Overview

HPE Synergy 480 Gen10 Compute Module

HPE Synergy, the first platform built from the ground up for Composable Infrastructure, offers an experience that empowers IT to create and deliver new value instantly and continuously. It is a single infrastructure that reduces operational complexity for traditional workloads and increases operational velocity for the new breed of applications and services. Through a single interface, HPE Synergy composes physical and virtual compute, storage, and fabric pools into any configuration for any application. As an extensible platform, it easily enables a broad range of applications and operational models such as virtualization, hybrid cloud, and DevOps. With HPE Synergy, IT can become not just the internal service provider but the business partner to rapidly launch new applications that become the business.

HPE Synergy supports both two-socket and four-socket compute modules which provide the performance, scalability, density optimization, storage simplicity, and configuration flexibility to power a variety of workloads, including business processing, IT infrastructure, web infrastructure, collaborative, and high-performance computing.

The HPE Synergy 480 Gen10 Compute Module delivers superior capacity, efficiency, and flexibility in a two-socket, half-height form factor to support demanding workloads. Powered by the latest Intel® Xeon® Scalable processors, HPE DDR4 SmartMemory supporting up to 3TB, flexible storage controller options, three I/O connectors, and designed to create a pool of flexible compute capacity within a composable infrastructure the HPE Synergy 480 Gen10 Compute Module is the ideal platform for general-purpose enterprise workload performance now and in the future.

Get the right balance of performance, flexibility, and density for your traditional or new style of business applications. The HPE Synergy 480 Gen10 Compute Module delivers even more choice of performance, capacity and flexibility to meet your workload needs. Powered with newest Intel® Xeon® Scalable processors, HPE Smart Memory, more storage solutions and capacity, unique Smart Arrays and new GPU options the Synergy 480 Gen10 Compute is ideal to fit any workload you have, now and in the future

HPE Synergy offers additional compute module options (that have individual QuickSpecs) including:
- HPE Synergy 660 Gen10 (2-4-socket, general purpose)

This QuickSpecs document focuses on the HPE Synergy 480 Gen10 Compute Module.
**NOTE:** The HPE Synergy Gen10 compute modules installation involves a minimum upgrade requirement for component compatibility purposes. To ensure proper system functionality, you must update your system to Release Set Version 3.00.20170707 (or later) before installing and operating your compute module. Go to **http://www.hpe.com/downloads/synergy.**

Overview

Front View – HPE Synergy 480 Gen10 Compute Module

1. Quick Access Panel
2. UID LED
3. Health Status LED
4. Mezzanine NIC status LED
5. Power On/Stand by button and system power LED
6. Compute Module handle release latch
7. Removable drive cage with two hot-plug drive bays
8. External USB 3.0 connectore & iLO USB connection (behind serial label pull tab)

Overview
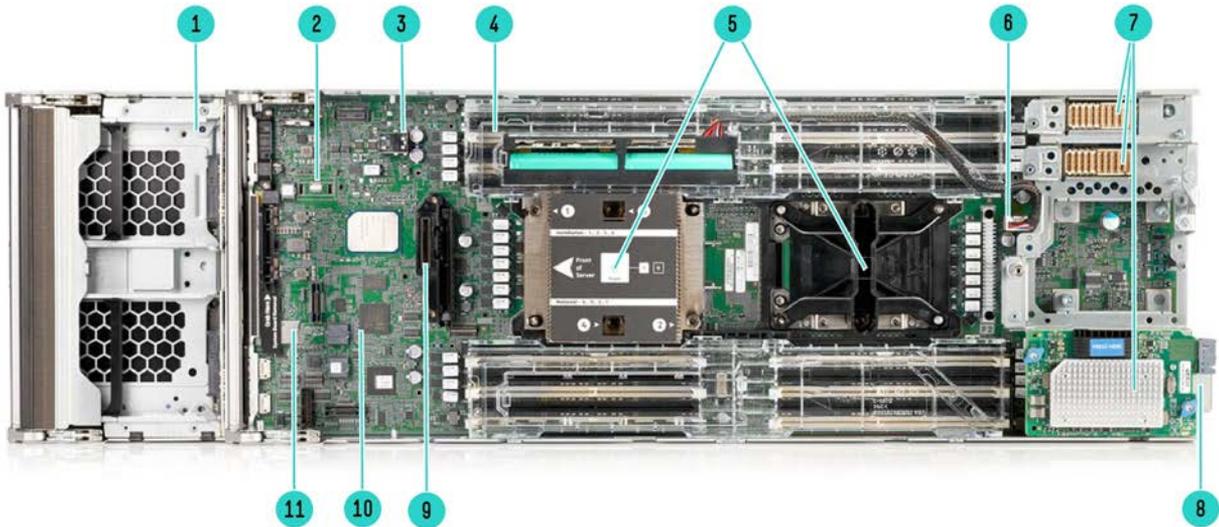
Synergy 480 Gen10 Compute Module
(Drive Cage removed)

1. Removable drive cage with two hot-plug drive bays and connection point for M.2 Drive Adaptor Kit
2. TPM connector (under drive cage)
3. USB 3.0 (boot port under drive cage)
4. Twenty-four (24) DDR4 DIMM memory slots (12 per processor)
5. Up to two (2) Intel® Xeon® Scalable Family processors
6. Smart Array Battery connection
7. Mezzanine connectors (3 x16 PCIe 3.0)
8. Compute Module Power and Managementconnector
9. M.2 Storage Adapter connection (under cage)
10. iLO chipset (under drive cage)
11. MicroSD Slot (under drive cage)

What's New

- Intel® Xeon® Scalable Family Generation 2 Processors
- New 2933MT/s memory for next Generation Intel Scalable Family Processors
- New HPE Persistent Memory optimized for data-intensive workloads featuring Intel® Optane™ DC persistent memory
- Additional Drive systems and replacements

Standard Features

Processors – Up to 2 of the following depending on model.

With the extention of the lifecycle of Gen10 Compute, HPE introduces a new line up of Intel Xeon Scalable Family of processors or Gen2. HPE offers both Gen1 and Gen2 processors during the introduction of this life cycle. Below are the two generations and specifications. Further details on slecting the right process are provided in the Configuring you system section below.

NOTE: This table covers the public HPE Synergy Gen10 offering only.

NOTE: The 2nd digit of the processor model number "x1xx" and "x2xx" is used to denote the processor generation (i.e. 1=1st generation and 2=2nd generation)

NOTE: Intel Xeon M or L labeled processors support extended memory capacities as show up to 2 and 4.5TB per socket. However, maximum memory capacity for the server will be limited by maximum capacity DIMMs available and number of DIMM slots.

NOTE: For more information regarding Intel Xeon processors, please see the following **http://www.intel.com/xeon**

Intel® Xeon® Scalable processor family - 2nd generation

Intel Xeon Models	CPU Frequency (GHz)	Cores	Power (WATTs)	DDR4 MT/s	Max Memory per socket (TeraBytes)	Persistent Memory Support
Platinum 8280L Processor	2.7	28	205	2933	4.5	Yes
Platinum 8280M Processor	2.7	28	205	2933	2	Yes
Platinum 8280 Processor	2.7	28	205	2933	1	Yes
Platinum 8276L Processor	2.2	28	165	2933	4.5	Yes
Platinum 8276M Processor	2.2	28	165	2933	2	Yes
Platinum 8276 Processor	2.2	28	165	2933	1	Yes
Platinum 8270 Processor	2.7	26	205	2933	1	Yes
Platinum 8268 Processor	2.9	24	205	2933	1	Yes
Platinum 8260Y Processor	2.4-2.5-2.8	24-20-16	165	2933	1	Yes
Platinum 8260L Processor	2.4	24	165	2933	4.5	Yes
Platinum 8260M Processor	2.4	24	165	2933	2	Yes
Platinum 8260 Processor	2.4	24	165	2933	1	Yes
Platinum 8256 Processor	3.8	4	105	2933	1	Yes
Platinum 8253 Processor	2.2	16	125	2933	1	Yes
Gold 6262V Processor	1.9	24	135	2933	1	Yes
Gold 6254 Processor	3.1	18	200	2933	1	Yes
Gold 6252N Processor	2.3	24	150	2933	1	Yes
Gold 6252 Processor	2.1	24	150	2933	1	Yes
Gold 6248 Processor	2.5	20	150	2933	1	Yes
Gold 6246 Processor	3.3	12	165	2933	1	Yes
Gold 6244 Processor	3.6	8	150	2933	1	Yes
Gold 6242 Processor	2.8	16	150	2933	1	Yes
Gold 6240Y Processor	2.6-2.8-3.1	18-14-8	150	2933	1	Yes
Gold 6240L Processor	2.6	18	150	2933	4.5	Yes
Gold 6240M Processor	2.6	18	150	2933	2	Yes
Gold 6240 Processor	2.6	18	150	2933	1	Yes
Gold 6238L Processor	2.1	22	140	2933	4.5	Yes
Gold 6238M Processor	2.1	22	140	2933	2	Yes
Gold 6238 Processor	2.1	22	140	2933	1	Yes
Gold 6234 Processor	3.3	8	130	2933	1	Yes
Gold 6230N Processor	2.3	20	125	2933	1	Yes
Gold 6230 Processor	2.1	20	125	2933	1	Yes
Gold 6226 Processor	2.7	12	125	2933	1	Yes
Gold 6222V Processor	1.8	20	115	2933	1	Yes

Hewlett Packard Enterprise

Standard Features

Gold 5222 Processor	3.8	4	105	2933	1	Yes
Gold 5220S Processor	2.6	18	125	2666	1	Yes
Gold 5220 Processor	2.2	18	125	2666	1	Yes
Gold 5218N Processor	2.3	16	105	2666	1	Yes
Gold 5218B Processor	2.3	16	125	2666	1	Yes
Gold 5218 Processor	2.3	16	125	2666	1	Yes
Gold 5217 Processor	3	8	125	2666	1	Yes
Gold 5215L Processor	2.6	10	85	2666	4.5	Yes
Gold 5215M Processor	2.6	10	85	2666	2	Yes
Gold 5215 Processor	2.6	10	85	2666	1	Yes
Silver 4216 Processor	2.1	16	85	2400	1	No
Silver 4215 Processor	2.5	8	85	2400	1	Yes
Silver 4214Y Processor*	2.2-2.3-2.4	12-10-8	85	2400	1	No
Silver 4214 Processor	2.2	12	85	2400	1	No
Silver 4210 Processor	2.2	10	85	2400	1	No
Silver 4208 Processor	2.1	8	85	2400	1	No
Bronze 3204 Processor	1.9	6	85	2133	1	No

Processor Suffix Description Offering(generation 2 Processors)

L Large memory tier Up to 4.5 TB addressable memory per socket

M Medium memory tier Up to 2.0 TB addressable memory per socket (up to 1.5TB for 1st generation Intel Xeon
Scalable Processors denoted with the "M" suffix)

N NFV Optimized Targeted at Network Function Virtualization (NFV) workloads. IntelR SST-BF improves
performance by directing base frequency to high priority/bottleneck cores. Other
workloads may see throttling, more details to be provided in upcoming documentation.

S Search Optimized Optimized base frequency to address 'search' workloads. Other workloads may see
throttling, more details to be provided in upcoming documentation.

V VM Optimized Fosters enhanced VM density, allowing to support more/larger
virtual machines per host.

Y Speed Select IntelR SST-PP increases base frequency when less cores are enabled. Allows greater
flexibility, deployment options and platform longevity.

NOTE: Platinum – 8200 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute
modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933 MT/s providing
up to 1TB on most and 2, 4.5TB on select processor skus. Intel Turbo Boost Technology, Intel Hyper-Threading Technology
supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

NOTE: Gold – 5200, 6200 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute
modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933/2666MHz
providing up to 1, 2, or 4.5TB memory capacity depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-
Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced
RAS supported.

NOTE: Silver – 4200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI , 6-
Channel DDR4 @ 2400 MHz providing up to 1, 2, or 4.5TB depending on processor selected. Intel Turbo Boost Technology,
Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: Bronze – 3200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI, supports
6-Channel DDR4 @ 2133MHz depending on processor and memory selected, providing up to 1TB memory capacity. Intel AVX-
512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

Intel® Xeon® Scalable processor family - 1st generation

Intel Xeon Models	CPU Frequency (GHz)	Cores	Power (WATTs)	DDR4 MT/s	Max Memory per socket
Platinum 8180M Processor	2.5	28	205	2666	1.5TB
Platinum 8180 Processor	2.5	28	205	2666	768GB
Platinum 8176 Processor	2.1	28	165	2666	768GB
Platinum 8170 Processor	2.1	26	165	2666	768GB

Standard Features

Platinum 8168 Processor	2.7	24	205	2666	768GB
Platinum 8164 Processor	2.0	26	150	2666	768GB
Platinum 8160M Processor	2.1	24	150	2666	1.5 TB
Platinum 8160 Processor	2.1	24	150	2666	768 GB
Platinum 8158 Processor	3.0	12	150	2666	768 GB
Platinum 8156 Processor	3.6	4	105	2666	768 GB
Platinum 8153 Processor	2.0	16	125	2666	768 GB
Gold 6154 Processor	3.0	18	200	2666	768 GB
Gold 6152 Processor	2.1	22	140	2666	768 GB
Gold 6150 Processor	2.7	18	165	2666	768 GB
Gold 6148 Processor	2.4	20	150	2666	768 GB
Gold 6146 Processor	3.2	12	165	2666	768 GB
Gold 6144 Processor	3.5	8	150	2666	768 GB
Gold 6142M Processor	2.6	16	150	2666	1.5 TB
Gold 6142 Processor	2.6	16	150	2666	768 GB
Gold 6140 Processor	2.3	18	140	2666	768 GB
Gold 6138 Processor	2.0	20	125	2666	768 GB
Gold 6136 Processor	3.0	12	150	2666	768 GB
Gold 6134 Processor	3.2	8	130	2666	768 GB
Gold 6132 Processor	2.6	14	140	2666	768 GB
Gold 6130 Processor	2.1	16	125	2666	768 GB
Gold 6128 Processor	3.4	6	115	2666	768GB
Gold 6126 Processor	2.6	12	125	2666	768 GB
Gold 5122 Processor	3.6	4	105	2666	768 GB
Gold 5120 Processor	2.2	14	105	2400	768 GB
Gold 5118 Processor	2.3	12	105	2400	768 GB
Gold 5115 Processor	2.4	10	85	2400	768 GB
Silver 4116 Processor	2.1	12	85	2400	768 GB
Silver 4114 Processor	2.2	10	85	2400	768 GB
Silver 4112 Processor	2.6	4	85	2400	768 GB
Silver 4110 Processor	2.1	8	85	2400	768 GB
Bronze 3104 Processor	1.7	6	85	2133	768 GB

NOTE: Platinum – 8100 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2666 MT/s providing up to 768GB memory capacity (1.5 TB on select processor skus). Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

NOTE: Gold – 5100, 6100 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2400(51xx)/2666(61xx) MHz (SKU 5122=supports 2666) providing up to 768GB memory capacity (1.5 TB on select skus). Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.

NOTE: Silver – 4100 Series - Supports 2 socket (Synergy 480 Gen10) compute module, 2 Socket supports 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2400 MHz providing up to 768 GB memory capacity. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: Bronze – 3100 Series - Supports 2 socket (Synergy 480 Gen10) compute module, 2 Socket supports 2UPI @ 9.6 GT/s, supports 6-Channel DDR4 @ 2133 MHz providing up to 768GB memory capacity. Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: Silver and Bronze level processors are primarily designed for 2 Socket Compute modules and will have Synergy 480 Gen10 only in the processor names.

Chipset

Intel C621 Series Chipset

NOTE: For more information regarding Intel® chipsets, please see the following

URL: **http://www.intel.com/products/server/chipsets/**

Standard Features

Synergy Management

HPE Composer powered by OneView

NOTE: Read and learn more about **OneView**

On Compute Management Chipset

HPE iLO 5 ASIC

NOTE: Read and learn more in the **iLO QuickSpecs**

Memory

One of the following depending on model

The following memory supports Intel® Xeon® Scalable Family processors 2nd generation (Models x2xx)

- HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 RDIMM Memory Kit
- HPE 64GB (1x64GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 LRDIMM Memory Kit
- HPE 128GB (1x128GB) Octal Rank x4 DDR4-2933 CAS-24-21-21 LRDIMM Memory Ki

The following memory supports Intel® Xeon® Scalable Family processors 1st generation (Models x1xx)

- HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-4-19-19-19 Registered Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 LRDIMM Memory Kit
- HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 LRDIMM Memory Kit

HPE Non-Volatile Memory DIMMs (NVDIMMs)

NOTE: Avalable/compatible on Intel Xeon Scalable Family Generation 1 Only.

HPE 16GB NVDIMM Single Rank x4 DDR4-2666 Module Kit

NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10. For additional information, please see the **HPE SmartMemory QuickSpecs.**

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

NOTE: For the latest information on **Memory Speed.**

NOTE: If you want to know more about the memory, reference the **RAS feature whitepaper.**

HPE Persistent Memory featuring Intel Optane DC Persistent Memory

NOTE: Supported on select HPE Synergy Gen10 servers with Intel Xeon Scalable Generation 2 processors (SY480 and SY660).

- HPE 128GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory
- HPE 256GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory
- HPE 512GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory

For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**

Modes of Operation	New class of memory which can be configured as either large server memory or fast storage
	• Flexibility to deploy as dense memory or fast storage
	• Single technology used as memory or storage reducing datacenter complexity

Standard Features

Type:		HPE DDR4 SmartMemory, Registered (RDIMM), Load Reduced (LRDIMM)
DIMM Slots Available	24	12 DIMM slots per processor, 6 channels per processor, 2 DIMMs per channel
Maximum capacity (LRDIMM)	3 TB	24 x 128 GB LRDIMM
Maximum capacity (RDIMM)	1.5 TB	24 x 64 GB RDIMM

NOTE: The 128 GB LRDIMM may not be mixed with other DIMM capacities/types.

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

NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE DDR4 SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10. Please see Memory Speed Tables for memory speed changes based on processors selected. For additional information, please see the **HPE DDR4 SmartMemory QuickSpecs**.

Memory Protection

Advanced ECC	Advanced ECC uses single device data correction to detect and correct single and all multibit error that occurs within a single DRAM chip.
Online Spare	Memory online spare mode detects a rank that is degrading and switches operation to the spare rank.
Online Mode	Memory Online Spare Mode (Rank Spare Mode)

NOTE: For details on the HPE Server Memory Options RAS feature, visit: **http://www.hpe.com/docs/memory-ras-feature.**

Mezzanine Connectors

Three (3) I/O expansion mezzanine connectors:

- x16 PCIe 3.0 Type D (supports Type C and Type D mezzanine cards) (mezzanine connector 1).

  NOTE: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 1 and the other to bay 4.

- x16 PCIe 3.0 Type D (supports Type C and Type D mezzanine cards (mezzanine connector 2).

  NOTE: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 2 and the other to bay 5.

  NOTE: A second processor must be installed (in processor slot 2) to have access to mezzanine connector 2.

- x16 PCIe 3.0 Type C (supports Type C mezzanine cards) (mezzanine connector 3).

  NOTE: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 3 and the other to bay 6.

Network Adapters or Mezzanine options include::

- HPE Synergy 3820C 10/20Gb Converged Network Adapter
  NOTE: Supports full hardware offload option of FCoE storage protocol processing for highest performance converged Ethernet data and storage networks
- HPE Synergy 2820C 10GbE Converged Network Adapter
  NOTE: Delivers flexibility to compose multiple network flows including Ethernet and FCoE or iSCSI within each connection.
- HPE Synergy 4820C 10/20/25Gb CNA
- HPE Synergy 4610C 10/25Gb Ethernet Adptr
- HPE Synergy 6810C 25/50Gb Ethernet
- HPE Synergy 6410C 25/50Gb Ethernet
- HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 3530C 16G Fibre Channel Host Bus Network Adapter
- HPE Synergy 3830C 16G Fibre Channel Host Bus Network Adapter

Standard Features

HPE Compute Module ROM

HPE ROM (read only memory) is now digitally signed using the HPE Corporate Signing Service. As part of the Secure Start, this signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HPE ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HPE ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

HPE Synergy Compute ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration using the UEFI System Utilities.

NOTE: For further information, please refer to the **https://support.hpe.com/hpsc/doc/public/display?docId=a00016407en_us en**

Storage Controllers

One of the following depending on model

Software RAID	HPE Smart Array S100i SR Gen10 SW RAID

NOTE: HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives.
NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only.
NOTE: HPE Synergy 480 Gen10 M.2 FIO Adptr Brd Kit(873165-B21) required for enablement of optional internal M.2 SATA Drives.
NOTE: For legacy support select Legacy mode settings part, 758959-B22.

Essential RAID Controller	HPE Smart Array E208i-c SR Gen10 12G SAS Modular Controller (8 internal lanes/no cache)
Performance RAID Controller	HPE Smart Array P204i-c SR Gen10 12G SAS Modular Controller (4 internal lanes/1GB cache) HPE Smart Array P416ie-m SR Gen10 12G SAS Mezzanine Controller (8 internal 8 external lanes/2GB cache for use with with Synergy D3940 Storage Modules)
Premium Backplane CTO Compute Module	Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with up to 2 NVMe drives in front drive cage. Or, supports P416ie-m with specific SAS cable connections allowing P416ie-m to manage 2x SATA or SAS drives in both front drive cage and drives on the Synergy D3940 Storage Module)

NOTE: For more details on HPE Smart Array Controller solutions please see their **QuickSpecs**

Maximum Internal Storage

	CAPACITY	CONFIGURATION

Standard Features

Hot Plug SFF SAS SSD	30.6 TB	2 x 15.3 TB (with standard front SFF drive cage)
Hot Plug SFF SATA SSD	7.68 TB	2 x 3.84 TB (with standard front SFF drive cage)
Hot Plug SFF SATA/SAS HDD	4.0 TB	2 x 2.0 TB (with standard front SFF drive cage)
Hot Plug SFF NVMe SSD	15.6 TB	2 x 7.8 TB (with Premium front SFF drive cage)
Hot Plug uFF SATA SSD	1.3 TB	4 x 340 GB (with standard front SFF drive cage)
M.2 SATA SSD Option Drives	1.9 TB	2 x 960GBATA M.2 Drives (internal w/ adaptor)

Interfaces

Micro SDHC Slot	One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot
USB 3.0 Port	One (1) internal USB 3.0 connector for USB flash media drive keys

NOTE: The above options are intended for integrated hypervisor virtualization environments.

USB 3.0 Port	One (1) external USB 3.0 connector for USB flash media drive keys
iLO Port	One (1) external USB port for direct iLO access to compute.

Operating Systems and Virtulization Software Support

Microsoft Windows Server
Microsoft Hyper-V Server
Red Hat Enterprise Linux
SUSE Linux Enterprise Server
VMware ESXi
VMware vSphere

Citrix Xenserver 7.0, 7.1 (primary use for HPE GPU Options/XENDesktop)
NOTE: Operating System support may change. To get the most updated information, please go to the HPE OS Support Matrix at **http://www.hpe.com/info/ossupport**

Client OS (with GPU Options Only)

Windows & Enterprise Client OS
Red Hat Enterprise Linux Desktop/Workstation
SLES Desktop (64 bit - includes XEN &KVM)

NOTE: For Operating Systems tested with the NVIDIA and AMD GPU options, please see the Graphics Adapter Quick Specs for details **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00016718enw**

Frames

HPE Synergy 12000 Frame, is the base for all Synergy products and supports:
- Up to 12 half-height, 6 full-height single-wide, or 3 full-height double-wide Compute Modules (mixing allowed)
- Up to 5 half-height double-wide HPE Synergy D3940 Storage Modules (mixing with compute modules in any to any ratio allowed)
- One HPE Synergy 12000 Frame will support up to twelve (12) HPE Synergy 480 Gen10 Compute Modules

Industry Standard Compliance

- Microsoft® Logo certifications
- WOL enabled on some adaptors
- PXE support enabled
- USB 3.0 Compliant; iLO USB 2.0 Compliant
- TPM 2.0 Support(RBSU support for TPM 1.2)
- IEEE (specific IEEE standards depending on Ethernet adapter card(s) installed)
- Advanced Encryption Standard (AES)
- Triple Data Encryption Standard (3DES)

Standard Features

- SNMP v3
- SSL 2.0
- DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP)
- Active Directory v1.0
- PCIe 3.0 Compliant
- UEFI (Unified Extensible Firmware Interface Forum)
- Redfish API (iLO5)

Graphics (ilO)

Integrated Matrox G200eH2 video standard with 16 MB of Video RAM
- 1280 x 1024 (32 bpp)
- 1920 x 1200 (16 bpp)

HPE iLO 5 on system management memory
- 32 MB Flash
- 512 MB with ECC (224 MB after ECC and video)

HPE Server UEFI/Legacy ROM

Unified Extensible Firmware Interface (UEFI) is an industry standard that provides better manageability and more secured configuration than the legacy ROM while interacting with your server at boot time. HPE ProLiant Gen10 servers have a UEFI Class 2 implementation and support both UEFI Mode (default) and Legacy BIOS Mode.

NOTE: The UEFI System Utilities tool is analogous to the HPE ROM-Based Setup Utility (RBSU) of legacy BIOS. For more information, please visit **https://support.hpe.com/hpsc/doc/public/display?docId=c04398276**
http://itdoc.hitachi.co.jp/manuals/ha8000v/hard/Gen10/UEFI/881334-004_en.pdf

UEFI enables numerous new capabilities specific to HPE Synery Compute Modules such as:
- Secure Boot and Secure Start enable for enhanced security
- Operating system specific functionality
- Support for > 2.2 TB (using GPT) boot drives
- USB 3.0 Stack
- Embedded UEFI Shell
- Mass Configuration Deployment Tool using iLO RESTful API that is Redfish API Conformant.
- PXE boot support for IPv6 networks
- Workload Profiles for simple performance optimization

UEFI Boot Mode only:
- TPM 2.0 Support
- NVMe Boot Support
- Platform Trust Technology (PTT) can be enabled.
- iSCSI Software Initiator Support.
- HTTP/HTTPs Boot support as a PXE alternative.
- Boot support for option cards that only support a UEFI option ROM

NOTE: For UEFI Boot Mode, boot environment and OS image installations should be configured properly to support UEFI.
NOTE: UEFI FIO Setting (758959-B22) can be selected to configure the system in Legacy mode in the factory for your HPE Synergy Gen10 Server.

Standard Features

Embedded Management

HPE Synergy Composer powered by HPE OneView

HPE Synergy integrates HPE OneView to deliver 'composable infrastructure' with a view of resources. This flexible and scalable solution provides IT managers with the architecture to implement their software-defined data center (SDDC) -- and to address the changing business needs and the challenges of today's enterprise data centers.

HPE Integrated Lights-Out (HPE iLO)

Silicon Root of Trust. Protect, detect, recover with iLO. Monitor your servers for ongoing management, service alerting, reporting and remote management with HPE iLO. Learn more at **http://www.hpe.com/info/ilo**.

UEFI

Configure and boot your servers securely with industry standard Unified Extensible Firmware Interface (UEFI). Learn more at **http://www.hpe.com/servers/uefi**.

Intelligent Provisioning

Hassle free server and OS provisioning for 1 or more servers with Intelligent Provisioning. Learn more at **http://www.hpe.com/servers/intelligentprovisioning**.

iLO RESTful API

iLO RESTful API is Redfish API conformance and offers simplified server management automation such as configuration and maintenance tasks based on modern industry standards. Learn more at **http://www.hpe.com/info/restfulapi**.

Security

Newest forms of security based on iLO 5 features.

- Secure Start, with hardware root of trust.
- HPE hardware designed logic in iLO chip validates iLO firmware burned in chip.
- iLO then validates system/compute ROM firmware for digital signature.
- iLO completes the chain of trust.
- ROM validates option ROMs and OS Bootloader via UEFI Secure Boot.

Standard security features

Power-on password

Administrator's password

Keyboard password (QuickLock)

HPE iLO Management On System Management Chipset with SSL encryption, Secure Shell version 2, Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface, AES and RC4 encryption of video

External USB port enable/disable

Network server mode

Serial interface control

TPM (Trusted Platform Module) 1.2 or 2.0 option

Advanced Encryption Standard (AES)

Intel® Advanced Encryption Standard-New Instructions (AES-NI).

About Trusted Platform Module

Trusted Platform Module (TPM) is a separate processor that monitors the system state. TPM is a passive component needing to be updated and not able to lock down any component in the system except access to its own memory. It also provides some cryptographic operations - among them: creating RSA keypairs, and working with them.

Standard Features

The first verification of signatures happens by code on the CPU, which can be intercepted and replaced. Emulating a "properly" booted system is possible by sending the right values to the TPM.

The bootblock, the part of the firmware that contains the first instructions executed by the CPU, comes first and anchors the root of trust. But if you can't trust the bootblock to send a truthful state into the TPM, this is a vulnerability.

About HPE Silicon Root of Trust

As soon as the server is powered on and the iLO firmware comes alive, it looks into the silicon for the immutable fingerprint that verifies all the firmware code is valid and uncompromised. Over a million lines of firmware code run before the operating system starts, making it vital to confirm that all server essential firmware is free from malware or compromised code.

During operation of the server, HPE has a new technology that conducts run-time firmware validation that checks the firmware stored in the server. At any point, if compromised code or malware is inserted in any of the critical firmware, an iLO audit log alert is created to notify the customer that a compromised has occurred. It is achieved by storing iLO 5 and UEFI firmware in non-volatile Flash memory which is thoroughly scanned at regular user determined intervals. The contents of the firmware stored in memory must be exactly right, down to the individual bit, or else it is flagged as compromised. See the iLO 5 Quickspecs for recovery processes.

Warranty

This product is covered by a global limited warranty and supported by HPE Services and a worldwide network of HPE Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HPE Pointnext operational services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

NOTE: Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have Hewlett Packard Enterprise replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available
at: **http://h17007.www1.hpe.com/us/en/enterprise/servers/warranty/.**

Optional Features

Server Management

HPE OneView Advanced   **HPE OneView** brings a new level of automation to infrastructure management by taking a template driven approach to provisioning, updating, and integrating compute, storage, and networking infrastructure. It provides full-featured licenses which can be purchased for managing Gen8 Gen9 and Gen10 servers.

HPE iLO Advanced (standard with Synergy Compute)

HPE iLO Advanced licenses offer smart remote functionality without compromise. The license includes the full integrated remote console, virtual keyboard, video, and mouse (KVM), multi-user collaboration, console record and replay, and GUI-based and scripted virtual media and virtual folders. You can also activate the enhanced security and power management functionality

HPE iLO Advanced Premium (optional)

Security Edition for iLO 5 includes iLO Advanced License plus high-end security modes, unique security capabilities, like Automatic FW recovery; Runtime FW verification, and Secure erase.

HPE Graphics Accelerators and Expansion

Mezzanine GPU Options for Synergy 480 Compute Module
HPE Synergy 480Tesla P6 GPU Mezzanine Graphics Card
HPE Synergy 480 NVIDIA Quadro M3000SE Mezzanine Card

NOTE: All MXM graphics card options are sold in pairs of GPUs. If there are GPU slots available in the Module, it can be field upgraded with additional GPUs. Note mixing GPUs is not supported.

High Density Multi MXM Expansion Module GPU Options
- HPE Synergy 480 Gen10 Multi MXM FIO Expansion Module
- HPE Synergy 480 NVIDIA Tesla P6 Multi MXM Option Kit
- HPE Synergy 480 NVIDIA M3000SE Multi MXM Option Kit

Standard PCIe Expansion Module GPU Options
- HPE Synergy Gen10 PCIe Expansion Module
- HPE NVIDIA Tesla P40 24GB Computational Accelerator
- HPE NVIDIA Tesla V100 32GB PCIe Module
- HPE NVIDIA Quadro RTX6000 GPU Module

NOTE: Must be installed in Mezz 1. Due to heatsink size, no other card may be installed in Mezz 2 and the HPE Smart Array P416ie-m 12Gb Mezzanine SAS Controller, which provides connectivity to direct attach storage, cannot be in the same server due to size restraints.
NOTE: NVIDIA Tesla M6 requires NVIDIA Grid 2.0 or later to enable vGPU features. vGPU not enabled by default on the card alone. For more information, go to NVIDIA: **http://www.nvidia.com/grid**
NOTE: GRID license for use with NVIDIA Tesla M6 must be purchased separately through an NVIDIA verified virtualization partner at **http://www.nvidia.com/buygrid**
NOTE: For more details on Graphic Acceleration Options please see the **Graphics Accelerator QuickSpecs.**

Fibre Channel Support

Up to two (2) optional Fibre Channel mezzanine HBAs are supported on the HPE Synergy 480 Gen10.
- HPE Synergy 3530C 16G Fibre Channel Host Bus Adapters
- HPE Synergy 3830C 16G Fibre Channel Host Bus Adapters
- HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters

Hewlett Packard Enterprise

Optional Features

Compatible SAN

HPE Synergy 480 Gen10 Compute Modules are optimized for HPE MSA, EVA, 3PAR, XP, and Storevirtual VSA.

HPE Virtual Connect

HPE Synergy composable fabric delivers high performance and composability for the delivery of applications and services. The composable fabric is based on master/satellite architecture.

The HPE Virtual Connect SE 40Gb F8 Module, master module, based on composable fabric is designed for Composable Infrastructure. Its disaggregated, rack-scale design uses a master/satellite architecture to consolidate data center network connections, reduce hardware and scales network bandwidth across multiple HPE Synergy Frames.

The master module contains intelligent networking capabilities that extend connectivity to satellite frames through Interconnect Link Modules. This eliminates top of rack switch need and substantially reduces cost. The reduction in components also simplifies fabric management at scale while consuming fewer ports at the data center aggregation layer.

The HPE VC SE 40 Gb F8 modules eliminate up to 95% of network sprawl at the compute module edge with one device that converges traffic inside frames and directly connects to external LANs. Each redundant pair of Virtual Connect modules provide eight adjustable downlink connections (six Ethernet and two Fibre Channel, or eight Ethernet) to dual-port 10 Gb and in case of 20 Gb Converged Network Adapters 16 adjustable downlinks connections 14 Ethernet and two Fibre Channel) on each compute module. Up to six uplinks using QSFP+ interfaces are available for connection to upstream Ethernet switches. Including splitter cables up to 24 uplinks are available for connection to upstream Ethernet and Fibre Channel. The HPE VC SE 40 Gb F8 modules avoid the confusion of traditional and other converged network solutions by eliminating the need for multiple Ethernet and Fibre Channel switches, extension modules, cables and software licenses. Also, Virtual Connect wire-once connection management is built-in enabling compute modules adds, moves and replacement in minutes instead of days or weeks. The Master/Satellite disaggregated architecture removes fixed of ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

For more information on Virtual Connect and converged network options,
see **https://h20195.www2.hpe.com/v2/GetPDF.aspx/c04815258.pdf**

One Config Simple (SCE)

SCE is a guided self-service tool to help sales and non-technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE.

Service and Support

Pointnext - Service and Support

Protect your business beyond warranty with HPE Support Services

HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

Connect your devices:

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Reduce down time and improve diagnostic accuracy with a single consolidated view of your environment. By connecting, you will receive 24x7monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to HPE support.

Learn more about getting connected at **http://www.hpe.com/services/getconnected**

Proactive Care Service Levels

HPE Proactive Care* with 24x7 coverage, three year Support Service

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.

https://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf

HPE Proactive Care Advanced* - 24x7 coverage, three year Support Service

This service helps achieve a higher return on your product investment with personalized support from a local assigned Account Support Manager who will share best practice advice and personalized recommendations designed to help improve availability and performance to increase stability and reduce unplanned downtime. Leverage your system's ability to connect to HPE for pre-failure alerts, automatic call logging and parts dispatch. For business critical incidents, this service offers critical event management to reduce mean time to resolution. This recommendation provides 24x7 coverage with four-hour response for hardware and collaborative support that offers two-hour callback for supported software issues. Collaborative software management is included with independent software vendors unless you have your software support from HPE where we own all cases from start through to resolution.

https://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA5-3259ENW.pdf

NOTE: HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverable

Other related Services

HPE Server Hardware Installation

Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf

HPE Synergy First Frame Installation and Startup

Provides for hardware installation (HPE Synergy compute modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Frame Link Modules, and HPE Synergy D3940 Storage Modules) and software startup for the first frame of your HPE Synergy deployment. Additional frames can be added using the HPE Synergy Additional Frame Installation and Startup Service.
https://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA6-5014ENN.pdf

HPE Synergy Additional Frame Installation and Startup Service

Service and Support

Add additional frames to your HPE Synergy First Frame Startup service or expand your existing HPE Synergy Infrastructure.

HPE Factory Express Initial Frame Service for Synergy

Factory Express allows a customers' configurations to be pre-configured in the HPE Integration center with an implementation project manager to manage the deployment end to end. The project manager will act as a single point of contact to coordinate the build, delivery and onsite installation and commissioning of the solution. In addition to the configuration and deployment activities, your HPE Synergy configuration goes through comprehensive testing and a detailed documentation package on the configuration and settings of the delivered solution will be provided.

HPE Factory Express Synergy Additional Frame Service for Synergy

Add additional frames to your HPE Synergy Factory Express service or expand your existing HPE Synergy Infrastructure.

HPE Datacenter Care service

HPE Datacenter Care helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services "building blocks." You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with HPE via a single point of accountability for HPE and others' products. For more information,
visit **http://www.hpe.com/services/datacentercare**

HPE Greenlake Flexibly Capacity

With Flexible Capacity, you get the speed, scalability, and economics of the public cloud in the privacy of your data center. Gain the advantages of the public cloud—consumption-based payment, rapid scalability without worrying about capacity constraints. Reduce the "heavy lifting" needed to operate a data center. And retain the advantages that IT provides the business (i.e., control, security). Deliver the right user experience, choose the right technology for the business, manage privacy and compliance, and manage the cost of IT. And, you have the option to use the public cloud when needed.

HPE Service Credits

HPE Technology Services Support Credits offer flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

HPE Education Services

Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment. **http://www.hpe.com/ww/learn**

HPE Support Center

The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with HPE experts, access support resources or collaborate with peers. Learn more **http://www.hpe.com/support/hpesc**

HPE'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.

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

NOTE: HPE Support Center Mobile App is subject to local availability. For more information: **http://www.hpe.com/services**

Parts and Materials

Hewlett Packard Enterprise will provide HPE-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 quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

Service and Support

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

Pre-configured Models

SKU	Performance	Performance
[SKU Number]	P00496-B21	871943-B21
Model Name	HPE Synergy 480 Gen10 Compute – BTO Top Seller	HPE Synergy 480 Gen10 Compute – BTO Performance
Processor	2x Intel Xeon-G 6248 (20C, 2.5G, 150W)	2x Intel Xeon-G 6130 (16C, 2.1G, 125W)
Number of Processors	2	2
Memory	64GB (4x 16GB DIMMs @2933)	64GB (4x 16GB DIMMs)
Network Controller	HPE Synergy 3820C 10/20G Converged Network Adapter	HPE Synergy 3820C 10/20G Converged Network Adapter
Storage Controller	HPE Smart Array P204i-c Gen10 12G SAS Modular Controller	HPE Smart Array P204i-c Gen10 12G SAS Modular Controller
Drive Cage	Standard BP with 2 SFF/4 uFF Drive bays for optional SATA/SAS Drives	Standard BP with 2 SFF/4 uFF Drive bays for optional SATA/SAS Drives
Mezzanine Slots	3 x16 PCIe 3.0	
Management	OneView 3.1 and iLO 5 Advanced (standard)	

NOTE: UEFI is the standard default for all Predefined models.

Country Code Key	xx1 = B21	Worldwide
	xx1 = B22/23	TAA

NOTE: The -B21 WW SKU is to be ordered in all countries other than Japan or PRC.

	xx1 = 291	Japan
	xx1 = AA1	PRC

Configuration Information - Factory Integrated Models

NOTE: Not all models are available in all regions. Check with your local country Hewlett Packard Enterprise offices for availability.
NOTE: This section lists some of the steps required to configure a Factory Integrated Model (configure-to-order or CTO compute module). To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends the use of an Hewlett Packard Enterprise approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.
NOTE: Configure-to-order compute modules must start with a CTO Compute Module.
NOTE: FIO indicates that this option is only available as a factory installable option.
NOTE: All Factory Integrated Models will be populated with sufficient drive blanks based on the number of initial drives ordered with the server.
NOTE: The Factory integrated w/o drive bay model ships with a grill blank in place of the drive cage and drive backplane.

Step 1: Base Configuration (choose one of the following configurable models)

CTO Compute Module	HPE Synergy 480 Gen10 CTO Standard BackPlane Compute Module	HPE Synergy 480 Gen10 CTO w/o Drives Compute Module	HPE Synergy 480 Gen10 CTO Premium Backplane Compute Module
SKU Number	871940-B21	871941-B21	871942-B21
TAA SKU [1]	871940-B22	871941-B22	871942-B22
Processor	Up to 2 Selectable Intel Xeon Scalable Family Processors		
DIMM Slots	Up to 24 DIMM slots(12 per processor-6DPC)		
Storage Backplane	Standard backplane 2 Hot-plug SFF Bays	No backplane, No Drive Carriage system	Premium backplane, 2 Hot-plug SFF
Storage Controllers	Front Drive Cage Controller Options: Software RAID - S100i Chipset SATA, Essential RAID - E208i-c, Performance RAID– P204i-c and P416ie-m SATA/SAS Mezzanine option for D3940 Storage Module	Front Drive Cage Blank, Optional: P416ie-m SATA/SAS Mezzanine option for D3940 Storage Module	Premium Backplane supports NVMe drive in front drive cage (no S100i, E208i-c or P204i-c controllers supported Optional: P416ie-m SATA/SAS Mezzanine (with optional SAS cables allow additional access to SATA/SAS drives in Front Drive Cage as well as for D3940 Storage Modules)
Drives supported	Optional: 2x SAS/SATA/SSD, 4x uFF or 2x Internal M.2 SATA drives or SATA/SAS in D3940 Storage Modules	Optional: 2x Internal M.2 SATA drives	Optional: 2x NVMe Drives or 2x Internal M.2 SATA drives, SATA/SAS in D3940 Storage Modules
IO Expansion/ Mezzanine slots	3x 16 PCIe 3.0 Slots for Mezzanine Options		
Network	Optional: (HPE Synergy 2820C 10Gb CNA, HPE Synergy 3820C 10/20Gb CNA, HPE Synergy 4820c 10/20/25 CNA, HPE Synergy 6810C 25/50Gb Ethernet Adapter, HPE Synergy 6410C 25/50Gb Ethernet Adapter, HPE Synergy 3530C 16G FC HBA, HPE Synergy 3830C 16G FC HBA) , HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters, HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters		
Graphic Processing Units	Optional MXM Mezzanine and PCI Module solutions		
Security	iLO 5		

Configuration Information - Factory Integrated Models

USB and MicroSD	1 Internal USB 3.0, 1 Internal microSD
Management	OneView 3.1 and iLO 5 Advanced (standard)

NOTE: CTO SKUs are designed for specific use case fits.
NOTE: This information applies to factory CTO configurations, Field upgrades may differ depending field configurations.
NOTE: BackPlane in the chassis description refers to the type of controller backplane in the Drive Cage modules.
NOTE: Standard BackPlane CTO Chassis is designed for flexible use of the Compute Module for most workloads. This SKU may use the SATA Board Option, or SmartArray options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
NOTE: The Drive-Less CTO option is intended for stateless on SAN/NAS boot use cases and still supports messanine Smart Array for Synergy D3940 Storage Modules. Additional, this model supports adding the M.2 Adapter for dual M.2 drive options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
NOTE: The Premium BackPlane CTO option supports NVMe drives directly in the Front Drive cage. SATA/SAS drives may optionally be supported in the Front Drive Cage in combination with the D3940 Storage Module with a mezzanine Smart Array P416ie-m and addition SAS Cables that connect the mezzanine card directly to the Premium Backplane on the Local Drive Cage

NOTE[1]: HPE offers multiple Trade Agreement Act (TAA) compliant configurations to meet the needs of US Federal Government customers. These products are either manufactured or substantially transformed in a designated country.

Step 2a: Choose Required Options - Processors

Processor Option Kits

HPE SY480 Gen10 Compute may be configured with either Intel Xeon Scalable Family of Generation 1 or Generation 2 Processors(Mixing not allowed)

Intel Xeon Scalable Family Gen 2 - Processor Option Kits

Intel Xeon-Platinum Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280L (2.7GHz/28-core/205W) FIO Processor Kit	P07363-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280M (2.7GHz/28-core/205W) FIO Processor Kit	P07362-L21
HPE Synergy 480/660 Gen10 Intel® Xeon-Platinum 8280 (2.7GHz/28-core/205W) FIO Processor Kit	P07361_B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276L (2.2GHz/28-core/165W) FIO Processor Kit	P07360-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276M (2.2GHz/28-core/165W) FIO Processor Kit	P07359-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276 (2.2GHz/28-core/165W) FIO Processor Kit	P07358-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8270 (2.7GHz/26-core/205W) FIO Processor Kit	P07357-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8268 (2.9GHz/24-core/205W) FIO Processor Kit	P07356-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260Y (2.4GHz/24-20-16-core/165W) FIO Processor Kit	P07355-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260L (2.4GHz/24-core/165W) FIO Processor Kit	P07354-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260M (2.4GHz/24-core/165W) FIO Processor Kit	P07353-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260 (2.4GHz/24-core/165W) FIO Processor Kit	P07352-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8256 (3.8GHz/4-core/105W) FIO Processor Kit	P07340-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8253 (2.2GHz/16-core/125W) FIO Processor Kit	P07338-L21

Intel Xeon-Gold Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) FIO Processor Kit	P11881-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) FIO Processor Kit	P07351-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) FIO Processor Kit	P07350-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) FIO Processor Kit	P07349-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) FIO Processor Kit	P16385-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) FIO Processor Kit	P07348-L21

Configuration Information - Factory Integrated Models

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) FIO Processor Kit	P07347-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) FIO Processor Kit	P07346-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) FIO Processor Kit	P11886-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240M (2.6GHz/18-core/150W) FIO Processor Kit	P11884-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) FIO Processor Kit	P07345-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) FIO Processor Kit	P11885-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238M (2.1GHz/22-core/140W) FIO Processor Kit	P11883-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238 (2.1GHz/22-core/140W) Processor Kit	P07337-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) FIO Processor Kit	P11694-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) FIO Processor Kit	P07344-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) FIO Processor Kit	P12767-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) FIO Processor Kit	P11880-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) FIO Processor Kit	P08679-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) FIO Processor Kit	P11882-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220 (2.2GHz/18-core/125W) FIO Processor Kit	P07343-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218N (2.3GHz/16-core/105W) FIO Processor Kit	P07341-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) FIO Processor Kit	P12572-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) FIO Processor Kit	P07342-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) FIO Processor Kit	P07339-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215L (2.5GHz/10-core/85W) FIO Processor Kit	P12142-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215M (2.5GHz/10-core/85W) FIO Processor Kit	P12143-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) FIO Processor Kit	P07336-L21

Intel Xeon-Silver Processors

HPE Synergy 480 Gen10 Intel Xeon-Silver 4216 (2.1GHz/16-core/100W) FIO Processor Kit	P11692-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4215 (2.5GHz/8-core/85W) FIO Processor Kit	P08681-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4214Y (2.2GHz/12-10-8-core/85W) FIO Processor Kit	P07334-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4214 (2.2GHz/12-core/85W) FIO Processor Kit	P11693-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4210 (2.2GHz/10-core/85W) FIO Processor Kit	P07333-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4208 (2.1GHz/8-core/85W) FIO Processor Kit	P08678-L21

Intel Xeon-Bronze Processors

HPE Synergy 480 Gen10 Intel Xeon-Bronze 3204 (1.9GHz/6-core/85W) FIO Processor Kit	P07332-L21

NOTE: All processors within any single compute module must be identical.
NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.
NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.
NOTE: For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136; 6 is the SKU Level, 1 or 2 is the processor generation, 34 is the SKU model, m indicates memory sku)
NOTE: The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connector one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).

Configuration Information - Factory Integrated Models

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

NOTE: Platinum – 8200 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933 MT/s providing up to 1TB on most and 2, 4.5TB on select processor skus. Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

NOTE: Gold – 5200, 6200 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933/2666MHz providing up to 1, 2, or 4.5TB memory capacity depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.

NOTE: Silver – 4200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI , 6-Channel DDR4 @ 2400 MHz providing up to 1, 2, or 4.5TB depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: Bronze – 3200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI, supports 6-Channel DDR4 @ 2133MHz depending on processor and memory selected, providing up to 1TB memory capacity. Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: See indivual Specs for more details

Intel® Xeon® Scalable Family Gen 1 - Processor Option Kits

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180M (2.5GHz/28-core/205W) FIO Processor Kit	872131-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180 (2.5GHz/28-core/205W) FIO Processor Kit	872119-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176 (2.1GHz/28-core/165W) FIO Processor Kit	872120-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170 (2.1GHz/26-core/165W) FIO Processor Kit	872121-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8168 (2.7GHz/24-core/205W) FIO Processor Kit	872122-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8165 (2.3GHz/24-core/205W) FIO Processor Kit	881653-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8164 (2.0GHz/26-core/150W) FIO Processor Kit	872123-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160M (2.1GHz/24-core/150W) FIO Processor Kit	872130-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160 (2.1GHz/24-core/150W) FIO Processor Kit	872129-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8158 (3.0GHz/12-core/150W) FIO Processor Kit	873385-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8156 (3.6GHz/4-core/105W) FIO Processor Kit	873382-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8153 (2.0GHz/16-core/125W) FIO Processor Kit	873389-L21

Intel® Xeon®-Gold Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6154 (3.0GHz/18-core/200W) FIO Processor Kit	872132-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6152 (2.1GHz/22-core/140W) FIO Processor Kit	872133-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6150 (2.7GHz/18-core/165W) FIO Processor Kit	872134-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6148 (2.4GHz/20-core/150W) FIO Processor Kit	872135-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6146 (3.2GHz/12-core/165W)FIO Processor Kit	872136-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6144 (3.5GHz/8-core/150W) FIO Processor Kit	872137-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6143 (2.8GHz/16-core/205W) FIO Processor Kit	881652-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142M (2.6GHz/16-core/150W) FIO Processor Kit	872117-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142 (2.6GHz/16-core/150W) FIO Processor Kit	872138-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140M (2.3GHz/18-core/140W) FIO Processor Kit	872116-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140 (2.3GHz/18-core/140W) FIO Processor Kit	872139-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6138 (2.0GHz/20-core/125W) FIO Processor Kit	873376-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136 (3.0GHz/12-core/150W) FIO Processor Kit	873378-L21

Configuration Information - Factory Integrated Models

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134 (3.2GHz/8-core/130W) FIO Processor Kit	873379-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6132 (2.6GHz/14-core/140W) FIO Processor Kit	873380-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6130 (2.1GHz/16-core/125W) FIO Processor Kit	873381-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6128 (3.4GHz/6-core/115W) FIO Processor Kit	873383-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6126 (2.6GHz/12-core/125W) FIO Processor Kit	873384-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5122 (3.6GHz/4-core/105W) FIO Processor Kit	873386-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5120 (2.2GHz/14-core/105W) FIO Processor Kit	873388-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5118 (2.3GHz/12-core/105W) FIO Processor Kit	873387-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5115 (2.4GHz/10-core/85W) FIO Processor Kit	873390-L21

Intel Xeon-Silver Processors

HPE Synergy 480 Gen10 Intel Xeon-Silver 4116 (2.1GHz/12-core/85W) FIO Processor Kit	872114-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4114 (2.2GHz/10-core/85W) FIO Processor Kit	872112-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4112 (2.6GHz/4-core/85W) FIO Processor Kit	872113-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4110 (2.1GHz/8-core/85W) FIO Processor Kit	872110-L21

Intel® Xeon®-Bronze Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Bronze 3104 (1.7GHz/6-core/85W) FIO Processor Kit	872118-L21

NOTE: All processors within any single compute module must be identical.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.

NOTE: For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku)

NOTE: The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connector one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

NOTE: Platinum – 8100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2666 MT/s, 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

NOTE: Gold – 5100, 6100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2400 MHz (SKU 5122=supports 2666), 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS.

NOTE: Silver and Bronze processors are primarily designed for 2 Socket servers and will appear as Synergy 480 Gen10 only processors.

NOTE: Silver – 4100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2400 MHz, 768 GB memory capacity, Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS.

NOTE: Bronze – 3100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2133 MHz, 768 GB memory capacity, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS

Step 2b: Choose Memory Options

Configuration Information - Factory Integrated Models

Only one of the following from each list unless otherwise noted

Select memory associated with the processors selected in previous section.

HPE SmartMemory

The following memory supports Intel® Xeon® Scalable Family processors - 2nd generation

HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00918-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00920-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00922-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00924-B21
HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00930-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit	P00926-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2933 CAS-24-21-21 Load Reduced 3DS Smart Memory Kit	P00928-B21
HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-24-21-21 Load Reduced Smart Memory Kit	P11040-B21

The following memory supports Intel® Xeon® Scalable Family processors – 1st generation

HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	815097-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	815098-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	835955-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	815100-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 Load Reduced Smart Memory Kit	815101-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 3DS Load Reduced Memory Kit	815102-B21

NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10. For additional information, please see the **HPE SmartMemory QuickSpecs.**
NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
NOTE: For the latest information on **Memory Speed.**
NOTE: If you want to know more about the memory, reference the **RAS feature whitepaper**.

HPE Persistent Memory Kit featuring Intel Optane DC Persistent Memory

The following memory is for use with specific Intel Xeon Scalable Family Generation 2 processors only.
For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**
https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00017079enw

HPE 128GB 2666 Persistent Memory Kit featuring Intel Optane DC	835804-B21
HPE 256GB 2666 Persistent Memory Kit featuring Intel Optane DC	835807-B21
HPE 512GB 2666 Persistent Memory Kit featuring Intel Optane DC	835810-B21

NOTE: Supported on select HPE Synergy Gen10 servers with second generation Intel Xeon Scalable Gen2 processors (SY480 and SY660)

For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**

Step 2c: Choose Networking Adapters

NOTE: Only one or more of the following from each list unless otherwise noted

HPE Synergy 2820C 10Gb Converged Network Adapter	794538-B21
HPE Synergy 3820C 10/20Gb Converged Network Adapter	777430-B21
HPE Synergy 4610C 10/25Gb Ethernet Adapter	813890-B21
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
HPE Synergy 6410C 25/50Gb Ethernet Adapter	868779-B21

Configuration Information - Factory Integrated Models

NOTE: Networking adapters must have matched Interconnect Modules or Interconnect Links matched in the corresponding ICM slot on the rear of the Synergy 12000 Frame. See Specifications Section below for Mezzanine to ICM Best Practices and matching requirements.

Step 3: Choose Additional Factory Integratable Options

NOTE: Only one or more of the following

HPE Storage Controllers

HPE FIO Enable Smart Array SW RAID	784308-B21
HPE Synergy Compute Chipset SATA FIO Board Kit	872955-B21
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21
HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller	804424-B21
HPE 96W Smart Storage Battery (up to 20 Devices) with 260mm Cable Kit	P01367-B21
HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE Smart Array P416ie-m SR Gen10 SAS Cable Kit	871573-B21

NOTE: For SATA/SAS drive use with premium compute modules/front local drives

HPE I/O Expansion Options

HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
HPE Synergy 6410C 25/50Gb Ethernet Adapter	868779-B21
HPE Synergy 4610C 10/25Gb Ethernet Adapter	813890-B21
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 3820C 10/20Gb Converged Network Adapter	777430-B21
HPE Synergy 2820C 10Gb Converged Network Adapter	794538-B21
HPE Synergy 3830C 16Gb Fibre Channel Host Bus Adapter	777452-B21
HPE Synergy 3530C 16Gb Fibre Channel Host Bus Adapter	777454-B21
HPE Synergy 5330C 32Gb Fibre Channel Host Bus Adapter	870828-B21
HPE Synergy 5830C 32Gb Fibre Channel Host Bus Adapter	777456-B21

NOTE: See Specfications sections below for Best Practices and requirements for options placement in correct mezzanine slots that match with Interconnect model slotting for correct operations.

Step 4: Choose additional options for Factory Integration from Additional Options sections below or the following:

- HPE Synergy 12000 Frame QuickSpecs
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815113
- HPE Synergy Interconnect and Mezzanine Components QuickSpecs
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815110
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815110
- HPE Synergy D3940 Storage Module QuickSpecs
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815141

Step 5: Choose HPE Synergy Services

HPE Synergy Proactive Care Services

HPE 3 Year Proactive Care 24x7 Synergy SY480 Gen10 Service	H7MC1E
HPE 3 Year Proactive Care 24x7 with DMR Synergy SY480 Gen10 Service	H7MC2E
HPE 3 Year Proactive Care Advanced 24x7 Synergy SY480 Gen10 Service	H7MC4E
HPE 3 Year Proactive Care Advanced 24x7 with DMR Synergy SY480 Gen10 Service	H7MC5E

Additional Options

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends the use of an HPE approved configurator. Contact your local sales representative for additional information.

HPE Graphics Accelerators and Expansion

Mezzanine GPU Options for Synergy 480 Compute Module

HPE Synergy 480 NVIDIA Tesla P6 GPU Mezzanine Graphics Card	880708-B21
HPE Synergy NVIDIA Quadro M3000SE Mezzanine Card	869228-B21

High Density Multi MXM Expansion Module GPU Options

HPE Synergy 480 Gen10 Multi MXM FIO Expansion Module	872627-B21
HPE Synergy 480 NVIDIA Tesla P6 Multi MXM Option Kit	880709-B21
HPE Synergy 480 Multi MXM with 2 NVIDIA M3000SE Graphics Kit	868663-B21

Standard PCIe Expansion Module GPU Options

HPE Synergy 480 Gen10 PCIe FIO Expansion Module	872628-B21
HPE NVIDIA Tesla P40 24GB Computational Accelerator	Q0V80A
HPE NVIDIA Tesla V100 PCIe 32GB Computational Accelerator	Q9U36A
HPE NVIDIA Quadro RTX 6000 Graphics Accelerator	R0Z45A

NOTE: Must be installed in Mezz 1. Due to heatsink size, no other card may be installed in Mezz 2 and the HPE Smart Array P416ie-m 12Gb Mezzanine SAS Controller, which provides connectivity to direct attach storage, cannot be in the same server due to size restraints.

NOTE: NVIDIA Tesla M6 requires NVIDIA Grid 2.0 or later to enable vGPU features. vGPU not enabled by default on the card alone. For more information, go to NVIDIA: **http://www.nvidia.com/grid**

NOTE: GRID license for use with NVIDIA Tesla M6 must be purchased separately through an NVIDIA verified virtualization partner at **http://www.nvidia.com/buygrid**.

HPE Processors (1 or 2 required)

Optional Items as Required – 2nd Processors

HPE SY480 Gen10 Compute may be configured with either Intel® Xeon® Scalable Family of Generation 1 or Generation 2 Processors(Mixing not allowed)

Intel® Xeon® Scalable Family Gen 2 - Processor Option Kits

Intel® Xeon®-Platinum Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280L (2.7GHz/28-core/205W) Processor Kit	P07363-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280M (2.7GHz/28-core/205W) Processor Kit	P07362-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280 (2.7GHz/28-core/205W) Processor Kit	P07361_B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276L (2.2GHz/28-core/165W) Processor Kit	P07360-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276M (2.2GHz/28-core/165W) Processor Kit	P07359-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276 (2.2GHz/28-core/165W) Processor Kit	P07358-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8270 (2.7GHz/26-core/205W) Processor Kit	P07357-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8268 (2.9GHz/24-core/205W) Processor Kit	P07356-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260Y (2.4GHz/24-20-16-core/165W) Processor Kit	P07355-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260L (2.4GHz/24-core/165W) Processor Kit	P07354-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260M (2.4GHz/24-core/165W) Processor Kit	P07353-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260 (2.4GHz/24-core/165W) Processor Kit	P07352-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8256 (3.8GHz/4-core/105W) Processor Kit	P07340-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8253 (2.2GHz/16-core/125W) Processor Kit	P07338-B21

Intel® Xeon®-Gold Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) Processor Kit	P11881-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) Processor Kit	P07351-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) Processor Kit	P07350-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) Processor Kit	P07349-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) Processor Kit	P16385-B21

Additional Options

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) Processor Kit	P07348-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) Processor Kit	P07347-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) Processor Kit	P07346-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) Processor Kit	P11886-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240M (2.6GHz/18-core/150W) Processor Kit	P11884-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) Processor Kit	P07345-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) Processor Kit	P11885-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238M (2.1GHz/22-core/140W) Processor Kit	P11883-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238 (2.1GHz/22-core/140W) FIO Processor Kit	P07337-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) Processor Kit	P11694-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) Processor Kit	P07344-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) Processor Kit	P12767-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) Processor Kit	P11880-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) Processor Kit	P08679-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) Processor Kit	P11882-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220 (2.2GHz/18-core/125W) Processor Kit	P07343-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218N (2.3GHz/16-core/110W) Processor Kit	P07341-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) Processor Kit	P12572-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) Processor Kit	P07342-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) Processor Kit	P07339-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215L (2.5GHz/10-core/85W) Processor Kit	P12142-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215M (2.5GHz/10-core/85W) Processor Kit	P12143-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) Processor Kit	P07336-B21

Intel® Xeon®-Silver Processors

HPE Synergy 480 Gen10 Intel Xeon-Silver 4216 (2.1GHz/16-core/100W) Processor Kit	P11692-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4215 (2.5GHz/8-core/85W) Processor Kit	P08681-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4214Y (2.2GHz/12-10-8-core/85W) Processor Kit	P07334-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4214 (2.2GHz/12-core/85W) Processor Kit	P11693-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4210 (2.2GHz/10-core/85W) Processor Kit	P07333-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4208 (2.1GHz/8-core/85W) Processor Kit	P08678-B21

Intel® Xeon®-Bronze Processors

HPE Synergy 480 Gen10 Intel Xeon-Bronze 3204 (1.9GHz/6-core/85W) Processor Kit	P07332-B21

NOTE: All processors within any single compute module must be identical.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.

NOTE: For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel® Xeon®-Gold 6136; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku)

NOTE: The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connector one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

Additional Options

NOTE: Platinum – 8200 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933 MT/s providing up to 1TB on most and 2, 4.5TB on select processor skus. Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

NOTE: Gold – 5200, 6200 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933/2666MHz providing up to 1, 2, or 4.5TB memory capacity depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.

NOTE: Silver – 4200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI , 6-Channel DDR4 @ 2400 MHz providing up to 1, 2, or 4.5TB depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: Bronze – 3200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI, supports 6-Channel DDR4 @ 2133MHz depending on processor and memory selected, providing up to 1TB memory capacity. Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

NOTE: See indivual Specs for more details

Intel® Xeon® Scalable Family Gen 1 - Processor Option Kits

Intel® Xeon®-Platinum Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180 (2.5GHz/28-core/205W) Processor Kit	872119-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176 (2.1GHz/28-core/165W) Processor Kit	872120-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170 (2.1GHz/26-core/165W) Processor Kit	872121-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8168 (2.7GHz/24-core/205W) Processor Kit	872122-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8164 (2.0GHz/26-core/150W) Processor Kit	872123-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160 (2.1GHz/24-core/150W) Processor Kit	872129-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8158 (3.0GHz/12-core/150W) Processor Kit	873385-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8156 (3.6GHz/4-core/105W) Processor Kit	873382-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8153 (2.0GHz/16-core/125W) Processor Kit	873389-B21

Intel® Xeon®-Platinum Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180M (2.5GHz/28-core/205W) Processor Kit	872131-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8165 (2.3GHz/24-core/205W) Processor Kit	881653-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160M (2.1GHz/24-core/150W) Processor Kit	872130-B21

Intel® Xeon®-Gold Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6154 (3.0GHz/18-core/200W) Processor Kit	872132-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6152 (2.1GHz/22-core/140W) Processor Kit	872133-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6150 (2.7GHz/18-core/165W) Processor Kit	872134-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6148 (2.4GHz/20-core/150W) Processor Kit	872135-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6146 (3.2GHz/12-core/165W) Processor Kit	872136-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6144 (3.5GHz/8-core/150W) Processor Kit	872137-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142 (2.6GHz/16-core/150W) Processor Kit	872138-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140 (2.3GHz/18-core/140W) Processor Kit	872139-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6138 (2.0GHz/20-core/125W) Processor Kit	873376-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136 (3.0GHz/12-core/150W) Processor Kit	873378-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134 (3.2GHz/8-core/130W) Processor Kit	873379-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6132 (2.6GHz/14-core/140W) Processor Kit	873380-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6130 (2.1GHz/16-core/125W) Processor Kit	873381-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6128 (3.4GHz/6-core/115W) Processor Kit	873383-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6126 (2.6GHz/12-core/125W) Processor Kit	873384-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5122 (3.6GHz/4-core/105W) Processor Kit	873386-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5120 (2.2GHz/14-core/105W) Processor Kit	873388-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5118 (2.3GHz/12-core/105W) Processor Kit	873387-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5115 (2.4GHz/10-core/85W) Processor Kit	873390-B21

Intel® Xeon®-Gold Processors

Additional Options

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6143 (2.8GHz/16-core/205W) Processor Kit	881652-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142M (2.6GHz/16-core/150W) Processor Kit	872117-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140M (2.3GHz/18-core/140W) Processor Kit	872116-B21

Intel® Xeon®-Silver Processors

HPE Synergy 480 Gen10 Intel Xeon-Silver 4116 (2.1GHz/12-core/85W) Processor Kit	872114-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4114 (2.2GHz/10-core/85W) Processor Kit	872112-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4112 (2.6GHz/4-core/85W) Processor Kit	872113-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4110 (2.1GHz/8-core/85W) Processor Kit	872110-B21

Intel® Xeon®-Bronze Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Bronze 3104 (1.7GHz/6-core/85W) Processor Kit	872118-B21

NOTE: All processors within the compute module must be identical.
NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.
NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.
NOTE: For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity (ie. HPE Synergy 480/660 Gen10 Intel® Xeon®-Gold 6134; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku).
NOTE: The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connector one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).
NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.
NOTE: Platinum – 8100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2666 MT/s, 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.
NOTE: Gold – 5100, 6100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2400 MHz (SKU 5122=supports 2666), 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS.
NOTE: Silver and Bronze processors are primarily designed for 2 Socket servers and will appear as Synergy 480 Gen10 only processors.
NOTE: Silver – 4100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2400 MHz, 768 GB memory capacity, Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS.
NOTE: Bronze – 3100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2133 MHz, 768 GB memory.

HPE SmartMemory

The following memory supports Intel® Xeon® Scalable processor family 2nd generation

DIMMs (RDIMMs)

HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00918-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00920-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00922-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00924-B21
HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00930-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit	P00926-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2933 CAS-24-21-21 Load Reduced 3DS Smart Memory Kit	P00928-B21

Additional Options

HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-24-21-21 Load Reduced Smart Memory Kit   P11040-B21

The following memory supports Intel® Xeon® Scalable processor family 1st generation
DIMMs
HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit   815097-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit   815098-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit   835955-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit   815100-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 Load Reduced Smart Memory Kit   815101-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 3DS Load Reduced Memory Kit   815102-B21
NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this compute module.
HPE SmartMemory is required to realize the memory performance improvements and enhanced functionality
listed in this document for Gen10. For additional information, please see the **HPE DDR4 SmartMemory**
QuickSpecs
NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
NOTE: For more information refer to the **Memory Speed Tables**
NOTE: For memory **RAS feature whitepaper** if users want to know more about the memory RAS features.

HPE Persistent Memory Kit featuring Intel Optane DC Persistent Memory

The following memory is for use with specific Intel Xeon Scalable Family Gen 2 processors

For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**
https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00017079enw

HPE 128GB 2666 Persistent Memory Kit featuring Intel Optane DC   835804-B21
HPE 256GB 2666 Persistent Memory Kit featuring Intel Optane DC   835807-B21
HPE 512GB 2666 Persistent Memory Kit featuring Intel Optane DC   835810-B21
NOTE: Supported on select HPE Synergy Gen10 servers with second generation Intel Xeon Scalable Gen2
processors (SY480 and SY660)

HPE Drives

NOTE: The HPE Synergy 480 Gen10 Compute Module supports the HPE hot-plug small form factor (SFF) SmartDrive carrier for
enhanced management and reduced maintenance errors. HPE drives from generation G7 servers and before are not compatible
with the HPE Synergy 480 Gen10 drive bays.
NOTE: The mixing of standard SAS drives with SAS SSD is supported within the compute module, but limits the RAID
configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported.
NOTE: HPE drives have either a one year or three year warranty; refer to the specific drive QuickSpecs for details. **HPE Hard**
Disk Drives or **HPE Solid State Drives**
NOTE: The drive options are not required when configuring a drive-less model.

HPE Synergy 480 Gen10 Compute Module support all small form factor (SFF) SAS and SATA HDDs and SSDs currently certified in
HPE Smart Carriers. Any exceptions to this qualification will be listed on this page by drive description and part number.
Enterprise - 12G SAS - SFF Drives
HPE 300GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD   872475-B21
HPE 300GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD   870753-B21
HPE 600GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD   870757-B21
HPE 600GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD   872477-B21
HPE 900GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD   870759-B21
HPE 1.2TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD   872479-B21
HPE 1.8TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD   872481-B21
HPE 2.4TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD   881457-B21
Midline - 12G SAS - SFF Drives
HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty Digitally Signed Firmware HDD   832514-B21

Additional Options

HPE 2TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD	765466-B21
HPE 1TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty Digitally Signed Firmware HDD	655710-B21
HPE 2TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e Digitally Signed Firmware HDD	765455-B21
HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e Digitally Signed Firmware HDD	765464-B21

Write Intensive - NVMe- SFF - Solid State Drives

HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	878014-B21

Read Intensive - SATA - SFF Drives

HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06194-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06196-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06198-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04556-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04560-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04564-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04566-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875503-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04570-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06200-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04474-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04476-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04478-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04480-B21
HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04482-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05938-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05946-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05924-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05928-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05932-B21

Mixed Use SATA SSD Drives

HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05976-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05980-B21

Micro Form Factor uFF Dual SATA Drives

HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	P06607-B21
HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	P06609-B21

Standard – M.2 Solid State Drives

NOTE: M.2's require adapter kit for Synergy 480 Gen10

HPE Synergy 480 Gen10 M.2 NGFF FIO Adapter Board Kit	873165-B21
HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	875498-B21
HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	875488-B21
HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	875490-B21
HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	875492-B21
HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	875500-B21

Read Intensive – SAS SFF - Solid State Drives

HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06584-B21
HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06586-B21
HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06588-B21
HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06590-B21
HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P06592-B21
HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04517-B21
HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04519-B21
HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04521-B21

Additional Options

HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04523-B21
HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10440-B21
HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10442-B21
HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10444-B21
HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10446-B21

Write Intensive – SAS SFF - Solid State Drives

HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04541-B21
HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09098-B21
HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04543-B21
HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09100-B21
HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04545-B21
HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09102-B21
HPE 3.2TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04547-B21

Mixed Use – SFF - Solid State Drives

HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P00896-B21
HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04525-B21
HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04527-B21
HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04533-B21
HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04537-B21
HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04539-B21
HPE 960GB SAS 12G Mixed Use SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10448-B21
HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10454-B21
HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	P10460-B21

Mixed Use - SATA - SFF - Solid State Drives

HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09712-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09716-B21
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09722-B21
HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P00896-B21

Mixed Use - SATA - SFF - Solid State Drives

HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P07922-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P07926-B21
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P07930-B21
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05986-B21
HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P05994-B21

NVMe - SFF Drives

HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P13699-B21
HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P13701-B21
HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P13703-B21
HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07179-B21
HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07181-B21
HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10222-B21
HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07183-B21
HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07185-B21
HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10224-B21
HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10226-B21
HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P13695-B21
HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P13697-B21
HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10220-B21
HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10208-B21
HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07190-B21

Additional Options

HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07192-B21
HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10210-B21
HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07194-B21
HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10212-B21
HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07196-B21
HPE 15.36TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P07198-B21
HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10214-B21
HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10216-B21
HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P10218-B21
HPE 750GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	P06952-B21

Mixed Use – SAS SFF - Solid State Drives

HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09088-B21
HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09090-B21
HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09092-B21
HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09094-B21
HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P09096-B21

SATA Multi Vendor Solid State Drives

HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18424-B21
HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18432-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18420-B21
HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18430-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18434-B21
HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18438-B21
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18436-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18422-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18426-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	P18428-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21

Drive Qualification Exceptions:

At this time there are no exceptions to list.

HPE Security

HPE Trusted Platform Module 2.0 Gen10 Option	864279-B21

NOTE: The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2012. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2012 has not been tampered with while the system was offline.
NOTE: For more information about **TPM.**
NOTE: HPE Synergy OS pre-installed units will come with the partition required for TPM deployment.
NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

HPE Networking Mezzanine CNA's and Adapters

NOTE: The compute module requires a minimum of one (1) mezzanine network adapter.
NOTE: Mezzanine network adapters can be installed in any mezzanine connector. Hewlett Packard Enterprise best practice is to install the first network adapter in mezzanine connector 3 to facilitate installation of Type C and D mezzanines in mezzanine connectors 1 or 2

HPE Synergy 2820C 10Gb Converged Network Adapter	794538-B21
HPE Synergy 3820C 10/20Gb Converged Network Adapter	777430-B21
HPE Synergy 4610C 10/25Gb Ethernet Adapter	813890-B21
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21

Additional Options

HPE Synergy 6410C 25/50Gb Ethernet Adapter	868779-B21
HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21

HPE Fibre Channel

HPE Synergy 3830C 16Gb Fibre Channel Host Bus Adapter	777452-B21
HPE Synergy 3530C 16Gb Fibre Channel Host Bus Adapter	777454-B21
HPE Synergy 5330C 32Gb Fibre Channel Host Bus Adapter	870828-B21
HPE Synergy 5830C 32Gb Fibre Channel Host Bus Adapter	777456-B21

HPE Storage Controllers

HPE Synergy Compute Chipset SATA FIO Board Kit	872955-B21
HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller	804424-B21
HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE 96W Smart Storage Battery (up to 20 Devices) with 260mm Cable Kit	P01367-B21
HPE Smart Array P416ie-m SR Gen10 SAS Cable Kit	871573-B21
HPE FIO Enable Smart Array SW RAID	784308-B21
HPE 96W Smart Storage Battery (up to 20 Devices) with 260mm Cable Kit	P01367-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21

NOTE: For use with premium modules/front drives.

NOTE: HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.

NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives

NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only.

NOTE: HPE Synergy 480 Gen10 M.2 FIO Adapter Board Kit(873165-B21) required for enablement of optional internal M.2 SATA Drives.

NOTE: For legacy support select Legacy mode settings part, 758959-B22.

NOTE: Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with NVMe drives in front drive cage. Also, supports P416ie-m with specific SAS cable(871573-B21) connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and D3940.

HPE Flash Media Kits

HPE Enterprise Mainstream Flash Media Kits for Memory Cards

HPE 8GB microSD Flash Memory Card	726116-B21
HPE 32GB microSD Flash Memory Card	700139-B21
HPE 8GB Dual microSD Flash USB Drive	741279-B21
HPE 8GB microSD Flash Memory Card	726116-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123175**

HPE Synergy Services

HPE Synergy Proactive Care Services

HPE 3 Year Proactive Care 24x7 Synergy SY480 Gen10 Service	H7MC1E
HPE 3 Year Proactive Care 24x7 with DMR Synergy SY480 Gen10 Service	H7MC2E
HPE 3 Year Proactive Care Advanced 24x7 Synergy SY480 Gen10 Service	H7MC4E
HPE 3 Year Proactive Care Advanced 24x7 with DMR Synergy SY480 Gen10 Service	H7MC5E

NOTE: DMR – Defective Media Retention

Deployment/Installation & Start-up Services

Additional Options

HPE Factory Express Synergy Initial Frame Package 4 Service   HA454A1-300
HPE Factory Express Synergy Add-on Frame Package 4 Service   HA454A1-301
HPE Synergy First Frame Startup Service   U8JM3E
HPE Synergy Additional Frame Startup Service   U8JM4E

NOTE: For more information visit **HPE Support Services Central**

Third Party Solutions

Orumco Cloud Solution(Service Provider)

Ormuco is a turnkey, white label private and/or public cloud solution powered by HPE Rack and/or Synergy infrastructure. The solution is installed and operated by Ormuco in the enterprise or service provider data center and offers fully-featured Openstack/Docker based cloud with value add services in IaaS/PaaS. It offers a multilingual, sophisticated hybrid management end-user and administration portal.

Solution – see **http://www.Ormuco.com**

HPE internal Sales/Presales material can be found on the WW Service Provider Sales Portal SKUs.

Ormuco Installation	Description
ORM-INS-ENT	Enterprise Customer Site
ORM-INS-SP	Service Provider Customer Site

NOTE: HPE should be entitled to a 15% discount on list

Ormuco Software License and Support	List price per server / month
ORM-SW-SP	$2,200.00 USD
ORM-SW-ENT	$1,400.00 USD

NOTE: To request a quotation or place an order for the Ormuco SKUs send an email to HILS@hpe.com for WW engagement.

Memory

Memory Subsystem Architecture

Each processor socket contains six memory channels that support two DIMMs each for a total of 12 DIMM per installed processor or a grand total of twenty-four (24) DIMMs for the compute module.

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 compute module.
- DIMMs of different speeds may be mixed in any order; the compute module 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 HPE Synergy 480 Gen10 Compute Module.

To realize the performance memory capabilities listed in this document, HPE SmartMemory is required. For additional information, please see the **HPE DDR4 SmartMemory QuickSpecs**

Synergy 480 Gen10 Compute Module

Memory Speed Table for Memory used with Intel Scalable Family Gen2 Processors

	Register DIMM (RDIMM)				
HPE SKU P/N	P00918-B21	P00920-B21	P00922-B21	P00924-B21	P00930-B21
SKU Description	HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
DIMM Rank ->	Single Rank (1R)	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)
DIMM Capacity ->	**8GB**	**16GB**	**16GB**	**32GB**	**64GB**
Voltage	1.2V	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	1G	2G	1G	2G	4G
DRAM Width [bit]	x8	x4	x8	x4	x4
DRAM Density	8Gb	8Gb	8Gb	8Gb	16Gb
CAS Latency	21-21-21	21-21-21	21-21-21	21-21-21	21-21-21
DIMM Native Speed (MT/s)	2933	2933	2933	2933	2933
HPE Server Memory speed (MT/s): Intel® Xeon® Platinum/Gold 82xx/62xx processors*					
1 DIMM Per Channel	2933	2933	2933	2933	2933
2 DIMM Per Channel (HPE)	2933	2933	2933	2933	2933
HPE Server Memory speed (MT/s): Intel Xeon Gold 52xx processors*					
1 DIMM Per Channel	2666	2666	2666	2666	2666
2 DIMM Per Channel	2666	2666	2666	2666	2666
HPE Server Memory speed (MT/s): Intel Xeon Silver 42xx processors					
1 DIMM Per Channel	2400	2400	2400	2400	2400

Memory

2 DIMM Per Channel	2400	2400	2400	2400	2400
HPE Server Memory speed (MT/s): Intel Xeon Bronze 32xx processors					
1 DIMM Per Channel	2133	2133	2133	2133	2133
2 DIMM Per Channel	2133	2133	2133	2133	2133

Load Reduced (LRDIMM)			
HPE SKU P/N	P00926-B21	P00928-B21	P11040-B21
SKU Description	HPE 64GB 4Rx4 PC4-2933Y-L Smart Kit	HPE 128GB 8Rx4 PC4-2933Y-L 3DS Smart Kit	HPE 128GB 4Rx4 PC4-2933Y-L Smart Kit
DIMM Rank ->	Quad Rank (4R)	Octal Rank (8R)	Quad rank (4R)
DIMM Capacity ->	**64GB**	**128GB**	**128 GB**
Voltage	1.2V	1.2V	1.2V
DRAM depth [bit]	2G	2G	2G
DRAM Width [bit]	x4	x4	x4
DRAM Density	8Gb	8Gb	16Gb
CAS Latency	21-21-21	24-21-21	21-21-21
DIMM Native Speed (MT/s)	2933	2933	2933
HPE Server Memory speed (MT/s): Intel Xeon Platinum/Gold 82xx/62xx processors*			
1 DIMM Per Channel	2933	2933	2933
2 DIMM Per Channel	2933	2933	2933
HPE Server Memory speed (MT/s): Intel Xeon Gold 52xx processors*			
1 DIMM Per Channel	2666	2666	2666
2 DIMM Per Channel	2666	2666	2666
HPE Server Memory speed (MT/s): Intel Xeon Silver 42xx processors			
1 DIMM Per Channel	2400	2400	2400
24002 DIMM Per Channel	2400	2400	2400
HPE Server Memory speed (MT/s): Intel Xeon Bronze 32xx processors			
1 DIMM Per Channel	2133	2133	2133
2 DIMM Per Channel	2133	2133	2133

NOTE*: The maximum memory speed is a function of the memory type, memory configuration, and processor model.

NOTE: The information contained herein is subject to change without notice. HPE Confidential. Not for customer viewing. Do not distribute.

	Synergy 480 Gen10 Compute Module			
DIMM Type	**Register DIMM (RDIMM)**			
HPE SKU P/N	815097-B21	815098-B21	835955-B21	815100-B21
SKU Description	HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit	HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit
DIMM Rank	Single Rank (1R)	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)
DIMM Capacity	**8 GB**	**16 GB**	**16 GB**	**32 GB**

Memory

Voltage	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	1G	2G	1G	2G
DRAM Width [bit]	x8	x4	x8	x4
DRAM Density	8 Gb	8 Gb	8 Gb	8 Gb
CAS Latency	19-19-19	19-19-19	19-19-19	19-19-19
DIMM Native Speed (MT/s)	2666	2666	2666	2666
HPE Server Memory Speed (MT/s) with Intel Xeon 8100, 6100 Series Scalable Family Processors (Platinum) (also supported 5122)				
1 DIMM Per Channel	2666 MT/s	2666 MT/s	2666 MT/s	2666 MT/s
2 DIMM Per Channel	2666 MT/s	2666 MT/s	2666 MT/s	2666 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 5100 & 4100 Series Scalable Family Processors (Silver/Gold) (except for 5122 processor above)				
1 DIMM Per Channel	2400 MT/s	2400 MT/s	2400 MT/s	2400 MT/s
2 DIMM Per Channel	2400 MT/s	2400 MT/s	2400 MT/s	2400 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 3100 Series Scalable Family Processors (Bronze)				
1 DIMM Per Channel	2133 MT/s	2133 MT/s	2133 MT/s	2133 MT/s
2 DIMM Per Channel	2133 MT/s	2133 MT/s	2133 MT/s	2133 MT/s

DIMM Type	**Load Reduced (LRDIMM)**	
HPE SKU P/N	815101-B21	815102-B21
SKU Description	HPE 64GB 4Rx4 PC4-2400V-L	HPE 128GB 8Rx4 PC4-2666V-L
DIMM Rank	Quad Rank (4R)	Octal Rank (8R)
DIMM Capacity	**64GB**	**128GB**
Voltage	1.2V	1.2V
DRAM depth [bit]	2G	2G
DRAM Width [bit]	x4	X4
DRAM Density	8 Gb	8Gb
CAS Latency	19-19-19	19-19-19
DIMM Native Speed (MT/s)	2666	2666
HPE Server Memory Speed (MT/s) with Intel Xeon 8100 & 6100 +5122 Series Scalable Family Processors (Gold/Platinum)		
1 DIMM Per Channel	2666 MT/s	2666 MT/s
2 DIMM Per Channel	2666 MT/s	2666 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 5100 & 4100 Series Scalable Family Processors (Silver/Gold)		
1 DIMM Per Channel	2400 MT/s	2400 MT/s
2 DIMM Per Channel	2400 MT/s	2400 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 3100 Series Scalable Family Processors (Bronze)		
1 DIMM Per Channel	2133 MT/s	2133 MT/s
2 DIMM Per Channel	2133 MT/s	2133 MT/s

NOTE: For more information refer to: **http://www.hpe.com/docs/memory-speed-table**

Memory

Memory Population Rules and Guidelines
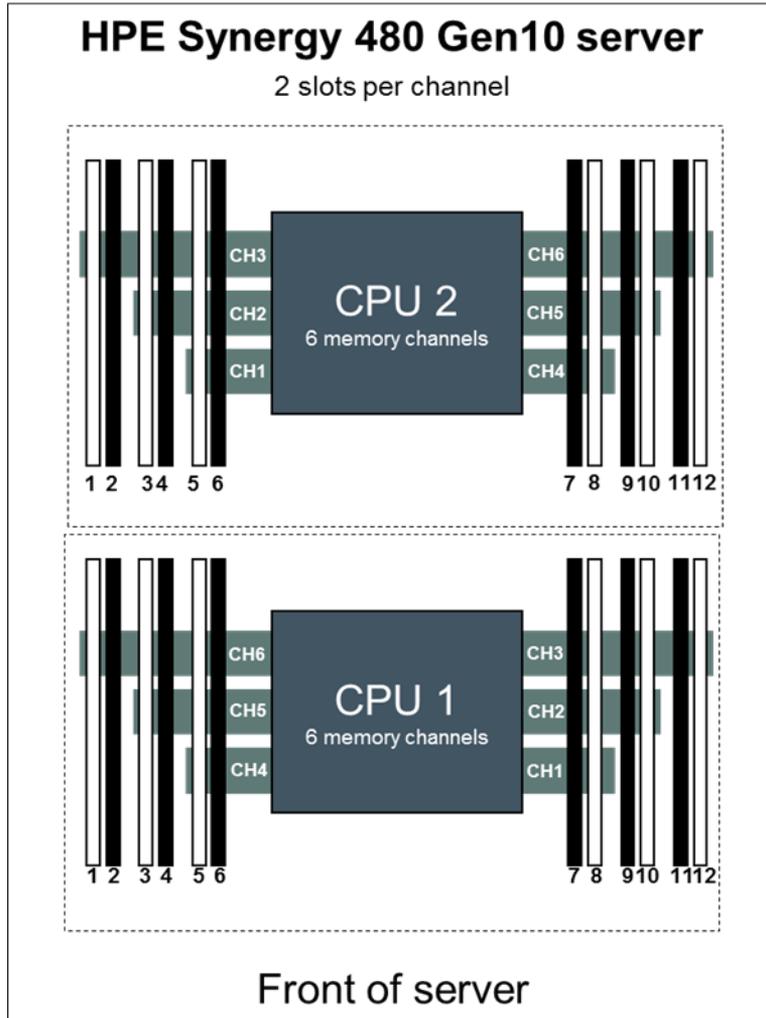
Population guidelines for HPE SmartMemory DIMMs in HPE Synergy 480 Gen10 compute modules

HPE Synergy 480 Gen10 compute modules have twelve DIMM slots per CPU.
Table: Population guidelines for HPE SmartMemory DIMMs in HPE Synergy 480 Gen10 compute modules

DIMM population order for SY480 Gen10												
	CPU1											
DIMM Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
1								R				
2								R		R		
3								R		R		R
4			R		R			R		R		
5*			R		R			R		R		R
6	R		R		R			R		R		R
7*	R		R		R		R	R		R		R
8			R	R	R	R	R	R	R	R		
9*	R		R		R		R	R	R	R	R	R
10*	R		R	R	R	R	R	R	R	R		R
11*	R		R	R	R	R	R	R	R	R	R	R
12	R	R	R	R	R	R	R	R	R	R	R	R

Memory

- Unbalanced configuration (operational, but performance degraded)

DIMM population order for SY480 Gen10												
	CPU2											
DIMM Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
1					R							
2			R		R							
3	R		R		R							
4			R		R			R		R		
5*	R		R		R			R		R		
6	R		R		R			R		R		R
7*	R		R		R	R		R		R		R
8			R	R	R	R	R	R	R	R		
9*	R	R	R	R	R	R		R		R		R
10*	R	R	R	R	R	R		R		R	R	R
11*	R	R	R	R	R	R	R	R	R	R		R
12	R	R	R	R	R	R	R	R	R	R	R	R

For more information or additional DIMM configurations go to:
https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00017079enw

Population guidelines for HPE NVDIMM-Ns in HPE Synergy 480 Gen10 compute modules

A single NVDIMM-N remains available for Intel Xeon Scalable Family Generaton 1 (not available for Generation 2 processors)

Since HPE NVDIMM-Ns are designed to unleash maximum system performance, systems using HPE NVDIMM-Ns should have one HPE SmartMemory DPC to provide maximum memory performance (i.e., six HPE SmartMemory DIMMs per processor). One to six HPE NVDIMM-Ns (based on persistent memory capacity and performance needs) should then be added as described in Table above. The HPE Smart Storage battery is connected to all DIMM slots and supports a maximum of twelve HPE NVDIMM-Ns across all CPUs.

Table: Population guidelines for HPE NVDIMM-Ns with six HPE SmartMemory DIMMs attached to CPU 1 in HPE Synergy 480 Gen10 compute modules

DIMM population order for SY480 Gen10												
	CPU1											
NVDIMM-N Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
0	R		R		R			R		R		R
1	R	N	R		R			R		R		R
2	R	N	R	N	R			R		R		R
3		N	R	N	R	N		R		R		
4	R	N	R	N	R			R	N	R	N	R
5[4]	R	N	R	N	R	N		R	N	R	N	R
6	R	N	R	N	R	N	N	R	N	R	N	R

Key: R = Regular DIMM (i.e., an HPE SmartMemory DIMM), N = HPE NVDIMM-N.
1 CPU 3 is only available on HPE Synergy 660 Gen10 compute modules.
2 Persistent memory capacity assumes that 16 GiB NVDIMM-Ns are used.
3 Nominal persistent memory bandwidth assumes that the system is running at 2667 MT/s, NVDIMM-N interleaving is enabled, and that no bandwidth is being used for the HPE SmartMemory DIMMs.
4 Non-interleaved—NVDIMM-N interleaving should be disabled for this configuration.

Population guidelines for HPE NVDIMM-Ns with six HPE SmartMemory DIMMs attached to CPU 2 in HPE Synergy 480 Gen10 compute modules

Memory

	DIMM population order for SY480 Gen10											
	CPU2											
NVDIMM-N Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
0	R		R		R			R		R		R
1	R		R		R			R		R	N	R
2	R		R		R			R	N	R	N	R
3	R		R		R		N	R	N	R	N	R
4	R	N	R	N	R			R	N	R	N	R
5[4]	R	N	R	N	R		N	R	N	R	N	R
6	R	N	R	N	R	N	N	R	N	R	N	R

Key: R = Regular DIMM (i.e., an HPE SmartMemory DIMM), N = HPE NVDIMM-N.
1 CPU 4 is only available on HPE Synergy 660 Gen10 compute modules.
2 Persistent memory capacity assumes that 16 GiB NVDIMM-Ns are used.
3 Nominal bandwidth assumes that the system is running at 2667 MT/s and NVDIMM-N interleaving is enabled, and that no bandwidth is being used for the HPE SmartMemory DIMMs.
4 Non-interleaved—NVDIMM-N interleaving should be disabled if five NVDIMM-Ns are used.

Although Hewlett Packard Enterprise recommends that HPE NVDIMM-Ns be used with six HPE SmartMemory DIMMs, they may also be combined with smaller quantities of HPE SmartMemory DIMMs as described in Tables 19 to 22 if regular memory performance is not as important or if larger persistent memory capacity is needed.

Population guidelines for HPE Persistent Memory

For data-intensive workloads where latency and capacity are key considerations, HPE Apollo, HPE ProLiant, and HPE Synergy servers deliver faster data access at a reasonable price point when equipped with HPE Persistent Memory 128, 256, or 512 GB modules featuring Intel Optane DC Persistent Memory. This new persistent memory offering, based on phase-change memory technology, must be included alongside HPE SmartMemory DIMMs.

DIMMs and HPE Persistent Memory modules are installed in specific configurations based on the workload requirements of the server. Supported configurations are optimized for persistent memory capacity, volatile memory capacity, and performance.

- Persistent memory capacity—the available capacity is equal to the HPE Persistent Memory capacity.
- Volatile memory capacity
    - App Direct (1 LM) mode—the volatile capacity is equal to the DIMM capacity.
    - Memory (2 LM) mode—the volatile capacity is some or all of the HPE Persistent Memory capacity.
- Performance
    - Uses all channels to efficiently utilize processor resources.
    - Memory (2 LM) mode—more regular DIMMs provide a better cache ratio.

DIMMs and HPE Persistent Memory modules can be installed in the server in the following configurations:

	Slot 1	**Slot 2**	**Slot 3**	**Slot 4**	**Slot 5**	**Slot 6**	**Slot 7**	**Slot 8**	**Slot 9**	**Slot 10**	**Slot 11**	**Slot 12**
6+6	D	P	D	P	D	P	P	D	P	D	P	D
4+6	D		D	P	D	P	P	D	P	D		D
2+8	P		D	D	D	D	D	D	D	D		P
2+6	D		D		D	P	P	D		D		D
2+4	P		D		D			D		D		P
1+6	D		D		D			D		D	P	D

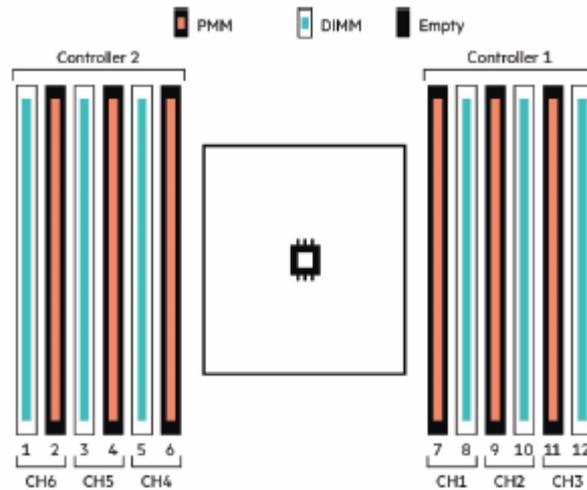HPE Persistent Memory (P)   DIMMs (D)

NOTE: P00918-B21—HPE 8GB 1Rx8 2933 RDIMM does not support pairing with HPE Persistent Memory.

6+6 configuration

This configuration is also referred to as a 2-2-2 configuration, based on the number of modules populated per channel, per memory controller. This configuration is symmetric and uses all slots. It provides the best bandwidth for both DRAM DIMMs and HPE
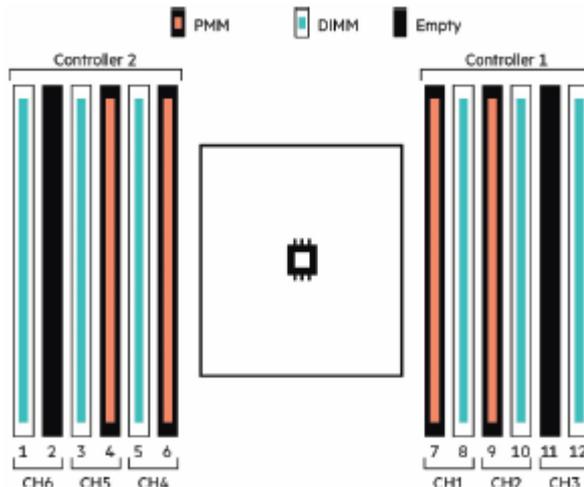
Memory

Persistent Memory, using all the channels and pins on the processor. Since DRAM DIMMs and HPE Persistent Memory modules share channels, there might be some competition for access; the HPE Persistent Memory module will slow down the DRAM compared to a system without HPE Persistent Memory.
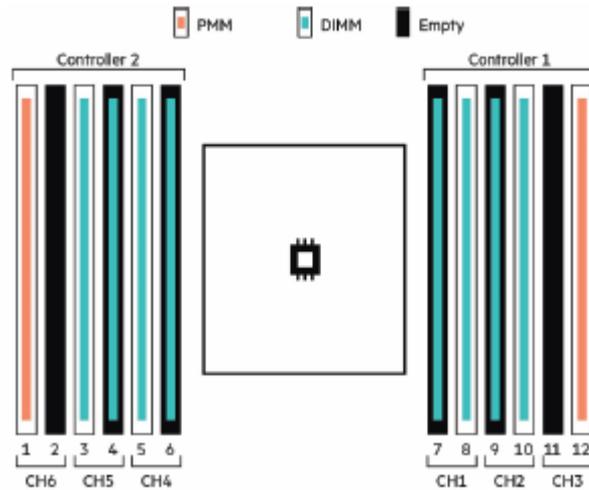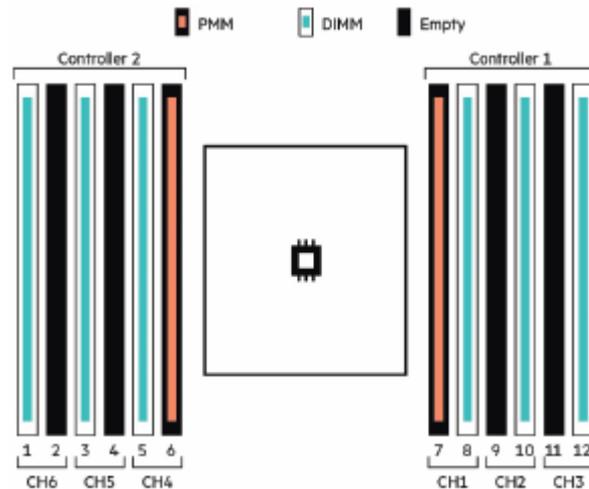

HPE Persistent Memory capacity up to 3 TB using 512 GB modules and DIMM capacity up to 768 GB using 128 GB DIMMs

4+6 configuration

This configuration is also referred to as a 2-2-1 configuration (that nomenclature does not consider whether there are two HPE Persistent Memory modules or one DIMM and one HPE Persistent Memory module in a channel). By using all channels, this configuration provides the best performance for DIMMs. It offers less capacity for HPE Persistent Memory. Since DIMMs and HPE Persistent Memory modules share four channels, they might compete for access.

HPE Persistent Memory capacity up to 2 TB using 512 GB modules and DIMM capacity up to 768 GB using 128 GB DIMMs

2+8 configuration

This configuration is also referred to as a 2-2-1 configuration (that nomenclature does not consider whether there are two DIMMs or one DIMM and one HPE Persistent Memory module in a channel). This configuration does not support Memory (2 LM) mode because the capacity of the DIMMs is likely too large to use as a cache for the small number of HPE Persistent Memory modules. This configuration offers the largest regular DIMM capacity but only offers 66% of the possible DIMM bandwidth, since DIMMs are not installed on all channels.

NOTE: Only App Direct mode is supported with 2+8 configuration.

Memory

HPE Persistent Memory capacity up to 1 TB using 512 GB HPE Persistent Memory and DIMM capacity up to 1 TB using 128 GB DIMMs

2+6 configuration

This configuration is also referred to as a 2-1-1 configuration. Two channels are shared, so there is still some competition between DRAM and HPE Persistent Memory traffic.
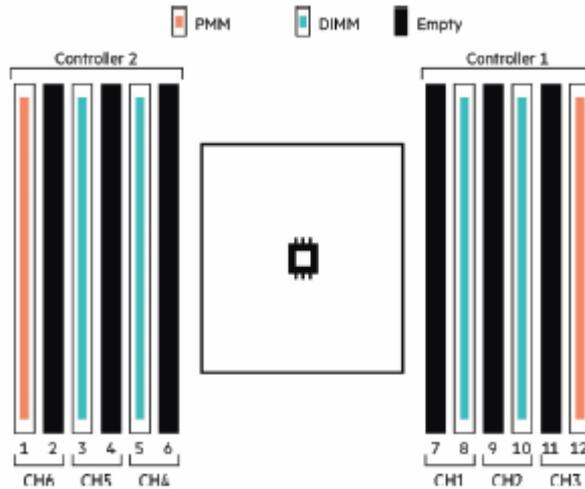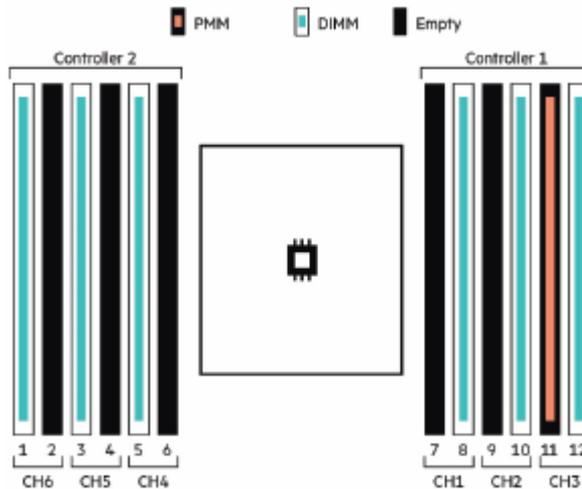

HPE Persistent Memory capacity up to 1 TB using 512 GB HPE Persistent Memory and DIMM capacity up to 768 GB using 128 GB DIMMs

### 2+4 configuration

This configuration is also referred to as a 1-1-1 configuration. Although HPE Persistent Memory traffic stays out of the way of DIMM traffic, the regular DIMMs are only interleaved four ways and provide less bandwidth than a +6 configuration.

Memory

HPE Persistent Memory capacity up to 1 TB using 512 GB HPE Persistent Memory and DIMM capacity up to 512 GB using 128 GB DIMMs

1+6 configuration

This configuration is also referred to as a 1-1-1 asymmetric configuration. It offers the smallest HPE Persistent Memory capacity. This configuration does not support memory (2 LM) mode because 2 LM mode requires symmetrical population under each memory controller.

NOTE: Only App Direct mode is supported with 1+6 configuration.

HPE Persistent Memory capacity up to 512 GB using 512 GB HPE Persistent Memory and DIMM capacity up to 768 GB using 128 GB DIMMs

For more details, please refer to Persistent Memory details on our website. **https://www.hpe.com/us/en/servers/persistent-memory.html**

Storage

FRONT LOCAL STORAGE

1-2   2 x SFF hot-plug drive bays for SAS, SATA, SAS SDD, SATA SSD, NVMe PCIe
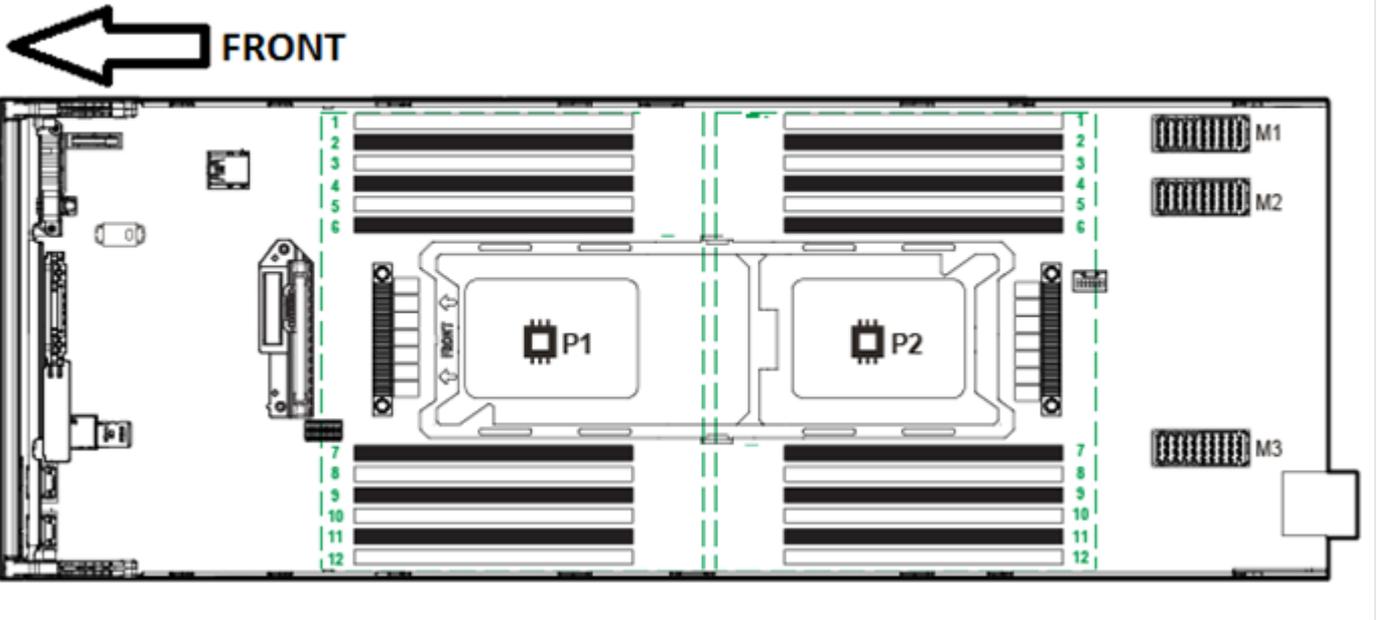
INTERNAL FABRIC ROUTING
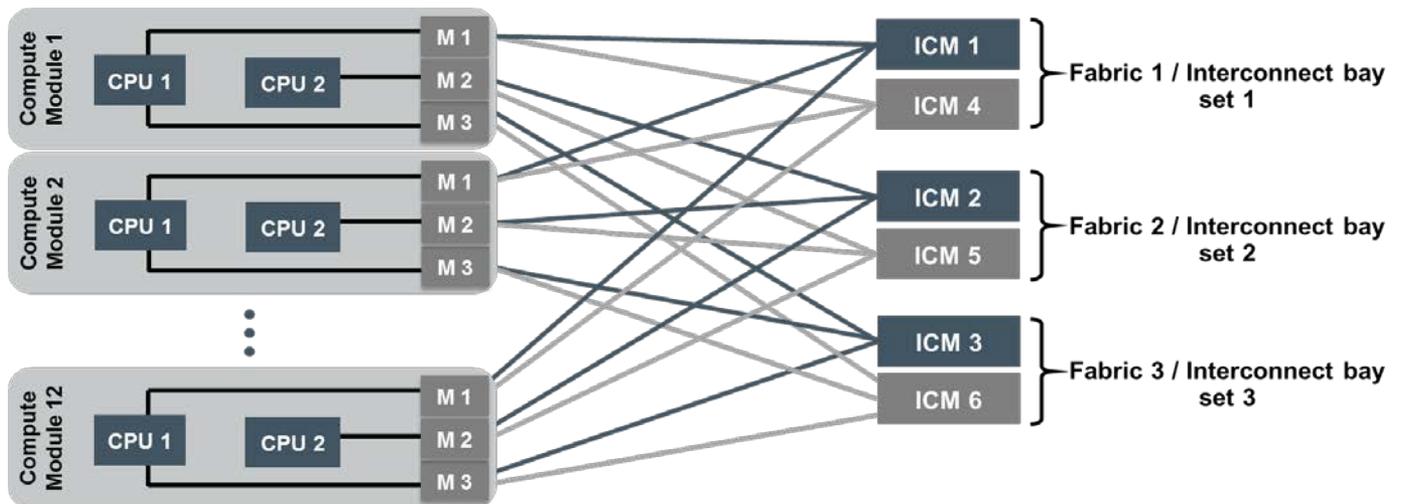
Technical Specifications

System Unit

Dimensions (H x W x D)	6.35 x 21.4 x 60.0 cm 2.5 x 8.43 x 23.62 in	With bezel
Weight (approximate)	8.16 kg 18 lb	Maximum: all processors, 24 DIMMs, drives, mezzanine cards, and one flash cache battery installed)
	6.57 kg 14.5 lb	Minimum: one processor and 1 DIMM installed
Power Specifications	For power specifications including input requirements, BTU rating, and power supply output, please see the HPE Synergy Frame QuickSpecs. To review typical system power ratings use the HPE Power Advisor which is available via the online tool located at **http://www.hpe.com/info/hpepoweradvisor.**	
System Inlet Temperature	Operating	10°C to 35°C (50°F to 95°F) 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.
	Non-operating	-30C to 60C (-22F to 140F).
Extended Ambient Operating Support	Qualifications for extended ambient configurations are detailed at: **https://www.hpe.com/servers/ASHRAE**	
Relative Humidity (non-condensing)	Operating	10% to 90% @ 28C (82.4F)
	Non-operating	5% to 95% @ 38.7C (101.7F)
Acoustic Noise	For acoustic noise specifications, please see the HPE Synergy 12000 Frame QuickSpecs.	

NOTE: For technical information on the controllers for this product, visit the HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller **QuickSpecs**.

NOTE: For technical information on the controllers for this product, visit the HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller **QuickSpecs**.

NOTE: For technical information on the controllers for this product, visit the HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller **QuickSpecs**.

Network Options QuickSpecs/Details:	For information on the HPE Synergy 3820C 10/20Gb CNA please refer to their **QuickSpecs**. For information on the HPE Synergy 6810C 25/50 Gb Ethernet adapter please refer to their **QuickSpecs.** For information on the HPE Synergy 6410C 25/50 Gb Ethernet adapter please refer to their **QuickSpecs.** For information on the HPE Synergy 2820C 10Gb CNA please refer to their **QuickSpecs**. For information on the HPE Smart Array S100i SR Gen10 Controller please refer to their **QuickSpecs.** For information on the HPE Smart Array E208i-c SR Gen10 Controller please refer to their **QuickSpecs**. For information on the HPE Smart Array P204i-c SR Gen10 Controller please refer to their **QuickSpecs**. For information on the HPE Smart Array P416ie-m SR Gen10 Controller please refer to their **QuickSpecs** Support for Network Partitioning (NPAR) when using Pass-thru modules. **http://h20195.www2.hpe.com/v2/redirect.aspx?/products/quickspecs/15418_div/15418_div.PDF**
Environment-friendly Products and Approach - End-of-life Management and Recycling	Hewlett Packard Enterprise offers **End-of-life product return, Trade-in, and Rrecycling programs**, in many geographic areas, for our products. Products returned to Hewlett Packard 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. These instructions may be used by recyclers and other WEEE

Technical Specifications

treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.
sfg

Summary of Changes

Date	Version History	Action	Description of Change
05-Aug-2019	Version 15	Changed	QuickSpecs was updated.
		Added	SKUs added: P18424-B21, P18432-B21, P18420-B21, P18430-B21, P18434-B21, P18438-B21, P18436-B21, P18422-B21, P18426-B21, P18428-B21, P02054-B21.
01-Jul-2019	Version 14	Changed	Standard Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated. The U.S. version of QuickSpecs is no longer being updated, please reference the Worldwide QuickSpecs for latest information.
		Added	SKUs added in Additional
		Removed	Obsolete SKUs were deleted: P08920-L21, P08919-L21, 870763-B21.
03-Jun-2019	Version 13	Changed	Overview, Standard Features, Configuration Information - Factory Integrated Models, Optional Features, Additional Options, Memory, and Storage sections were updated.
		Added	SKUs added: P11881-L21, P08920-L21, P16385-L21, P11886-L21, P11884-L21, P11885-L21, P11883-L21, P07337-L21, P11694-L21, P08919-L21, P12767-L21, P11880-L21, P11882-L21, P07341-L21, 835804-B21, 835807-B21, 835810-B21, P11881-B21, P08920-B21, P16385-B21, P11886-B21, P11884-B21, P11885-B21, P11883-B21, P07337-B21, P11694-B21, P08919-B21, P07344-B21, P12767-B21, P11880-B21, P11882-B21, P07341-B21, R0W29A, R0Z45A, R1F95A, Q9U36A, P17391-B21, 870763-B21, 765464-B21, P05938-B21, P05946-B21, P05924-B21, P05928-B21, P05932-B21, P05976-B21, P05980-B21, P10448-B21, P10454-B21, , P10460-B21, P05986-B21, P05994-B21, P13699-B21, P13701-B21, P13703-B21, P07179-B21, P07181-B21, P10222-B21, P07183-B21, P07185-B21, P10224-B21, P10226-B21, P13695-B21, P13697-B21, P10220-B21, P10208-B21, P07190-B21, P07192-B21, P10210-B21, P07194-B21, P10212-B21, P07196-B21, P07198-B21.
02-Apr-2019	Version 12	Changed	Overview, Standard Features, Physical and Environmental Information, and Technical Specifications sections were updated.
		Added	SKUs added in Configuration Information and Additional Options sections: P07363-L21, P07362-L21 , P07361_B21, P07360-L21, P07359-L21, P07358-L21, P07357-L21, P07356-L21, P07355-L21, P07354-L21, P07353-L21, P07352-L21, P07340-L21, P07338-L21, P07351-L21, P07350-L21, P07349-L21, P07348-L21, P07347-L21, P07346-L21, P07345-L21, P07344-L21, P08679-L21, P07343-L21, P12572-L21, P07342-L21, P07339-L21, P12142-L21, P12143-L21, P07336-L21, P11692-L21, P08681-L21, P07334-L21, P11693-L21, P07333-L21, P08678-L21, P07332-L21, 813890-B21, 876449-B21, P00918-B21, P00920-B21, P00922-B21, P00924-B21, P00930-B21, P00926-B21, P00928-B21, 815097-B21, 815098-B21, 835955-B21, 815100-B21, 815101-B21, 815102-B21, 875488-B21, 813890-B21, 876449-B21, 870828-B21, 777456-B21, P01367-B21, P02381-B21, 813890-B21, H7MC1E, H7MC2E, H7MC4E, H7MC5E.
		Removed	SKUs added in Configuration Information and Additional Options sections: 881653-L21, 881652-L21, 845264-B21, 868417-B21, 765464-B21, 765463-B21, 873351-B21, 873355-B21, 873357-B21, 868814-B21, 868818-B21, 868822-B21, 868826-B21, 875511-B21, 875513-B21, 875311-B21, 872390-B21, 872392-B21, 872394-B21, 875313-B21, 875326-B21, 875330-B21, 870144-B21, 870148-B21, 872374-B21, 872376-B21, 872382-B21, 872386-B21, 875483-B21, 872344-B21, 875470-B21, , 872348-B21, 875474-B21, 872352-B21, 875478-B21, 880295-B21, 877994-B21, 877986-B21, 877998-B21, 875488-B21, 872374-B21,

Summary of Changes

			873359-B21, 873363-B21, 873365-B21, 873367-B21, 868417-B21, 875509-B21.
03-Dec-2018	Version 11	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, Additional Options, and Technical Specifications sections were updated
		Added	SKUs added in Configuration Information - Factory Integrated Models and Additional Options sections: 877740-B21, 877746-B21, 877752-B21, 877758-B21, 877764-B21, 875587-B21, 875589-B21, 875591-B21, 877776-B21, 877782-B21, 877788-B21, 877994-B21, 877984-B21, 877988-B21, 875490-B21, 875492-B21.
		Removed	SKUs deleted: 877740-B21, 877746-B21, 877752-B21, 877758-B21, 877764-B21, 875587-B21, 875589-B21, 875591-B21, 877776-B21, 877782-B21, 877788-B21, 877994-B21, 877984-B21, 877988-B21, 875490-B21, 875492-B21.
01-Oct-2018	Version 10	Changed	Recommended/Extended updates were applied. Overview section was updated.
		Added	SKUs added in Additional Options sections: P04474-B21, P04476-B21, P04478-B21, P04480-B21, P04482-B21, P06584-B21, P06586-B21, P06588-B21, P06590-B21, P06592-B21, P07922-B21, P07926-B21, P07930-B21.
06-Aug-2018	Version 9	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, Additional Options
		Added	SKUs added in Additional Options sections: 876449-B21, P06194-B21, P06196-B21, P06198-B21, P06200-B21, P01367-B21.
		Removed	Obsolete SKU was deleted: 875242-B21
04-Jun-2018	Version 8	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated.
		Added	SKUs added: 873377-L21, 872111-L21, 869226-B21, 869224-B21, 826043-B21, M3X67A, Q0J76A, 872111-B21, 870763-B21, 765453-B21, 872355-B21, 872359-B21, 872363-B21, 868814-B21, 868818-B21, 868822-B21, 868826-B21, 868830-B21, 880875-B21, 880877-B21, 875317-B21, 875319-B21, 875311-B21, 872344-B21, 872348-B21, 872352-B21, 875490-B21, 875492-B21, 872374-B21, 873359-B21, 872376-B21, 873363-B21, 872382-B21, 877365-B21, 872386-B21, 877367-B21, 488069-B21, 745823-B21.
		Removed	SKUs deleted: 872131-L21, 872130-L21, 872116-L21, Q0V76A, 872131-B21, 872130-B21, 872116-B21, 878014-B21, P04556-B21, P04560-B21, P04564-B21, P04566-B21, P04570-B21, P06607-B21, P06609-B21, 873165-B21, 85488-B21, 875490-B21, 875492-B21, P00896-B21, 872374-B21, 872376-B21, 872382-B21, 872386-B21, 877994-B21, 877998-B21, 877984-B21, 877986-B21, 877988-B21, 875488-B21, 873359-B21, 873363-B21, 873365-B21, 873367-B21, 872108-B21, 864279-B21.
02-Apr-2018	Version 7	Changed	Optional Features and Additional Options sections were updated.
		Added	SKUs added in QuickSpecs: 880708-B21, 880709-B21, Q0V80A, Q0J76A, Q0J62A, 870763-B21, 872359-B21, 872363-B21, 815605-B21, 815606-B21, 822593-B21, 822594-B21, 875311-B21, 872344-B21, 877984-B21, 877986-B21, 877988-B21.
		Removed	Obsolete SKUs removed: Q0V76A, 815605-B21, 815606-B21, 822593-B21, 822594-B21.
12-Feb-2018	Version 6	Changed	Overview, Standard Features, and Additional Options sections were updated.
		Added	SKUs added in Configuration Information – Factory Integrated Models section: 700076-B21, 700767-B21, 700748-B21, 665246-B21, 655639-B21,

Summary of Changes

			700065-B21, 700763-B21, 766490-B21, 873351-B21, 873355-B21, 873357-B21, 877740-B21, 875503-B21, 877746-B21, 875509-B21, 877752-B21, 875511-B21, 877758-B21, 875513-B21, 877764-B21, 880875-B21, 880877-B21, 875587-B21, 875589-B21, 875591-B21, 875317-B21, 875319-B21, 875498-B21, 875500-B21, 872390-B21, 872392-B21, 872394-B21, 875311-B21, 875313-B21, 875326-B21, 875330-B21, 870144-B21, 870148-B21, 880295-B21, 875483-B21, 877776-B21, 875470-B21, 877782-B21, 875474-B21, 877788-B21, 875478-B21, 877994-B21, 877998-B21, 875488-B21, 875490-B21, 875492-B21, 872374-B21, 873359-B21, 872376-B21, 873363-B21, 872382-B21, 873365-B21, 872386-B21, 873367-B21.
		Removed	SKUs deleted in Configuration Information - Factory Integrated Models, Core Options, and Additional Options sections: 875954-L21, 875955-L21, 875956-L21, 877851-L21, 877807-L21, 875952-L21, 875953-L21, 872009-L21, 872006-L21, 872007-L21, 700066-B21, 700764-B21, 766491-B21, 684214-B21, 759208-B21, 785067-B21, 759210-B21, 759212-B21, 781516-B21, 785069-B21, 781518-B21, 791034-B21, 870763-B21, 875492-B21, 872359-B21, 872363-B21, 869374-B21, 869376-B21, 869378-B21, 869384-B21, 869386-B21, 748387-B21, 873391-L21, 872115-L21, 872116-L21, 872131-L21, 876871-L21, 872130-L21.
04-Dec-2017	Version 5	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, and Memory sections were updated.
		Added	SKUs added in Configuration Information - Factory Integrated Models, and Memory sections: 881653-L21, 881652-L21, 845264-B21, 881653-B21, 881652-B21, P01367-B21, H7ML8E, H7ML9E, H7ML9E, H7MM2E, 815102-B21, 845264-B21, 870144-B21.
		Removed	OBS SKUs deleted: 764894-B21, 822593-B21.
25-Sep-2017	Version 4	Changed	Standard Features, Configuration Information - Factory Integrated Models, Additional Options, and Memory sections were updated.
		Added	SKUs added in Configuration Information - Factory Integrated Models, Additional Options sections: 872136-L21, 872137-L21, 815102-B21.
		Removed	SKUS removed in Configuration Information - Factory Integrated Models, Additional Options sections: 777262-B21, 777262-B21, 875494-B21.
14-Aug-2017	Version 3	Changed	Standard Features and Additional Options sections were updated.
		Added	SKUs added in Additional Options section: H7MC1E, H7MC2E, H7MC4E, H7MC5E.
		Removed	Obsolete SKU was deleted: 875494-B21.
17-Jul-2017	Version 2	Changed	Overview section was updated.
11-Jul-2017	Version 1	Created	New QuickSpecs

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Summary of Changes

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