	Host Memory Addressing	64-bit, supporting servers memory space greater than 4GB
	RAID Support	RAID 1 (mirroring), RAID 0 (striping), RAID 10
	Other	Upgradeable firmware with recovery ROM Online drive flash (with SAS drives)

HPE Smart HBA H244br Controller	Disk Drive Interface	12Gb/s SAS (Serial Attached SCSI) 6Gb/s SATA (Serial ATA)
	Server Interface	x8 5G PCIe 3.0 provides 8GB/s maximum bandwidth
	Cache Memory	None
	Logical Drives Supported	64
	Host Memory Addressing	64-bit, supporting servers memory space greater than 4GB
	RAID Support	RAID 1 (mirroring) and RAID 0 (striping)
Other	Upgradeable firmware with recovery ROM Online drive flash (with SAS drives)	

HPE Dynamic	Disk Drive	6Gb/s SATA (Serial ATA)
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Technical Specifications

Smart Array B140i Controller	Interface	
	Server Interface	Embedded x4 PCIe 2.0
	SAS Connectors	2 internal SATA ports
	Cache Memory	None
	SAS Speed	6Gb/s SATA links
	Logical Drives Supported	Up to 10 logical volumes (2 physical drives)
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
	Hot Plug Support	Yes
	RAID Support	RAID 1 (Mirroring) RAID 0 (Striping)
	Other	Upgradeable firmware with recovery ROM

HPE FlexFabric Type 10Gb 2-port 536FLB FlexibleLOM	Network Processor	Integrated dual-port KR 10Gb FlexibleLOM with FlexFabric (Flex-10, FCoE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing 1Gb/10Gb Ethernet capability) QLogic 57840S with integrated MAC/PHY
	Data Transfer Method	x8 PCI Express 3.0
	Network Transfer Rate	Two ports, each at 20Gbps full duplex; 40Gbps aggregate full duplex theoretical bandwidth NOTE: Each port is autosensing 1Gb/10Gb, and can interoperate with 1Gb or 10Gb HPE BladeSystem c-Class interconnect components. Both ports v operate at the same speed. NOTE: Each port on the 554FLB adapter transmits from the server at 20Gbps (theoretical) full duplex.
	IEEE Compliance	802.1p, 802.1q, 802.1qau, 802.3ad, 802.3ae, 802.3ap (10GBase-KX4) and 802.3x
	Standard Features	Full hardware offload of iSCSI and FCoE storage protocol processing for highest performance converged Ethernet data and storage networks. Dual-port 10GbE Flex-10 FlexibleLOM network adapter that provides the flexibility to choose the type of LOM to meet growing infrastructure needs Industry-leading throughput and latency performance Supports HPE's Flex-10 blade interconnect technology User configurable bandwidth settings when combined with the 10Gb Flex-10 Virtual Connect module. From 100Mb/s to 10Gb/s on up to four "Physical Function" NICs per port, in increments of 100Mb/s for NIC. The combined bandwidth of NICs cannot exceed port bandwidth i.e. 10 Gb. Up to 40Gb/s bi-directional near line rate throughput Hardware acceleration and offloads for stateless TCP/IP, TCP Offload Engine (TOE) Improved small packet performance Support for Preboot eXecution Environment (PXE)

Technical Specifications

		<p>Integrated PHY and MAC</p> <p>Supports for SR-IOV</p> <p>Support for Network Partitioning (NPAR)</p>
<p>HPE FlexFabric Type</p> <p>20Gb</p> <p>2-port 650FLB</p> <p>FlexibleLOM</p>		<p>Integrated dual-port KR2 20Gb FlexibleLOM with FlexFabric (Flex-20, FCoE, RoCE, Tunnel Offload with VXLAN/NVGRE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing Ethernet speed capability)</p>
	<p>Network Processor</p>	<p>Emulex XE-104</p>
	<p>Data Transfer Method</p>	<p>x8 PCI Express 3.0</p>
	<p>Network Transfer Rate</p>	<p>Two ports, each at 40 Gbps bi-directional; 80 Gbps aggregate bi-directional theoretical bandwidth</p>
	<p>IEEE Compliance</p>	<p>802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap</p>
	<p>Standard Features</p>	<p>Dual 20Gb ports provide up to 80Gb bi-directional per adapter</p> <p>Multi-speed adapter operates at either 20GbE or 10GbE</p> <p>Converges FCoE or RoCE with LAN traffic on a single Ethernet wire</p> <p>Tunnel Offload support for VXLAN and NVGRE</p> <p>RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency (6125XLG only)</p> <p>Advanced storage offload processing freeing up valuable CPU cycles</p> <p>Supports UEFI and legacy boot options</p> <p>Mixed Storage - supports NIC + FCoE on one port, and NIC + iSCSI on the other</p> <p>Concurrent Storage - concurrently supports NIC, FCoE, and iSCSI storage functions on the same port (NIC + FCoE + iSCSI)</p> <p>Industry-leading throughput and latency performance</p> <p>Supports HPE's Flex-20 blade interconnect technology</p> <p>Over eight million small packets/s, ideal for web/mobile applications, mobile messaging, and social media</p> <p>User configurable bandwidth settings when combined with the 20Gb Flex-20 Virtual Connect module. From 100Mb/s to 10Gb/s on up to four "Physical Function" NICs per port, in increments of 100Mb/s for NIC. The combined bandwidth of NICs cannot exceed port bandwidth i.e. 20 Gb/s.</p> <p>Greater bandwidth with PCIe 3.0</p> <p>Jumbo Frames support</p> <p>Supports Wake On LAN (WOL)</p> <p>Support for Preboot eXecution Environment (PXE)</p> <p>Support for Microsoft Windows SMB Direct</p> <p>Optimized host virtualization density with SR-IOV support</p>

<p>Environment-friendly Products and Approach</p>	<p>End-of-life Management and Recycling</p>	<p>Hewlett Packard Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hpe.com/info/recycle. To recycle your product, please go to: http://www.hpe.com/info/recycle or contact your nearest Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard</p>
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Technical Specifications

Enterprise will be recycled, recovered or disposed of in a responsible manner.

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 Enterprise web site at:

<http://www.hpe.com/info/recycle>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HEWLETT PACKARD ENTERPRISE OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.



Summary of Changes

Date	Version History	Action	Description of Change
10-Feb-2017	From Version 3 to 4	Changed	Configuration Information - Factory Integrated Models, and Core Options sections were updated.
		Added	SKUs were added to QuickSpecs: 819853-L21, 819842-L21, 819839-L21, 805351-B21, 836220-B21, 805347-B21, 819853-L21, 819842-L21, 819839-L21, 775588-B21, 762263-B21, 815605-B21.
		Removed	Obsolete SKUs were deleted: 691868-B21, 691866-B21, BD883A.
11-Mar-2016	From Version 2 to 3	Changed	Configuration Information - Factory Integrated Models and Core Options sections were updated.
		Added	SKUs added in Configuration Information - Factory Integrated Models and Core Options sections: 781518-B21, 791034-B21, 775588-B21, 700767-B21, 700764-B21, 710608-B21.
		Removed	Obsolete SKUs were deleted: F6Q89AAE, E5Y38A, E5Y39AAE, QK763A, QK762A, QK761A, D8S85AAE, D8S84A.
19-Jun-2015	From Version 1 to 2	Changed	Information updated and corrections to QS.

