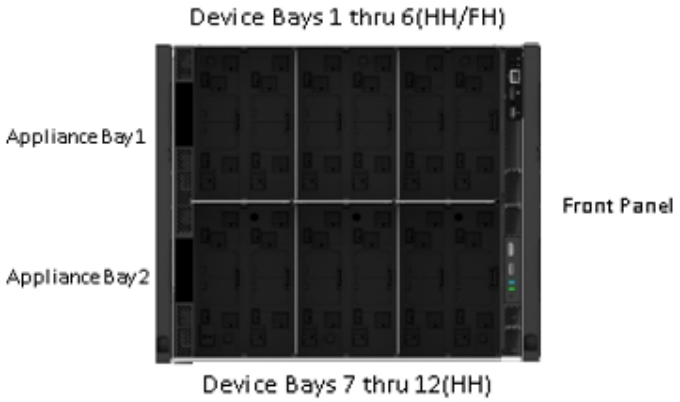
Overview

HPE Synergy 12000 Frame



HPE Synergy 12000 Frame - Front View

- 6 Zones for Compute and Storage
- 2 Appliance Bays for Management
- Front Panel, for Synergy Console connections

Notes: See Device Bay Population Guidelines in section below



HPE Synergy 12000 Frame - Rear View

- 6 Interconnect Module Bays (3+3 Redundancy)
- 10 Fan Bays
- 6 Power Supplies Bays (N+N, N+1 Redundancy)
- 2 Frame Link Module Slots

What's New

The HPE Synergy 12000 Frame is the base for an HPE Synergy intelligent infrastructure with embedded management and scalable links that expands to meet business demand. The Frame is the base infrastructure that pools resources of compute, storage, fabric, cooling, power and scalability. IT can manage, assemble and scale resources on demand by using the Synergy Frame with an embedded management solution combining the Synergy Composer and Frame Link Modules. The Synergy Frame is designed to meet today's needs and future needs with continuing enhancements to compute and fabric bandwidths, including photonics-ready capabilities.

Enhancements to the HPE Synergy 12000 Frame include several new capabilities:

- Support for HPE Synergy 480 Gen11 Compute Modules,
- Support for HPE Synergy High-Capacity Fans
- Support for HPE Synergy Dual Flex Slot Power Supply Adapter,
- A guided installation experience for setting up HPE Synergy.

HPE Synergy is a single infrastructure of physical and virtual pools of compute, storage, and fabric resources, and a single management interface that allows IT to instantly assemble and re-assemble resources in any configuration. As the foundation for new and traditional styles of business infrastructure, HPE Synergy eliminates hardware and operational complexity so IT can deliver infrastructure to applications faster and with greater precision and flexibility.

Notes: HPE Synergy 12000 Frame are compatible with existing applications and workloads running on c-Class infrastructures today. Subject to availability of options required for specific applications.

Standard Features

HPE Synergy 12000

Frame

HPE Synergy solutions start with a Synergy 12000 Frame. Once the Frame has been selected, the following options may be added for a complete solution: Synergy Compute Modules, networks and storage options, networking interconnect modules/switches, single or redundant Synergy Composer(s) with embedded OneView, fans, power supplies and an additional redundant Frame Link Module for easy solutions scalability.

HPE Synergy 12000 Frame, is the base for all Synergy products and supports.

- Up to 12 half-height or 6 full-height Compute Modules, Zone designs allow space for double wide half height and full height Compute and/or Storage devices, mixing allowed in designated areas.
- Ten fans and single Frame Link Module is required with every system
- Two appliance bays for redundant management appliances, embedded HPE OneView (additional solution options in future)
- Up to six Power Supplies bays for redundant power line with Titanium-class efficiency power supplies
- Up to 6 Interconnect bays for full redundancy of 3 fabrics.
- Two (2) slots for Frame Link Modules, offering links to multiple frames through a private air-gapped management network
- HPE Synergy management that maximizes power and cooling efficiency
- HPE Intelligent Resources technology built-in to every frame and option for Auto-Discovery of resources

HPE Synergy Appliances

HPE Synergy Composer2

Is a management appliance with HPE OneView embedded. The appliance plugs directly into the Frame to manage all Synergy resources intelligently and seamlessly. The Synergy Composer appliance integrated to the system provides:



- A single point of management for single or scaled frames, which is ideal for on-demand composability.
- Management of all frame resources through HPE OneView profiles and templates.
- Auto-Discovery of Compute, Memory, Storage and Fabrics within a Frame or across multiple connected Frames.
- Activity, Health and Power LEDs for immediate status.

Notes: The USB port is for Hewlett Packard Enterprise Certified Service Parties Only.

Standard Features

HPE Synergy Frame Link Module (FLM)



Is the frame resource information control point which also links multiple frames. It provides:

- Integrated direct access to a single or multiple frames through a HPE Synergy Composer (powered by HPE OneView),
- A dedicated 10GbE air-gapped management network for multi-frame communications,
- Immediate status and health details through HPE OneView,
- Asset and inventory information reports for the devices in the frame,
- Robust, multi-frame setup and control via HPE Synergy Composer (powered by HPE OneView),
- Thermal and power information reports, including real-time actual power usage per server and per frame,
- High-availability across single or multi-frame deployments through the required minimum of two Synergy Frame Link Modules per frame, and HPE Synergy Console interfaces on each Synergy Frame Link Module.

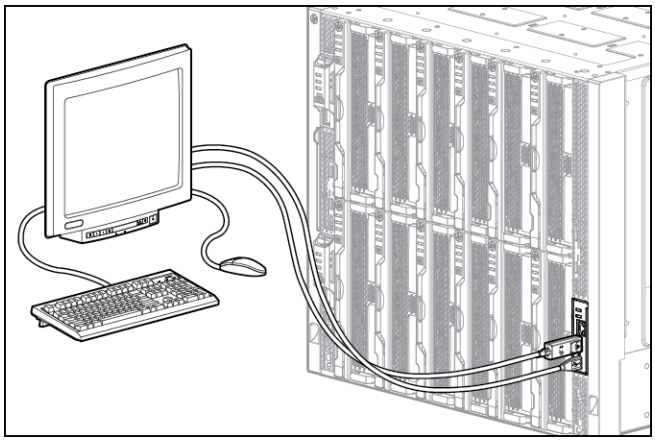
Notes: See Step 3 for details on the Frame Link Module and cable options.

HPE Synergy Console

Is the frame resource information control point. This control point connects technicians for easy setup and installation and/or also allows logins to HPE OneView for management of one or more frames.

- Front access to the Synergy Console is provided by the Front Panel Monitor Port and USB 2.0 connectors.
- Rear access to the Synergy Console is provided on each Frame Link Module.
- Laptop connection to the Synergy Console is provided from the Front Panel (RJ45 port) via simplet VNC services (free VNC software which can be downloaded from the internet).

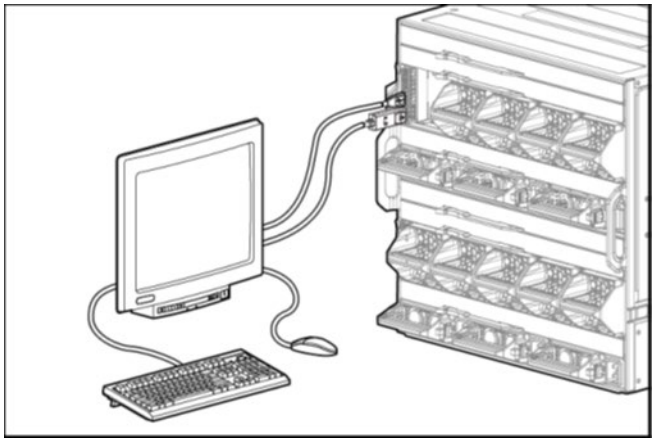
Notes: Hewlett Packard Enterprise offers and recommends the HPE LCD8500 1U Rackmount Console as the Synergy recommended Display Solution. See the Rackmount Solutions section below. The Monitor Port supports any monitor that has DisplayPort™ or an active DisplayPort adaptor for interfacing to VGA, HDMI or DVI monitors. External USB hub is required for keyboard and mouse if monitor does not include a hub.





Console Connect to the Front Panel

Standard Features





Console Connect to a Frame Link Module - Rear

Warranty

The HPE Synergy is covered by a global limited warranty and supported by Hewlett Packard Enterprise Services and a worldwide network of Hewlett Packard Enterprise Authorized Channel Partners. 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. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HPE Pointnext operational services or customized service agreements.

- HPE Synergy 12000 Frame: 3-3-3; Three-year parts and labor, on-site limited global warranty. Certain restrictions and exclusions apply
- Frame options: Fans, Power Supplies, Frame Link Modules, One-year parts only or Frame warranty
- HPE Synergy Composer: 3-3-3; Three-year parts and labor, on-site limited global warranty.
- HPE Synergy Interconnect Modules/Switches: One-year parts and labor, on-site regardless of the warranty period for the system in which they are installed
- HPE Storage Fibre Channel switches have a maximum warranty period of one (1) year regardless of the warranty period for the system in which they are installed
- Hard drives have either a one-year or three-year warranty. Refer to specific hard drive Tech Specs for details.

For additional information please visit: **https://www.hpe.com/info/synergy**

Carrier Grade Configuration

HPE Synergy 12000 Frame - Carrier Grade

The HPE Synergy 12000 Frame has been certified to NEBS Level 3. The certified configuration covers the compute modules, interconnect modules, and other components that passed the NEBS Level 3 and ETSI EN 300 386-2 certifications. For more information, see **HPE Synergy 12000 Frame - Carrier Grade Supplement**

Standard Features

Rack Airflow Requirements

HPE Advanced and Enterprise Series Racks

The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The HPE Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.

Notes: For the complete list of installation requirements, please see the documentation for the "HPE Synergy 12000 Frame " at: https://support.hpe.com/connect/s/product?language=en_US&kmpmoid=1008612379&tab=manualsAndGuides

Third-party racks

Notes:

- If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:
  - Front and rear doors: If your server rack includes closing front and rear doors, you must have a minimum of 65% free area compared to the total area of the door evenly distributed from top to bottom to permit adequate airflow.
  - Front door: The clearance from face of rack to inside of the front door must be a minimum of 77 mm (3 in).
  - Rear door: The clearance between the rear of the Frame and the rear rack door must be a minimum of 175 mm (6.9 in) to accommodate system cabling.
  - Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 70 mm (2.75 in).
  - Width: 483 mm (19 in)
  - Depth: Maximum clearance between front and rear RETMA rails is 864 mm (34 in). Minimum clearance for round-hole racks is 627 mm (24.7 in). Minimum clearance for square-hole racks is 635 mm (25 in).
  - The rack must be able to accept the adjustable rack rails that are shipped with each Frame :
    - Minimum rail length: 698.5 mm (27.5 in)
    - Maximum rail length: 749.3 mm (29.5 in)
- Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panel's results in improper cooling that can lead to thermal damage.
- For the complete list of installation requirements, please see the "HPE Synergy Frame Site Planning Guide" at **https://www.hpe.com/support**.

Factory Express Portfolio for Servers and Storage

HPE Factory Express offers configuration, customization, integration and deployment services for HPE Synergy solutions. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging and custom packaging. Hewlett Packard Enterprise products supported through Factory Express include: a wide array of servers and storage, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: **https://www.hpe.com/us/en/services/factory-express.html**.

Synergy Software Releases (with Synergy Service Packs)

HPE Synergy Software Releases allow users to perform firmware, driver, and related software updates. HPE Synergy Software Releases, comprised of HPE Synergy Management combinations (Composer and Image Streamer software set) and HPE Synergy Custom SPPs or HPE Synergy Service Packs (SSPs), are available to download and use on products under an active HPE Warranty or HPE Support Agreement. These combinations have been developed, tested, and released together. The download files include firmware updates to existing images and complete images for recovery Combinations within a specific release set are developed and released together. **http://www.hpe.com/downloads/synergy**

Standard Features

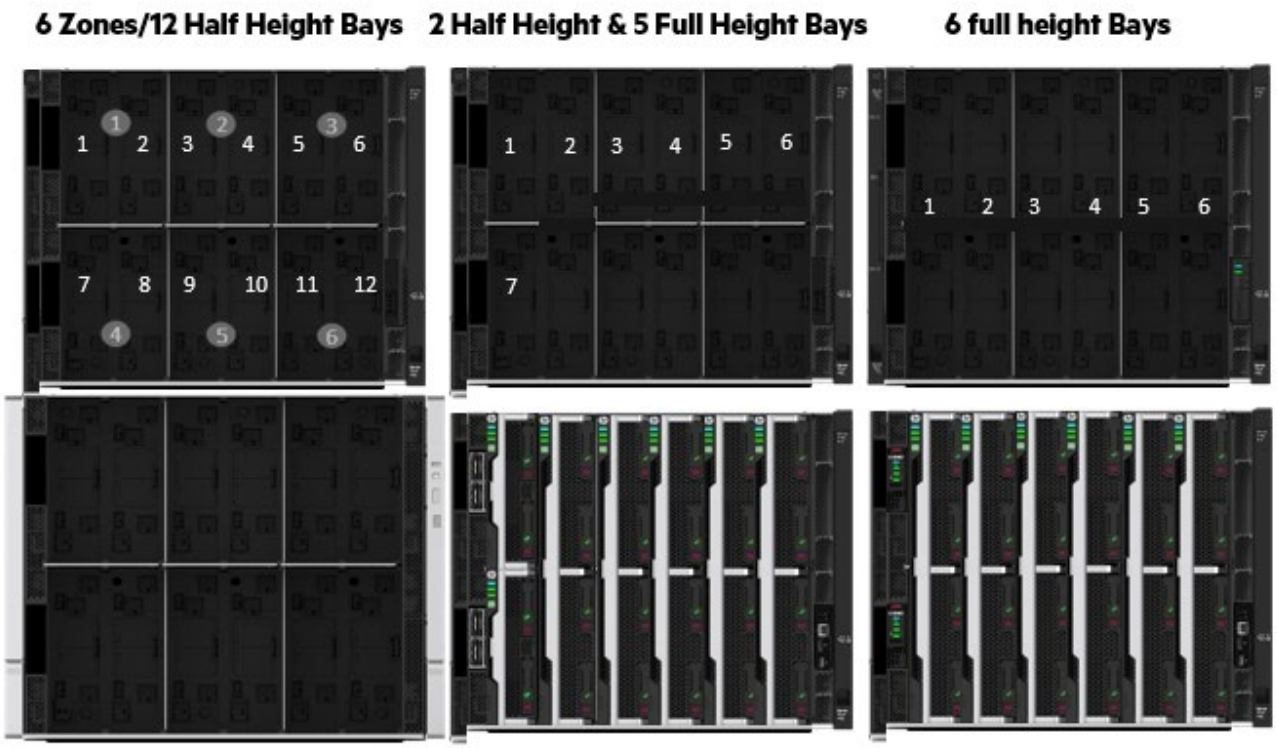
HPE Power Advisor

The HPE Power Advisor is a tool provided by Hewlett Packard Enterprise to assist in the estimation of power consumption and proper selection of components including power supplies at a system, rack, and multi-rack level. A variety of additional features are also provided including a condensed bill of materials, a cost of owner ship calculator, and a power report. The HPE Power Advisor tool allows you to configure multiple Hewlett Packard Enterprise compute, storage, fabric and power infrastructure solutions into a single rack or multi-rack configuration.

Hewlett Packard Enterprise highly recommends using the HPE Power Advisor tool to ensure the number of power supply options you have selected can fully support your Synergy 12000 Frame configuration and to review maximum system power ratings for facilities planning purposes.

HPE Power Advisor is available at: **https://www.hpe.com/info/hpepoweradvisor**

Mixed Configuration - Full Height and Half-Height Population rules



Frame Device Bay Options: Half Height, Full Height, Half Height Double Wide, Full Height Double Wide

Notes: The 12000 Frame is divided into 6 quadrants by the vertical and horizontal support metalwork. The horizontal supports or shelves are removable to support full height devices. Only quadrants 1 and 4 can mix Full-Height with Half-Height Compute modules with an optional Half Shelf kit.

Service and Support

HPE Pointnext - Service and Support

Get the most from your HPE Products. Get the expertise you need at every step of your IT journey with **HPE Pointnext Services**. We help you lower your risks and overall costs using automation and methodologies that have been tested and refined by HPE experts through thousands of deployments globally. HPE Pointnext **Advisory Services**, focus on your business outcomes and goals, partnering with you to design your transformation and build a roadmap tuned to your unique challenges. Our **Professional** and **Operational Services** can be leveraged to speed up time-to-production, boost performance and accelerate your business. HPE Pointnext specializes in flawless and on-time implementation, on-budget execution, and creative configurations that get the most out of software and hardware alike.

Consume IT on your terms

HPE GreenLake brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake accelerates digital transformation in a distributed, edge-to-cloud world..

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

Managed services to run your IT operations

HPE GreenLake Management Services provides services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

Free up resources with Operational Services from HPE Pointnext Services

HPE delivers services for IT by using proven best practices as well as automation and methodologies that have been tested and refined by HPE experts and artificial intelligence through thousands of deployments globally. Choose from the recommended services for customers purchasing from Hewlett Packard Enterprise or an authorized reseller. Services are quoted using Hewlett Packard Enterprise order configuration tools.

HPE Pointnext Tech Care

HPE Pointnext Tech Care is the new operational service experience for HPE products. Tech Care goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Pointnext Tech Care has been reimagined from the ground up to support a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Pointnext Tech Care is available in three response levels. Basic, which provides 9x5 business hour availability and a 2 hour response time. Essential which provides a 15 minute response time 24x7 for most enterprise level customers, and Critical which includes a 6 hour repair commitment where available and outage management response for severity 1 incidents.

https://www.hpe.com/services/techcare

HPE Pointnext Complete Care

HPE Pointnext Complete Care is a modular, edge-to-cloud IT environment service that provides a holistic approach to optimizing your entire IT environment and achieving agreed upon IT outcomes and business goals through a personalized and customer-centric experience. All delivered by an assigned team of HPE Pointnext Services experts. HPE Pointnext Complete Care provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

https://www.hpe.com/services/completecare

Service and Support

Service and Support

HPE Technology Services offers you a rich portfolio of consulting and support services designed to add value to our core products and solutions. We have the know-how and experience to put technology to work for you. We work closely with you, as your strategic partner, leveraging our full services portfolio to make sure that everything works to help optimize your enterprise.

Choose from services aligned to our product offerings and lifecycle. From proactive onsite services to innovative support when your products are connected to Hewlett Packard Enterprise, you choose the precise level of attention and support your business demands.

HPE Technology Services for HPE Synergy

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to Hewlett Packard Enterprise to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time.

Protect your business beyond warranty with HPE Support Services

Hewlett Packard Enterprise support services offer complete care and support expertise with committed response choices that are designed to meet your IT and business needs.

HPE Tech Care services offer scalable reactive support-packages for HPE Synergy and software. You choose the type and level of service that is most suitable for your IT and business needs.

HPE Tech Care keeps your system stable and reliable helping to prevent problems and reduce outages through proactive service management and enhanced technical response.

Advise, Transform, Integrate, Support, and Flex

HPE Technology Services helps you get the most out of what you have today and transition to HPE Synergy, a composable infrastructure, at your pace and from wherever you are on the journey.

Start with the HPE Transformation Workshop to ensure that your business and IT organizations collaborate, define the topline strategy for composable, software-defined, cloud-ready infrastructure and kick-start your projects confidently. This workshop clarifies your business requirements and the issues that IT and operations teams must resolve in order to meet these requirements.

A detailed executive briefing or high-level report summarizes the strategies, high-level plan and functional requirements.

HPE Modernization and Migration Services helps you choose the right platform for the right workload at the right cost and evolve your IT infrastructure, processes and organization taking advantage of “on-hybrid infrastructure” innovations such as composable, converged, software-defined, technologies. Hewlett Packard Enterprise experts advise, transform, integrate and implement for platform refresh, datacenter consolidation virtualization, migration and automation projects.

HPE Flexible Capacity is a pay per use model for on premise infrastructure. This offers needed HPE Synergy capacity in the datacenter, plus a buffer of additional capacity. As HPE Synergy will be a dynamic environment, this provides enough room to grow your environment, but only pay for actual metered use. Technology transitions and refresh can be built in, infrastructure and services are billed monthly, enabling you to align costs to business use.

Deploy and Integrate

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.

HPE Synergy Additional Frame Installation and Startup Service

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

Service and Support

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 Education

Training your IT staff is critical to help drive the value of HPE Synergy with increased efficiencies and better business outcomes. Training is key to the transformation and management of HPE Synergy. See **http://http://www.hpe.com/ww/learnconvergedsystems**

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 QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

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

For more information

More information on HPE services can be found at **https://www.hpe.com/services**.

Configuration Information

Models

HPE Synergy 12000 Frame Options

Notes:

- Hewlett Packard Enterprise does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.
- If you desire a custom configuration, please see the "Configuration Information - Factory Integrated Models" section of this QuickSpecs.
- Each Synergy 12000 Frame holds up to 12 half-height compute module, 6 full-height compute modules, and/or 6 double wide half-height compute/storage modules or 3 double wide full-height compute modules.

Configure To Order

HPE Synergy 12000 Configure-to-order Frame P51174-B21

Notes:

- This Frame is required when a Synergy 480 Gen11 compute module is ordered
- This Frame does not include hot-plug fans, a total of 10 units of HPE Synergy 12000 High-Capacity Fan SKU: P51175-B21 is required when this Frame is selected
- The Frame includes KVM ports built-in, and the blanks based on the configuration of the Frame.

HPE Synergy 12000 TAA-compliant Configure-to-order Frame with 2x4 Frame Link Module P51174-B22

Notes:

- This Frame is required when a Synergy 480 Gen11 compute module is ordered
- This Frame does not include hot-plug fans, a total of 10 units of HPE Synergy 12000 High-Capacity Fan SKU: P51175-B21 is required when this Frame is selected
- This Frame includes 2, 4-Port Frame Link Modules, with KVM ports built-in, and the blanks based on the configuration of the Frame.
- This section lists some of the required and optional steps to configure a Factory Integrated Model. To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends contacting your local sales representative for information on Factory Integrated Model product offerings and requirements.

HPE Synergy 12000 Configure-to-order Frame with 10x Fans P06011-B21

Notes:

- This Frame includes 10 hot-plug fans, with KVM ports built-in, and the blanks based on the configuration of the Frame. The hot-plug fans included in this Frame does not support Synergy Gen11 compute modules. For Synergy Gen11 compute modules, High-Capacity Fans (SKU: P51175-B21) must be installed

HPE Synergy 12000 TAA-compliant Configure-to-order Frame with 2x4 Frame Link Module 10x Fans P06011-B22

Notes:

- This Frame includes 2, 4-Port Frame Link Modules and 10 hot-plug fans, with KVM ports built-in, and the blanks based on the configuration of the Frame. The hot-plug fans included in this Frame does not support Synergy Gen11 compute modules. For Synergy Gen11 compute modules, High-Capacity Fans (SKU: P51175-B21) must be installed
- This section lists some of the required and optional steps to configure a Factory Integrated Model. To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends contacting your local sales representative for information on Factory Integrated Model product offerings and requirements.

Configuration Information

For a complete configuration of the HPE Synergy Frame System, please do the following:

Step 1: Select desired model, configuration, and quantity of HPE Synergy Frames and options per Frame (required)

Notes:

- HPE Synergy 12000 Frame will support all new components as part of the new Synergy Solutions program. Please review the links below to specific for Frame, Compute, Storage and Interconnects for details.
- Each HPE Synergy Frame holds up to 12 half height or 6 full height compute modules. Compute blanks will be shipped in all empty bays.
- For Synergy Compute Module information, please visit: **https://www.hpe.com/info/synergy**

Select the base Frame configuration (required)

HPE Synergy Frame

Notes:

- Frames listed below include KVM connections for Synergy Console and Synergy Composer (HPE OneView) via access on the Front Panel of the Frames. Additional management appliances, Frame Link Modules, power supply kits, power cables, interconnects, additional fans, etc. are added in the following steps.
- Frames listed below include the required blanking panels (device bay, interconnect module, power, redundant Appliance bays and Frame Link Modules as required per the ordered configuration. If the configuration is modified at a later date, additional blanking panels (ordered separately) may be required.

HPE Synergy 12000 Configure-to-order Frame P51174-B21

Notes:

- This Frame is required when a Synergy 480 Gen11 compute module is ordered
- This Frame does not include hot-plug fans, a total of 10 units of HPE Synergy 12000 High-Capacity Fan SKU: P51175-B21 is required when this Frame is selected
- The Frame includes KVM ports built-in, and the blanks based on the configuration of the Frame.

HPE Synergy 12000 TAA-compliant Configure-to-order Frame with 2x4 Frame Link Module P51174-B22

Notes:

- This Frame is required when a Synergy 480 Gen11 compute module is ordered
- This Frame does not include hot-plug fans, a total of 10 units of HPE Synergy 12000 High-Capacity Fan SKU: P51175-B21 is required when this Frame is selected
- This Frame includes 2, 4-Port Frame Link Modules and 10 hot-plug fans, with KVM ports built-in, and the blanks based on the configuration of the Frame.
- This section lists some of the required and optional steps to configure a Factory Integrated Model. To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends contacting your local sales representative for information on Factory Integrated Model product offerings and requirements.

HPE Synergy 12000 Configure-to-order Frame with 10x Fans P06011-B21

Notes:

- This Frame includes 10 hot-plug fans, with KVM ports built-in, and the blanks based on the configuration of the Frame. The hot-plug fans included in this Frame does not support Synergy Gen11 compute modules. For Synergy Gen11 compute modules, High-Capacity Fans (SKU: P51175-B21) must be installed

Configuration Information

HPE Synergy 12000 TAA-compliant Configure-to-order Frame with 2x4 Frame Link Module 10x Fans	P06011-B22

Notes:

- This Frame includes 2, 4-Port Frame Link Modules and 10 hot-plug fans, with KVM ports built-in, and the blanks based on the configuration of the Frame. The hot-plug fans included in this Frame does not support Synergy Gen11 compute modules. For Synergy Gen11 compute modules, High-Capacity Fans (SKU: P51175-B21) must be installed
- 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.

HPE Synergy 12000 High Capacity Fan Kit	P51175-B21

Notes:

- The HPE Synergy High-Capacity Fan is required when a Synergy 480 Gen11 compute module is ordered
- This HPE Synergy High-Capacity Fan is available as an option and it can be installed on the following HPE Synergy Frame 12000 SKUs: P51174-B21, P51174-B22, P06011-B21 and P06011-B22

Configuration Information

Select the Frame power options (required)

Synergy Power Supplies (Up to 6Power Bays)

Notes:

- Hewlett Packard Enterprise highly recommends using the HPE Power Advisor to ensure the number of power supply options you have selected can fully support your Synergy System configuration and to review maximum system power ratings for facilities planning purposes. HPE Power Advisor is simply a power start up advisor and does not reflect the actual power usage on each Frame or the values that may appear in OneView. HPE Power Advisor is available at: **http://www.hpe.com/info/poweradvisor**
- Mixing of Power Supplies Is Not Supported on HPE Synergy 12000 Frames, except during hot swaps to different level or higher efficient power supplies. OneView will exhibit a mismatch or not available error due to mixed power supplies until all power supplies are matched.
- HPE Synergy 12000 Frame AC power supplies meet 80 PLUS Titanium power efficiency requirements: Titanium (96%). The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 PLUS independently tests power supply efficiency and publicly posts the results on **https://plugloadsolutions.com/80PlusPowerSupplies.aspx**. DC power supplies are not eligible for 80 PLUS testing; efficiency is per Hewlett Packard Enterprise internal testing.

HPE 6x 2650W Performance Hot Plug Titanium Plus FIO Power Supply Kit 798096-B21

Notes:

- This option contains Intelligent Auto-Discovery features for HPE OneView.
- This option is for factory install only.
- The bundle includes a quantity of 6 HPE 2650W Titanium 96% PSU so a full Frame can be configured with a single part number.
- HPE Synergy Power supplies meet multiple Energy Efficiency Initiatives: 2650W, 96%: Climate Savers Computing Initiative TITANIUM and ECOS Consulting 80 Plus Titanium.

HPE 2650W Performance Hot Plug Titanium Plus Power Supply Kit 798095-B21

Notes:

- This option contains Intelligent Auto-Discovery features for HPE OneView.
- HPE Synergy Power supplies meet multiple Energy Efficiency Initiatives: 2650W, 96%: Climate Savers Computing Initiative Titanium and ECOS Consulting 80 Plus Titanium.

HPE 2650W -48VDC Hot Plug Power Supply Kit 798099-B21

Notes: HPE Synergy 2650W -48VDC Power Supplies provide 93% energy efficiency.

HPE 2900-3400W Hot Plug Platinum Power Supply Kit 876929-B21

Notes:

- HPE Synergy 2900–3400W Power Supplies provide 95% energy efficiency.
- This option ONLY supports 230-240VAC input.
- Synergy 12000 Frame only supports this option at a 230-240VAC input. Operating this option at a lower input voltage may result in exceeding the rating of power cords and/or power distribution equipment.

HPE 3000W Titanium Hot Plug Power Supply Kit P27749-B21

Notes:

- IMPORTANT: This Power Supply is available in NA only.
- HPE Synergy 3000W Power Supplies provide 96% energy efficiency.
- This option ONLY supports 208VAC.

Configuration Information

HPE 6x 3000W Titanium Hot Plug FIO Power Supply Kit P27750-B21

Notes:

- IMPORTANT: This Power Supply is available in NA only.
- HPE Synergy 3000W Power Supplies provide 96% energy efficiency.
- This option ONLY supports 208VAC.
- The bundle includes a quantity of 6 HPE 3000W Power Supplies so a full Frame can be configured with a single part number.

HPE Synergy Dual Slot Power Supply Adapter P44074-B21

Notes:

- This Adapter is required when an HPE 1800-2200W Hot Plug Power Supply is ordered
- This Adapter supports up to 2 Power Supplies per power bay

HPE 1800W-2200W Flex Slot Titanium Hot Plug Power Supply Kit P44712-B21

Notes:

- IMPORTANT: This Power Supply must be installed in pairs, 2 per power bay using the HPE Synergy Dual Flex Slot Power Supply Adapter with a total of 12 Power Supply for a full Frame configuration
- The HPE Synergy Dual Flex Slot Power Supply Adapter is required when this Power Supply is ordered
- HPE 1800-2200W FS Power Supplies provide 96% energy efficiency
- This Power Supply supports C13 outlets, a Jumper cable (SKU: AF590A) is needed to connect PDUs with C19 outlets.

Step 2: Select Management Appliance Options

HPE Synergy Frame Management Appliance Options

HPE Synergy Composer2 Management Appliance 872957-B21

HPE Synergy TAA-compliant Composer2 Management Appliance 872957-B22

Notes: 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.

HPE Synergy Composer2 Management Appliance Kit P54624-B21

Notes: This option is not available for factory installation.

Step 3: Select optional Redundant Synergy Frame Link Modules

HPE Synergy Frame Link Modules

Notes: Every Synergy 12000 Frame requires two Frame Link Modules. For redundancy and linking multiple frames it is REQUIRED that two Frame Link Modules be purchased for each Frame connected/linked.

CAUTION: Both FLM units of a redundant pair in a Synergy Frame must be of the same generation.

HPE Synergy 4-port Frame Link Module 876852-B21

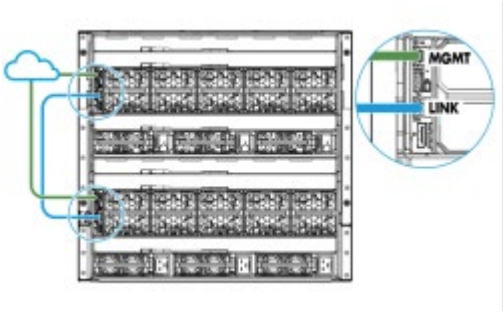
Notes: The 4-port Frame Link Module comes with 10 Gb/s private Ethernet networking solution included and requires a DAC or AOC cabling between Frames for connection to multiple Frames or forming a Management ring between multiple Frames. Multiple DAC and AOC cables are offered through Hewlett Packard Enterprise.

Configuration Information

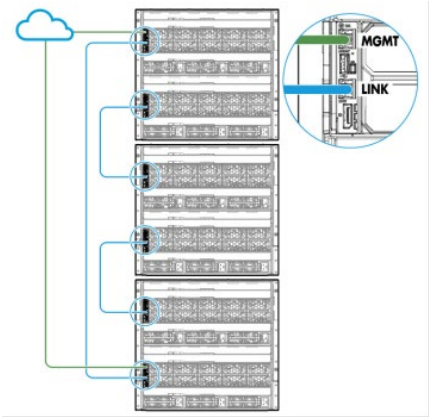
The Frame Link Module is the control and information link for a highly intelligent self-aware system of hardware options. It provides a direct link for resource information to the Synergy Composer (powered by HPE OneView). The link module provides an option for an air-gapped 10GbE management network ring that allows for multi-frame connectivity. Single or multiple Frames directly linked through this management network can be automatically discovered by HPE OneView along with their resources (compute, storage, networking, and other options) the instant they are plugged in and/or powered on.

Management Network

See Frame Link Topology below.



Single Frame MGMT Port and LINK Port Topology



Multiple Frame MGMT Port and LINK Port Topology

HPE Frame Link Topology Cables

HPE Synergy Frame Link Module CAT6A 1.2m Cable 861412-B21

Notes: For linking consecutive Frames

HPE Synergy Frame Link Module CAT6A 3m Cable 861413-B21

Notes: For linking bottom Frames to top Frames in a rack.

Copper Cables (DAC)

DAC Cables connect SFP+ ports using copper cable with built-in transceivers.

Notes:

- For use between Synergy 4-port FLMs, and for connecting management uplinks to other SFP+ network connections.
- Direct Attach Cables (DAC) use copper cables with built-in transceivers on each end.

CAUTION: Cable type determines the distance limit of connections.

- Active DAC cables @ 10Gbps = 15 meters (max)
- Passive DAC cables = ~5 meters

HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable 487655-B21

HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable 537963-B21

Configuration Information

Fiber Cables

Fiber Cables connect SFP+ ports using fiber cables with transceivers.

Notes:

- For use connecting between Synergy 4-port FLMs and for connecting management uplinks to other SFP+ network connections.
- HPE Synergy 4-port FLMs have SFP+ 10Gbps 2-fibre ports.
- Solutions can be created by using either OM3 or OM4 fibre cables with transceivers on each end.
- For distances over 50m, fibre cables are typically purchased from other suppliers.

CAUTION: Cable type and transceivers determine the distance limit of connections.

- Fiber cable use with SR transceivers = 300m (max)
- Fiber cable use with LR transceivers = 10km (max)
- Fiber cable use with ER transceivers = 40km (max)

OM3 Fibre Cables

HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

OM4 Fibre Cables

HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 1m Cable	QK732A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 2m Cable	QK733A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 5m Cable	QK734A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 15m Cable	QK735A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 30m Cable	QK736A
HPE Premier Flex LC/LC Multi-mode OM4 2 Fiber 50m Cable	QK737A

Transceivers

Transceiver use should consider bandwidth, port types, and port counts.

Transceivers (10 Gbps) for connecting SFP+ ports using fiber cables.

HPE BladeSystem c-Class 10Gb SFP+ SR Transceiver 455883-B21

Notes: Typical transceiver for use with single-mode fiber cable (short range).

HPE BladeSystem c-Class 10Gb SFP+ LR Transceiver 455886-B21

Notes: Typical transceiver for use with single-mode fiber cable (long range).

Transceivers (10 Gbps) for connecting SFP+ ports to RJ45 ports using CAT6A cables.

HPE 10GBase-T SFP+ Transceiver 813874-B21

Notes:

- Typical 10GbE transceiver for connecting CAT6A cables to SFP+ ports on the HPE Synergy 4-port FLM.
  - 861412-B21 HPE CAT6A 4-foot Cable
  - 861413-B21 HPE CAT6A 10-foot Cable
  - 861414-B21 HPE CAT6A 21-foot Cable

Configuration Information

Transceivers (1 Gbps) for connecting SFP+ ports (for use with MGMT ports only).

HPE BladeSystem c-Class Virtual Connect 1G SFP SX Transceiver 453151-B21

Notes: Typical 1Gb transceiver for use with fibre cable (<100m).

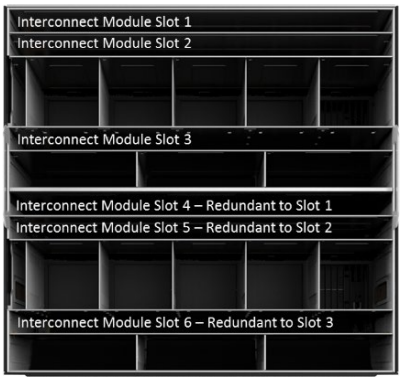
HPE BladeSystem CClass Virtual Connect 1G SFP RJ45 Transceiver 453154-B21

Notes: Typical 1Gb transceiver for connecting CAT cables to SFP+ ports on the HPE Synergy 4-port FLM.

Step 4: Select 1 or more interconnect switches/link modules for each Frame (as required)

For more information related to Frame interconnect modules and switches and cables required please consult the specific Interconnect Switches/Module QuickSpecs.

Notes: The HPE Synergy 12000 Frame provides Slots for 3 redundant Fabrics as shown here. Redundancy is 1 & 4, 2 & 5 and 3 & 6.



The following is a list of various HPE Synergy 12000 Frame Interconnect switches and link modules (Virtual Connect, Ethernet, Fibre Channel, SAS and Satellite Interconnect Modules). A pair of interconnects must be ordered if redundancy is required. For detailed interconnect options, consult the specific Synergy Interconnect Switches/Modules QuickSpecs.

Notes:

- Interconnect bays provide direct connect to Mezzanines within the Compute Modules in the front bays of the Frame. All Compute Mezzanine 1's connect to ICM slots 1 with redundancy in slot 4. All Compute Mezzanine 2's connect to ICM slots 2 with redundancy in slot 5. All Compute Mezzanine 3's connect to ICM slots 3 with redundancy in slot 6.
- For HPE Best Practices placement see notes with each ICM and place the associated mezzanines in the Compute slots associated with the ICM slots.
- The HPE Synergy interconnects ship as single units unless otherwise noted. Interconnects must be ordered in quantities of two for redundancy support.
- Options to specific Synergy interconnects are not included in the list below. Consult the individual interconnect QuickSpecs to obtain part numbers for interconnect options such as cables, SFPs, etc.

HPE Synergy Network Interconnects

HPE Virtual Connect SE 100Gb F32 Module for Synergy 867796-B21

Mellanox SH2200 TAA-compliant Switch Module for HPE Synergy 866573-B21

HPE Synergy 50Gb Interconnect Link Module 867793-B21

HE Synergy 10Gb Pass-Thru Module 799330-B21

Notes: 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.

HPE Storage and SAS Switch

Notes: The HPE Synergy Storage Module and 12Gb SAS connection modules are supported on all Synergy 12000 Frame(s).

HPE Synergy D3940 12Gb SAS CTO Drive Enclosure with 40 SFF (2.5in) Drive Bays 835386-B21

Configuration Information

Notes: The HPE Synergy Storage Module requires at least one and a maximum of two 12Gb SAS Connection Modules per frame.

12Gb SAS Connection Modules per frame.

HPE Synergy D3940 Redundant I/O Adapter	757323-B21

Notes: One I/O Adapter is configured automatically in each Synergy D3940 Storage Module. A second I/O Adapter can be selected for redundancy.

HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports	755985-B21

Notes: A SAS Connection Module must be placed in ICM bay 1 and ICM bay 4. If only configuring a single module in the frame, a connection module in ICM bay 1 will support storage modules in bays 1 – 6. A connection module in ICM bay 4 will support storage modules in bays 7-12. A second connection module can be configured in the frame for failover.

HPE Synergy SAN Interconnects

Notes:

- HPE Fibre Channel interconnect switches and modules supporting up to a 32Gbps internal port downlink speed (connection speed from the compute modules to the interconnect) are supported on all HPE Synergy 12000 Frames.
- For a list of complete FC SAN Switch Module SAN management software, hardware, cables and transceiver options for HPE Synergy, please refer to the Brocade FC Switch Module QuickSpecs for HPE Synergy.

Brocade 32Gb/20 4SFP+ Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy	Q2E57A
Brocade 16Gb Fibre Channel SAN Switch Module 12-port Upgrade E-LTU for HPE Synergy	D4U69AAE
HPE Virtual Connect SE 32Gb Fibre Channel Module for Synergy	876259-B21
HPE Virtual Connect SE 16Gb Fibre Channel Module for HPE Synergy	P08477-B21

HPE Synergy Converged Network Adapters

HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21

HPE Synergy Ethernet Adapters

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

HPE Synergy Fibre Channel Host Bus Adapters

HPE Synergy 5830C 32Gb Fibre Channel Host Bus Adapter	777456-B21
HPE Synergy 5330C 32Gb Fibre Channel Host Bus Adapter	870828-B21

Configuration Information

HPE Synergy Transceivers and Cable options

Notes: Check the QuickSpecs for each Synergy interconnect module to view the complete list of supported transceivers and cables.

HPE Synergy 100GbE/4x25GbE/4x32GbFC QSFP28 Transceiver	882251-B21

Notes:

- Mixing of Ethernet and Fiber Channel port types is not supported with the transceiver above.
- 4x8Gb FC, 4x16Gb FC, and 4x32Gb FC modes are all supported.

HPE 100Gb QSFP28 MPO SR4 100m Transceiver	845966-B21
HPE Synergy 40GbE/4x10GbE/4x8Gb FC QSFP+ Transceiver	817040-B21
HPE 100Gb QSFP28 Bidirectional Transceiver	845972-B21
HPE Synergy Dual 10GBASE-T QSFP+ 30m RJ45 Transceiver	838327-B21
HPE QSFP28 to SFP28 Adapter	845970-B21
HPE B-series 4x16 Short Wave QSFP Transceiver	K2Q87A
HPE Synergy 300Gb Interconnect Link 2.1m Direct Attach Copper Cable	876680-B21
HPE Synergy 300Gb Interconnect Link 3m Active Optical Cable	876689-B21
HPE Synergy 300Gb Interconnect Link 5m Active Optical Cable	876692-B21

Notes: The following cables can be used for 100Gb uplink connections on the Mellanox SH2200 Switch Module (866573-B21). Check its QuickSpecs to view the complete list of supported transceivers and cables.

HPE 100Gb QSFP28 to QSFP28 7m Active Optical Cable	845410-B21
HPE 100Gb QSFP28 to QSFP28 15m Active Optical Cable	845414-B21

Configuration Information

HPE Best Practices for ICM Slot Priority Placement

- Best practices for ICM Slot priority placements are to use:
  - Fabric 1 for the storage fabric (ICM bays 1 and 4), where the SAS storage ICM takes precedence over FC ICMs,
  - Fabric 2 for a secondary Ethernet fabric or storage fabric, if two of either are present (ICM bays 2 and 5), and
  - Fabric 3 for the main Ethernet/Converged fabric (ICM bays 3 and 6).
- Populate both respective ICM bays for each fabric in support of module redundancy.
- Do not mix different types of Ethernet, Fibre Channel, or SAS ICMs in any redundant Interconnect Bay Set. Also, the two interconnect slots of an Interconnect Bay Set cannot support different types of fabrics (Ethernet, Fibre Channel, SAS).
- Both ICM bays within a fabric must contain the same ICM module unless the fabric is a Synergy Composable Fabric.
  - For Synergy Composable Fabrics the frame can be populated with combinations of Primary or Satellite modules depending on the intended multi-frame configuration.
- ICM Bays are set up to be redundant: 1 and 4, 2 and 5, 3 and 6.
  - Primary bays are 1, 2 and 3.
  - Do not place an Ethernet interconnect in slots 1, 2, 4, or 5 unless interconnect slots 3 and/or 6 are filled.
  - Do not place Fibre Channel interconnects in ICM slots 1 or 4 if slots 2 and 5 are free, unless you have compute modules with unpopulated CPU2 sockets.

Part#	Option	ICM Slot Numbers (top to bottom of Frame)						Fabric Type
		1	2	3	4	5	6	
		Slot Priorities for each Options						
867796-B21	HPE Virtual Connect SE 100Gb F32 Module for Synergy	3	5	1	4	6	2	Ethernet
779224-B23	HPE Synergy 40Gb F8 Switch Module	3	5	1	4	6	2	Ethernet
794502-B23	HPE Virtual Connect SE 40Gb F8 Module for HPE Synergy	3	5	1	4	6	2	Ethernet
799330-B21	HPE Synergy 10Gb Pass Thru Module	3	5	1	4	6	2	Ethernet
755985-B21	HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports	1			2			SAS
867793-B21	HPE Synergy 50Gb Interconnect Link Module	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Ethernet
779218-B21	HPE Synergy 20Gb Interconnect Link Module	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Ethernet
779215-B21	HPE Synergy 10Gb Interconnect Link Module	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Ethernet
K2Q83B	Brocade 16Gb/12 Fibre Channel SAN Switch Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel
K2Q84B	Brocade 16Gb/24 Fibre Channel SAN Switch Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel
Q2E55A	Brocade 32Gb/12 2SFP+ Fibre Channel SAN Switch Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel
P08477-B21	HPE Virtual Connect SE 16Gb FC Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel
876259-B21	HPE Virtual Connect SE 32Gb Fibre Channel Module for Synergy	1	3	5	2	4	6	Fibre Channel

Configuration Information

Synergy 12000 Frame - Best Practices for placing Products in Mezzanine Slots

Best Practices for ICM/Mezzanine #1			
This is the Primary Fabric/ICM Slot for a Synergy D3940 Storage module in Front Frame device bays 1-thru-6. This fabric slot must be used for SAS ICM Bay#1 with SAS Mezzanine Controller (Mezz #1) of the Compute module. If the D3940 Storage Module is in device bays 7-thru-12, then a SAS ICM must be in ICM Bay #4. Regardless of storage module placement, ICM Bays #1 and #4 are redundant slots. If there is no D3940 Storage Module being used in the frame, then this ICM bay and Mezzanine slot are open for Ethernet or Fibre Channel networking use.			
***Priority**	**Compute Mezzanine Slots: M1 or M1/M4**		**ICM Bay 1 (and redundant ICM Bay 4)**
	Mezz Slots	**Compute Mezzanine Description**	**Interconnect Module Description**
Primary	M1 for SY480	HPE Smart Array P542D Controller (759557-B21)	HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports (755985-B21)
		HPE Smart Array P416ie-m Controller (804428-B21)	
Alternate-1	M1/M4 for SY660	HPE Synergy 2820C 10/20Gb Converged Network Adapter (794538-B21)	HPE Virtual Connect SE 100Gb F32 Module for Synergy (867796-B21)
		HPE Synergy 3820C 10/20Gb Converged Network Adapter (777430-B21)	HPE Virtual Connect SE 40Gb F8 Module for Synergy (794502-B23)
		HPE Synergy 6820C 25/50Gb Converged Network Adapter (P02054-B21)	HPE Synergy 40Gb F8 Switch Module (779224-B23)
		HPE Synergy 4820C 10/20/25Gb Converged Network Adapter(876449-B21)	HPE Synergy 50Gb Interconnect Link Module (867793-B21)
			HPE Synergy 20Gb Interconnect Link Module (779218-B21)
Alternate-2		HPE Synergy 5830C 32G FC HBA (Fibre) (777456-B21)	Brocade 16Gb/24 Fibre Channel SAN Switch Module for HPE Synergy (K2Q84A)
		HPE Synergy 5330C 32G FC HBA (Fibre) (870828-B21)	Brocade 16Gb/24 Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy (K2Q86A)
		HPE Synergy 3830C 16G FC HBA (Fibre) (777452-B21)	HPE Virtual Connect SE 16Gb Fibre Channel Module for Synergy (779227-B21)
		HPE Synergy 3530C 16G FC HBA (Fibre) (7774524-B21)	Brocade 16Gb/12 Fibre Channel SAN Switch Module for HPE Synergy (K2Q83A)

Configuration Information

Best Practices for ICM/Mezzanine #2			
This ICM Bay/Mezzanine slot is usually the primary Fibre Channel fabric, when storage modules are included in the Frame. It can also be used as a secondary Ethernet fabric. When using single processor Synergy Compute Modules, these Bays will be unavailable. Storage Mezzanine controller/ICM is not supported in this mezzanine/slot.			
***Priority**	**Compute Mezzanine Slots: M2 or M2/M5**		**ICM Bay 2 (and redundant ICM Bay 5)**
	Mezz Slots	**Compute Mezzanine Description**	**Interconnect Module Description**
Alternate-1	M2 for SY480	HPE Synergy 5830C 32G FC HBA (Fibre) (777456-B21)	Brocade 16Gb/24 Fibre Channel SAN Switch Module for HPE Synergy (K2Q84A)
	M2/M5 for SY660	HPE Synergy 5330C 32G FC HBA (Fibre) (870828-B21)	Brocade 16Gb/24 Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy (K2Q86A)
		HPE Synergy 3830C 16G FC HBA (Fibre) (777452-B21)	HPE Virtual Connect SE 16Gb Fibre Channel Module for Synergy (779227-B21)
		HPE Synergy 3530C 16G FC HBA (Fibre) (777454-B21)	Brocade 16Gb/12 Fibre Channel SAN Switch Module for HPE Synergy (K2Q83A)
Alternate-2		HPE Synergy 2820C 10/20Gb Converged Network Adapter (794538-B21)	HPE Virtual Connect SE 100Gb F32 Module for Synergy (867796-B21)
		HPE Synergy 3820C 10/20Gb Converged Network Adapter (777430-B21)	HPE Virtual Connect SE 40Gb F8 Module for Synergy (794502-B23)
			HPE Synergy 40Gb F8 Switch Module (779224-B23)
		HPE Synergy 6820C 25/50Gb Converged Network Adapter (P02054-B21)	HPE Synergy 50Gb Interconnect Link Module (867793-B21)
			HPE Synergy 20Gb Interconnect Link Module (779218-B21)
		HPE Synergy 4820C 10/20/25Gb Converged Network Adapter(876449-B21)	HPE Synergy 10Gb Interconnect Link Module (779215-B21)

Configuration Information

Best Practices for ICM/Mezzanine #3			
Mezzanine #3 in the Compute module, together with Frame ICM Bays #3 and #6, are to be used for the Primary Ethernet Fabric. Storage Mezzanine controller/ICM is not supported in this mezzanine/slot.			
***Priority**	**Compute Mezzanine Slots: M3 or M3/M6**		**ICM Bay 3 (and redundant ICM Bay 6)**
	Mezz Slots	**Compute Mezzanine Description**	**Interconnect Module Description**
Alternate-1	M3 for SY480	HPE Synergy 2820C 10/20Gb Converged Network Adapter (794538-B21)	HPE Virtual Connect SE 40Gb F8 Module for Synergy (794502-B23)
		HPE Synergy 6810C 25/50Gb Ethernet Adapter (867322-B21)	
		HPE Synergy 6410C 25/50 Ethernet Adapter (868779-B21)	
	M3/M6 for SY660	HPE Synergy 3820C 10/20Gb Converged Network Adapter (777430-B21)	HPE Synergy 40Gb F8 Switch Module (779224-B23)
		HPE Synergy 3520C 10/20Gb Converged Network Adapter (777434-B21)	HPE Synergy 20Gb Interconnect Link Module (779218-B21)
			HPE Synergy 10Gb Interconnect Link Module (779215-B21)
Alternate-2		HPE Synergy 3830C 16G FC HBA (Fibre) (777452-B21)	Brocade 16Gb/24 Fibre Channel SAN Switch Module for HPE Synergy (K2Q84A)
		HPE Synergy 3530C 16G FC HBA (Fibre) (777454-B21)	Brocade 16Gb/24 Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy (K2Q86B)
			HPE Virtual Connect SE 16Gb Fibre Channel Module for Synergy (P08477-B21)
			Brocade 16Gb/12 Fibre Channel SAN Switch Module for HPE Synergy (K2Q83B)

Notes:

- ICM Bays 1 & 4, 2 & 5, and 3 & 6 are Redundant. The Primary ICM Bays are 1, 2, and 3.
- You cannot mix different types of Ethernet, Fibre or SAS ICMs in any redundant Interconnect Bay Set.
- The two interconnect slots of an interconnect Bay set cannot support different types of fabrics (Ethernet, Fibre Channel, and SAS).
- ICM Slots 1 & 4 for are for SAS, Slots 2 & 5 are for Fibre Channel or for secondary Ethernet, and Slots 3 & 6 are primarily for Ethernet fabrics. Do not place an Ethernet interconnect in Slots 1, 2, 4, or 5 unless interconnect Slots 3 and/or 6 are filled.
- FibreChannel: Use Mezz and ICM slots 2 and 5 if they are available. Do not place a Fibre Channel in Mezz 1 or 4, and Interconnects in ICM slots 1 or 4, if Mezz and ICM slots 2 and 5 are free. Also, Mezz slots 2 and 5 require that the CPU2 & CPU4 processors be installed.
- SY660 must match Mezzanine options slots 1 & 4, 2 & 5, and 3 & 6.

***Priority of Slot Choices**

Primary

Primary slotting (which is key for internal D3940 Storage Module)

Alternate-1

First Choice, if not filled with Primary slot priority

Alternate-2

Second Choice, if not filled with Primary or Alternate-1 slot priorities

Configuration Information

Step 5: HPE Synergy Storage Module (Optional)

HPE Synergy Storage Modules

Notes: The HPE Synergy Storage Module and 12Gb SAS connection modules are supported on all Synergy 12000 Frame(s).

HPE Synergy D3940 12Gb SAS CTO Drive Enclosure with 40 SFF (2.5in) Drive Bays 835386-B21

Notes: The HPE Synergy Storage Module requires at least one and a maximum of two 12Gb SAS Connection Modules per frame.

HPE Synergy D3940 Redundant I/O Adapter 757323-B21

Notes: One I/O Adapter is configured automatically in each Synergy D3940 Storage Module. A second I/O Adapter can be selected for redundancy.

HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports 755985-B21

Notes: A SAS Connection Module must be placed in ICM bay 1 and ICM bay 4. If only configuring a single module in the frame, a connection module in ICM bay 1 will support storage modules in bays 1 – 6. A connection module in ICM bay 4 will support storage modules in bays 7-12. A second connection module can be configured in the frame for failover.

Step 6: Select your Rack (optional)

HPE Data Center Racks

Notes:

- Hewlett Packard Enterprise highly recommends the use of racks with a depth of 1200mm (47.2 in) or deeper to ensure adequate space in the back of the rack for cable and power management. Additional Hewlett Packard Enterprise Data Center racks are available other than those listed below. For more information on the full line of Hewlett Packard Enterprise Data Center Racks and rack accessories, please see **https://www.hpe.com/us/en/integrated-systems/rack-power-cooling.html**.
- Static load capacity for Advanced G2 and Enterprise G2 racks is 3000 lbs. and represents the maximum weight load for racks that are configured directly in the data center and will never be moved with installed equipment. Dynamic load capacity is 2250 lbs. for Advanced G2 racks and 3000 lbs. for Enterprise G2 racks. Dynamic load capacity represents the maximum load capacity for racks that are shipped fully configured using a shock pallet rack model option. Due to the Dynamic load capacity limitations for Advanced G2 racks, a limit of 2-3 Synergy frames is recommended based on the overall load weight of all equipment included in a single rack.

HPE Advanced G2 Series Racks

HPE 42U 600mmx1200mm G2 Kitted Advanced Pallet Rack with Side Panels and Baying P9K09A

HPE 42U 600mmx1200mm G2 Kitted Advanced Shock Rack with Side Panels and Baying P9K10A

HPE 42U 800mmx1200mm G2 Kitted Advanced Pallet Rack with Side Panels and Baying P9K15A

Notes:

- Hewlett Packard Enterprise provides both standard pallet and shock pallet shipping options for most racks. If there is a requirement to transport the rack with any IT equipment installed, Hewlett Packard Enterprise highly recommends choosing a shock pallet option to protect your equipment during transport.
- HPE Network Racks are designed for dense network equipment. These racks have the front vertical rails moved back 75mm to facilitate front to rear cabling and have additional bristle covered cable access slots in the front and on top of the racks to prevent mixing of hot and cold air and to allow for large cable bundles.

Step 7: Select rack power distribution unit (PDU) (optional)

Notes:

- A pair of PDUs must be ordered for AC feed redundancy.
- HPE G2 PDUs with C13 and/or C19 outlets support HPE IEC Locking Power Cords. One locking power cord is included with each compatible PDU model. Additional IEC Locking Power Cords are available for purchase from HPE – see Power Cord section for additional details.
- Additional HPE Power Distribution Units (PDUs) are available than those listed below. For a complete list of all Hewlett Packard Enterprise PDUs, please visit: **https://www.hpe.com/us/en/integrated-systems/rack-power-cooling.html**

Configuration Information

HPE Power Distribution Units (PDUs)

HPE G2 Basic Single-Phase Power Distribution Units

HPE G2 Basic Modular 4.9kVA/L6-30P 24A/208V Outlets (6) IEC C19/1U Horizontal NA/JP PDU	P9Q39A
HPE G2 Basic 4.9kVA/L6-30P 24A/208V Outlets (36) C13 (6) C19/Vertical NA/JP PDU	P9Q42A
HPE G2 Basic Modular 7.3kVA/60309 3-wire 32A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9Q43A
HPE G2 Basic 7.3kVA/60309 3-wire 32A/230V Outlets (36) C13 (6) C19/Vertical INTL PDU	P9Q46A
HPE G2 Basic Modular 8.3kVA/CS8265C 40A/208V Outlets (6) C19/1U Horizontal NA/JP PDU	P9Q47A
HPE G2 Basic 8.3kVA/CS8265C 40A/208V Outlets (30) C13 (6) C19/Vertical NA/JP PDU	P9Q48A
HPE G2 Basic 9.2kVA/50A Term Block 40A/208V Outlets (30) C13 (6) C19/Vertical WW PDU	P9Q49A
HPE G2 Basic 11kVA/60309 63A 3-wire 48A/230V Outlets (30) C13 (6) C19/Vertical INTL PDU	P9Q50A
HPE G2 Basic Modular 14.4kVA/60309 63A 3-wire 48A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9Q51A

Notes: G2 PDU Extension Bars can be added to any PDU model with an available C19 outlet. See "Extension Bars" section for more details.

HPE G2 Metered Single-Phase Power Distribution Units

HPE G2 Metered Modular 4.9kVA/L6-30P 24A/208V Outlets (6) IEC C19/1U Horizontal NA/JP PDU	P9R51A
HPE G2 Metered 4.9kVA/L6-30P 24A/208V Outlets (32) C13 (6) C19/Vertical NA/JP PDU	P9R53A
HPE G2 Metered Modular 7.3kVA/60309 3-wire 32A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9R54A
HPE G2 Metered 7.3kVA/60309 3-wire 32A/230V Outlets (32) C13 (6) C19/Vertical INTL PDU	P9R56A
HPE G2 Metered 8.3kVA/CS8265C 40A/208V Outlets (30) C13 (6) C19/Vertical NA/JP PDU	P9R57A
HPE G2 Metered Modular 8.3kVA/CS8265C 40A/208V Outlets (6) C19/1U Horizontal NA/JP PDU	P9R77A

Notes: G2 PDU Extension Bars can be added to any PDU model with an available C19 outlet. See "Extension Bars" section for more details.

HPE G2 Switched Single-Phase Power Distribution Units

HPE G2 Switched 4.9kVA/L6-30P 24A/208V Outlets (20) C13 (4) C19/Vertical NA/JP PDU	P9S14A
HPE G2 Switched 7.3kVA/60309 3-wire 32A/230V Outlets (20) C13 (4) C19/Vertical INTL PDU	P9S17A

Notes: G2 PDU Extension Bars can be added to any PDU model with an available C19 outlet. See "Extension Bars" section for more details.

HPE G2 Metered & Switched Single-Phase Power Distribution Unit

HPE G2 Metered/Switched 4.9kVA/L6-30P 24A/208V Outlets (20) C13 (4) C19/Vertical NA/JP PDU	P9S15A
HPE G2 Metered/Switched 7.3kVA/60309 3-wire 32A/230V Outlets (20) C13 (4) C19/Vertical INTL PDU	P9S18A

Notes: G2 PDU Extension Bars can be added to any PDU model with an available C19 outlet. See "Extension Bars" section for more details.

HPE PDU Extension Bars

HPE G2 IEC C20 Input/(4) C13 (2) C19 Expansion Outlets/PDU Extension Bar Kit	P9Q67A
HPE G2 IEC C20 Input/(7) 5-20R Expansion Outlets/PDU Extension Bar Kit	P9Q68A

Notes: G2 Extension Bars Kits include 2 extensions bars per kit. G2 Extension Bars can be used with any HPE PDU; however, C20 receptacle on input power cord will only lock onto compatible G2 Basic, Metered, Switched, and Metered & Switched PDUs.

HPE 2m 15A C20 C13 Univ Jpr Cord	AF590A

Step 8: Select an uninterruptible power system (UPS) (optional)

Notes: Additional HPE Uninterruptable Power Systems (UPSs) are available other than those listed here. For a complete list of all Hewlett Packard Enterprise UPS options and additional information, please visit **https://www.hpe.com/us/en/integrated-systems/rack-power-cooling.html** .

Configuration Information

Step 9: Select power cords (optional)

Notes:

- For additional power cable information, please visit: https://www.hpe.com/psnow/doc/c05324691.HTML?jumpid=in_pb-psnow-red
- For Carrier Grade (NEBS-compliant) configurations, including Seismic Rack Kits and Cable Kits used with the -48VDC Power Supply, please see: **HPE Synergy 12000 Frame - Carrier Grade Supplement**.

Power Distribution Unit (PDU) Power Jumper Cords

HPE C19 - C20 WW 250V 16Amp Flint Gray 1.20m Jumper Cord	AF575A
HPE C19 - C20 WW 250V 16Amp Flint Gray 2.0m Jumper Cord	AF574A
HPE C19-C20 IN 250V 16Amp 2.5m Black Jumper Cord	R1C66A

HPE Locking IEC Power Cords(C19-C20)

Notes: These IEC power cords will lock onto the G2 PDUs and will also lock onto the Synergy power supplies.

HPE C19 - C20 WW 250V 16Amp 2m Black Locking Power Cord	Q0P72A

HPE Locking IEC Power Cords (C19-C20)

HPE C19 - C20 WW 250V 16Amp 2m 6-pack Black Locking Power Cord	Q0R17A

High Voltage Direct Current (HVDC) Power Jumper Cords

HPE SAFDGRID-SAFDGRID 277V 15Amp DC 2.0m Jumper Cord	J6X00A

Additional HPE Power Cords

HPE High Line Power Cords 200 - 240V AC

HPE C19 - Nema L6-20P NA/JP 250V 20Amp High Voltage 3.6m Power Cord	AF593A
HPE C19 - CEE-VII EU 250V 16Amp 3.6m Power Cord	AF576A

Power Cords used with 277VAC Power Supply

HPE SDG23A-SDG23B 277V 0.76m Jumper Cord	P9B75A
HPE SDG23A-SDG23B 277V 2.0m Jumper Cord	P9B77A
HPE SAFDGRID-SAFDGRID 277V 15Amp DC 2.0m Jumper Cord	J6X00A

Related Options

HPE Synergy Spares Options

HPE Synergy 12000 Frame Options

For purchasing any of the following option spares please go to HPE Parts Store at
https://parts.hpe.com/Hpparts/Default.aspx?mscssid=08A46B692773436E9BC247202DCEFC43&cc=GB&lang=EN

HPE Synergy Frame Round Hole Rack Rail Kit 871749-B21

Notes: This rack rail kit provides round hole capability for installing Synergy Frames into racking solutions which require round holes (versus the default square holes).

SPS - TB BK FAN KIT 807967-001

SPS-FAN HC MODULE GNRC P52789-001

Notes: Every Synergy 12000 Frame supports up to 10 Fans

HPE Synergy Compute Bay Half-Height Blank Option Kit 813561-001

Notes: 1 blank for half-height server bay

HPE Synergy Compute Bay Full-Height Blank-Coupler Option Kit 417894-B21

Notes:

- The coupler option is intended for use with two Half-Height Bay Blanks (2x 813561-001) to for a single full-height bay blank for insertion in open full-height Bay.
- For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy 12000 Frame Compute Half Shelf 804923-B21

Notes:

- The half-shelf option is designed for mixing half-height and full-height compute nodes in a specific zone. With the middle shelf removed between Bays 1 & 2 and 7 & 8 you may install two full-height Compute modules in what become Bays 1 & 2 for full-heights. If you need to mix half-height with full-height Compute nodes you can install the Half-Shelf option in the leftmost slots between 1 & 7 bays. This allows for two half-height compute module in the leftmost slots 1 & 7 with a full-height compute note in bay 2(2&8). This is the only Zone that allows mixing of compute modules.
- For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Full-Shelf Option Kit 813569-001

Notes:

- The full-shelf is for spares purposes or to replace lost shelves. The Frame is designed with 3 of these shelves inserts to accommodate 12 half-height compute modules.
- For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Frame Lift Handle Option Kit 813567-001

Notes:

- The Lift Handle option comes with one (1) handle that latches to the side of a Synergy Frame. Four (4) Lift Handles are required for 4 persons to execute a safe and proper lift of the Synergy 12000 Frame.
- It is HIGHLY RECOMMENDED that any HPE Synergy be empty of all key compute, interconnects, power supplies, fans and options prior to attempting to lift and place into a rack system.

CAUTION: All Frames, chassis, or enclosures generally require multiple people when lifting from the shipping container to a work bench or table or into the rack. The Synergy 12000 Frame requires 4 people to safely and properly lift when empty.

HPE Synergy Interconnect Module/Switch Blank Option Kit 813563-001

Notes:

- This is a single blank for open interconnect module/switch bays.
- For optimal cooling and operating performance there should be no open bays or slots.

Related Options

HPE Synergy Frame Rack Rail Option Kit	813568-001

Notes: This is a single rack rail kit for installing Synergy Frames into desired racking solutions.

HPE Synergy Appliance Bay Blank Option Kit	813562-001

Notes:

- This blank is for an open Appliance Bay.
- For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Frame Link Module Bay Blank Option Kit	813560-001

Notes:

- This blank is for an open Appliance Bay.
- For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Power Supply Bay Blank Option Kit	813564-001

Notes:

- This blank is for an open Appliance Bay.
- For optimal cooling and operating performance there should be no open bays or slots.

HPE Tape Backup

Notes:

- For the complete range of tape drives, autoloaders, libraries and media see: **https://www.hpe.com/us/en/storage/storeever-tape-storage.html**.
- For hardware and software compatibility of Hewlett Packard Enterprise tape backup products see: **http://www.hpe.com/storage/spock**.

HPE System Management Options

Notes:

- The HPE Synergy 12000 Frame comes with a single USB and DisplayPort ports on the Front Panel of the Frame and on each of the Frame Link Modules in the rear. Synergy Console and OneView must be accessed at the Front Panel of the Frame that has the Synergy Composer installed. When multiple Frames are linked properly and the Synergy Composer/OneView is running you may access Synergy Console from any Front Panel, Frame Link Module or network connections.
- For additional information regarding Rack Options, please see the following URL: **https://www.hpe.com/us/en/integrated-systems/rack-power-cooling.html** .

HPE 1U Rackmount Keyboard with USB

Notes: Single to multi-port USB Adaptor required for Keyboard and Mouse.

HPE USB US Keyboard/Mouse Kit	631341-B21
HPE USB UK Keyboard/Mouse Kit	631344-B21
HPE USB FR Keyboard/Mouse Kit	631346-B21
HPE USB ES Keyboard/Mouse Kit	631348-B21
HPE USB DE Keyboard/Mouse Kit	631358-B21
HPE USB JP Keyboard/Mouse Kit	631360-B21
HPE USB IT Keyboard/Mouse Kit	631362-B21
HPE USB CN Keyboard/Mouse Kit	631364-B21
HPE USB AE Keyboard/Mouse Kit	638212-B21
HPE USB RU Keyboard/Mouse Kit	638214-B21

Related Options

HPE LCD8500 1U Rackmount KVM Console Kit Models

HPE LCD8500 1U US Rackmount Console Kit	AF630A
HPE LCD8500 1U JP Rackmount Console Kit	AF642A
HPE LCD8500 1U INTL Rackmount Console Kit	AF644A

Notes: The DisplayPort cable option below is required for any of these Display solutions

HPE LCD8500 1U Rackmount KVM Console Kit Models

HPE LCD8500 1U UK Rackmount Console Kit	AF631A
HPE LCD8500 1U DE Rackmount Console Kit	AF632A
HPE LCD8500 1U FR Rackmount Console Kit	AF633A
HPE LCD8500 1U RU Rackmount Console Kit	AF643A
HPE LCD8500 1U US TAA Rackmount Console Kit	AF645A

HPE LCD8500 1U Rackmount KVM Console Kit Models

HPE Kit LCD 1.83m Latch Display Port Cable	G7T29A

HPE KVM Analog Console Switches

HPE 0x1x8 G3 KVM Console Switch	AF651A
HPE 0x2x16 G3 KVM Console Switch	AF652A

HPE KVM IP Console Switches with Virtual Media and CAC Support

HPE 1x1Ex8 KVM IP Console Switch G2 with Virtual Media CAC Software	AF620A
HPE 2x1Ex16 KVM IP Console Switch G2 with Virtual Media CAC Software	AF621A
HPE 4x1Ex32 KVM IP Console Switch G2 with Virtual Media CAC Software	AF622A

HPE Synergy Services

Deployment/Installation & Start-up Services

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

Technical Specifications

Power Supply Specifications

Notes: HPE highly recommends using the HPE Power Advisor tool to ensure the number of power supply options you have selected can fully support your Synergy Frame configuration and to review maximum system power ratings for facilities planning purposes. HPE Power Advisor is available at: **http://www.hpe.com/info/hpepoweradvisor**.

HPE 2650 Watts Titanium Hot Plug AC Power Supply					
Part Number	798095-B21				
Input Voltage Range (Vrms)	200-240				
Frequency Range (Nominal) (Hz)	50 – 60				
Nominal Input Voltage (Vrms)	200	208	220	230	240
Maximum Rated Output Wattage	2650	2650	2650	2650	2650
Nominal Input Current (A rms)	14.4	13.9	13.1	12.5	12.0
Maximum Rated Input Wattage Rating (Watts)	2879	2877	2873	2869	2866
Maximum Rated VA (Volt-Amp)	2882	2882	2878	2875	2871
Efficiency (%)	92%	92.1%	92.2%	92.4%	92.5
Power Factor	0.9				
Leakage Current (mA)	0.87	0.9	0.96	1	1.04
Maximum Inrush Current (A peak)	30				
Maximum Inrush Current duration (mS)	0.2				
Maximum British Thermal Unit Rating (BTU-Hr)	9823	9817	9803	9790	9780

- See the “Technical Specifications” section for additional power specifications.
- Accept IEC C19-C20 and C19-C20 Intelligent Power Distribution Unit (iPDU) power cables. One WW 250W C19-C20 2.0m (non-iPDU) power cable is included per supported power supply. iPDU power cables are ordered separately.
- Accept IEC C19-C20 power cables. One WW 250W C19-C20 2.0m power cable is included per supported power supply.
- Rated 200 to 240 VAC line-to-neutral. The Frame will not operate from higher line-to-line voltage with the WYE wall plug configuration. This power input module is configured to provide 200 to 240 VAC to the power supplies.
- Each Frame must include only one type of power supply. Mixing of power supplies is not supported, except during hot swaps to different level or higher efficient power supplies.
- Maximum output per power supply is 2650W.
- Power cables with APP Saf-D-Grid connectors are ordered separately.

HPE 2650 Watts Hot Plug 380V HVDC Power Supply			
HPE 2650W HVDC Hot Plug Power Supply Kit	798342-B21		
Input Voltage Range (VDC)	240 - 420		
Frequency Range (Nominal) (Hz)	N/A		
Nominal Input Voltage (VDC)	240	380	420
Maximum Rated Output Wattage	2650	2650	2650
Nominal Input Current (A rms)	11.7	7.4	6.7
Maximum Rated Input Wattage Rating (Watts)	2816	2804	2795
Maximum Rated VA (Volt-Amp)	2816	2804	2795
Efficiency (%)	94.1%	94.5%	94.8%
Power Factor	NA		
Leakage Current (mA)	N/A		
Maximum Inrush Current (A peak)	30	N/A	
Maximum Inrush Current duration (mS)	0.2	N/A	
Maximum British Thermal Unit Rating (BTU-Hr)	9609	9568	9538

Technical Specifications

HPE 2650W 277VAC Hot Plug Power Supply			
HPE 2650W 277VAC Hot Plug Power Supply Kit	798101-B21		
Input Voltage Range (Vrms)	180 - 305		
Frequency Range (Nominal) (Hz)	50 - 60		
Nominal Input Voltage (Vrms)	180	277	305
Maximum Rated Output Wattage	2650	2650	2650
Nominal Input Current (A rms)	16.2	10.3	9.3
Maximum Rated Input Wattage Rating (Watts)	2856	2801	2792
Maximum Rated VA (Volt-Amp)	2914	2858	2849
Efficiency (%)	92.8%	94.6%	94.9%
Power Factor	0.98		
Leakage Current (mA)	0.49	0.75	0.83
Maximum Inrush Current (A peak)	30		
Maximum Inrush Current duration (mS)	0.2		
Maximum British Thermal Unit Rating (BTU-Hr)	9743	9558	9528

HPE 2650W -48VDC Hot Plug Power Supply			
HPE 2650W -48VDC Hot Plug Power Supply Kit	798099-B21		
Input Voltage Range (VDC)	−40 to −72		
Frequency Range (Nominal) (Hz)	N/A		
Nominal Input Voltage (VDC)	-40	-48	-72
Maximum Rated Output Wattage	2650	2650	2650
Nominal Input Current (A rms)	-71.8	-59.4	-39.5
Maximum Rated Input Wattage Rating (Watts)	2871	2850	2841
Maximum Rated VA (Volt-Amp)	2871	2850	2841
Efficiency (%)	92.3%	93.0%	93.3%
Power Factor	N/A		
Leakage Current (mA)	N/A		
Maximum Inrush Current (A peak)	180		
Maximum Inrush Current duration (mS)	0.2		
Maximum British Thermal Unit Rating (BTU-Hr)	9796	9725	9695

HPE 2900-3400W 240VAC Hot Plug Platinum Power Supply Kit		
HPE 2900-3400W Hot Plug Platinum Power Supply Kit	876929-B21	
Input Voltage Range (Vrms)	230 - 240	
Frequency Range (Nominal) (Hz)	50 – 60	
Nominal Input Voltage (Vrms)	230	240
Maximum Rated Output Wattage	3400	3400
Nominal Input Current (A rms)	15.8	15.1
Maximum Rated Input Wattage Rating (Watts)	3626	3618
Maximum Rated VA (Volt-Amp)	3628	3620
Efficiency (%)	94%	94%
Power Factor	1.000	0.999
Leakage Current (mA)	1.00	1.04
Maximum Inrush Current (A peak)	30	30
Maximum Inrush Current duration (mS)	0.2	0.2
Maximum British Thermal Unit Rating (BTU-Hr)	12372	12346

Technical Specifications

HPE 3000W Titanium Hot Plug Power Supply Kit	
HPE 3000W Titanium Hot Plug Power Supply Kit	P27750-B21
Input Voltage Range (Vrms)	208
Frequency Range (Nominal) (Hz) 50 – 60	50-60
Nominal Input Voltage (Vrms)	208
Maximum Rated Output Wattage	3000
Nominal Input Current (A rms)	15.8
Maximum Rated Input Wattage Rating (Watts)	3260
Maximum Rated VA (Volt-Amp)	3268
Efficiency (%)	96
Power Factor 1.000 0.999	0.999
Leakage Current (mA)	0.9
Maximum Inrush Current (A peak)	30
Maximum Inrush Current duration (mS)	0.2
Maximum British Thermal Unit Rating (BTU-Hr)	10916

HPE 1800W-2200W Flex Slot Titanium Hot Plug Power Supply					
HPE 1800W-2200W Flex Slot Titanium Hot Plug Power Supply	P44712-B21 HPE's Generic Part Number: P44714-001 HPE's Spares Part Number: P47163-001				
Input Voltage Range (Vrms)	200 – 240				
Frequency Range (Nominal) (Hz)	50 - 60				
Nominal Input Voltage (Vrms)	200	208	220	230	240
Maximum Rated Output Wattage	1799	1900	2000	2100	2200
Nominal Input Current (A rms)	9.6	9.8	9.7	9.8	9.8
Maximum Rated Input Wattage Rating (Watts)	1904	2013	2119	2226	2334
Maximum Rated VA (Volt-Amp)	1923	2033	2140	2249	2357
Efficiency (%)	94.5	94.4	94.4	94.3	94.3
Power Factor	0.99	0.99	0.99	0.99	0.99
Leakage Current (mA)	0.66	0.69	0.73	0.76	0.80
Maximum Inrush Current (A peak)	30				
Maximum Inrush Current duration (mS)	10				
Maximum British Thermal Unit Rating (BTU-Hr)	6497	6868	7230	7596	7962

Technical Specifications

HPE Synergy 12000 Frame		
Dimensions	Height	17.4in (442mm)
	Width	18.98in (482mm)
	Depth	36.88in (936mm)
Shipping Dimensions	Height	30.13in (765.3mm)
	Width	24.50in (622.3mm)
	Depth	40.50in (1028.7mm)
Frame Weight	Unboxed	137lb (62kg)
	Shipping	185lb (84kg)
Notes: The Frame weight above includes only an empty Frame- Compute, storage, power supplies, fans, interconnect modules, Management Appliances and Frame Link Modules are not included. The weight for power supplies, fans, and other option(s) is listed below. Please see the specific compute module and interconnect module QuickSpecs for their respective weight.		
Power Supply Weight (minimum 1, maximum 6)	4.8lbs (2kg)	
HPE Synergy Fan Weight (minimum 10, maximum 10)	1.5lbs (1kg)	
Management Appliances (minimum 1, maximum 2)	3lbs (1.4kg)	
Frame Link Modules (minimum 1 maximum 2)	1.4lbs (1kg)	
Maximum Frame Weight (approximate)	Unboxed	521lb (236kg)
	Shipping	569lb (258kg)
Notes: The approximate maximum Frame weight above includes 12 480 Compute Modules, 6 six power supplies, 10 fans, 6 interconnect modules, 2 Composer Management Appliances and 2 Frame Link Modules.		
Temperature Range	Operating	50° to 95° F (10° to 35° C)
	Non-Operating	-22° to 140° F (-30° to 60° C)
Relative Humidity	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
	Non-Operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F)maximum wet bulb temperature, non-condensing.

Notes:

- Operating temperature has an altitude derating of 1.8° F (1° C) per 1,000 ft (304.8 m). No direct sunlight. Upper operating limit is 10,000 ft (3,048 m) or 70Kpa/10.1 psia. Upper non-operating limit is 30,000 ft (9,144 m) or 30.3 KPa/4.4 psia. Storage maximum humidity of 95% is based on a maximum temperature of 113° F (45° C). Altitude maximum for storage is 70 KPa.
- For detailed environmental and other installation requirements, please see the “HPE Site Planning Guide” at **http://www.hpe.com/support**.

Environmental-friendly Products and Approach End-of-life Management and Recycling

Hewlett Packard Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to **http://www.hpe.com/info/recycle** To recycle your product, please go to: **http://www.hpe.com/info/recycle** or contact your nearest Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard Enterprise web site at: **http://www.hpe.com/info/recycle.** These instructions may be used by recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
03-Apr-2023	Version 32	Changed	Standard Features and Configuration Information sections were updated.
06-Mar-2023	Version 31	Changed	Standard Features, Configuration information and Related Options sections were updated.
10-Jan-2023	Version 30	Changed	Configuration information section was updated Obsolete SKUs were removed
04-Apr-2022	Version 29	Changed	Overview, Standard Features, Configuration Information sections were updated Obsolete SKUs were removed
15-Sep-2021	Version 28	Changed	Obsolete SKUs were removed Service and Support Pointnext Tech Care and Complete Care information added
06-Jul-2021	Version 27	Changed	Configuration Information and Technical Specifications sections were updated
04-May-2021	Version 26	Changed	Standard Features and Configuration Information sections were updated Obsolete SKUs were deleted: K2Q84B, 777430-B21, H0VL8E
15-Feb-2021	Version 25	Changed	QuickSpecs was updated and rebranding was applied.
18-Jan-2021	Version 24	Changed	Configuration Information section was updated.
17-Aug-2020	Version 23	Changed	Configuration Information and Related Options sections were updated.
09-Dec-2019	Version 22	Changed	Configuration Information and Technical Specifications sections were updated.
03-Sep-2019	Version 21	Changed	QuickSpecs sections were updated.
05-Aug-2019	Version 20	Changed	Configure-to-Order - Factory Integrated Models, and Power Supply Specifications sections were updated. Obsolete SKUs were deleted: 759557-B21, K2Q83A, P9R52A, P9R55A, P9S13A, P9S16A, AF460A, AF461A, AF462A, AF463A, AF429A, AF430A.
15-Apr-2019	Version 19	Changed	Overview, Standard Features, Service and Support, Configure-to-Order - Factory Integrated Models, and Power Supply Specifications sections were updated. SKUs added: 876929-B21, Q2E55A, Q2E56A, Q2E57A, Q2E58AA, 876529-B21, P08477-B21, 876449-B21, 777456-B21, 870828-B21. SKUs deleted: 779227-B21, 777430-B21, 804098-B21, P9K16A, P9K18A, P9K57A, P9K60A, AF520A, AF525A, AF521A, AF531A, AF534A, AF431A, AF432A, AF611A, AF618A, AF619A.
03-Dec-2018	Version 18	Changed	Configure to Order - Factory Integrated Models section was updated. SKUs added: 868779-B21, 845972-B21, R1C66A, 804923-B21, 845970-B21. SKUs were deleted: 813570-001, K2Q86A, 845412-B21.
05-Nov-2018	Version 17	Changed	Standard Features, Service and Support, and Configure-to-order - Factory Integrated Models sections were updated. Obsolete SKUs were deleted: K2Q86A, 845412-B21.
01-Oct-2018	Version 16	Changed	Updates applied to document.
04-Sep-2018	Version 15	Changed	Recommended/Extended updates were applied. SKUs added in Configure to Order – Factory Integrated Models
06-Aug-2018	Version 14	Changed	Service and Support, Platform Information, and Configure-to-order - Factory Integrated Models were updated. SKUs added: 845970-B21, 807967-001, 813561-001. Obsolete SKUs were deleted: TK744A, TK745A, TK739A, TK740A, TK741A, TK742A, TK743A, E7804A, E7805A, AF592A, 359615-031, AF577A, AF579A, AF580A, AF581A, AF582A, AF583A, 807967-B21, 813561-B21, C0L99A, AF653A, P9Q40A, P9Q41A, P9Q44A, P9Q45A, P9Q52A, P9Q53A, P9Q54A, P9Q55A, P9Q56A, P9Q57A, P9Q58A, P9Q59A, P9Q60A, P9Q61A, P9Q62A, P9Q63A, P9Q64A, P9Q65A, P9R58A, P9R59A, P9R60A, P9R61A, P9R79A, P9R80A, P9R82A, P9R83A, P9R86A, P9R81A, P9R87A, P9R84A, P9R85A, P9S20A, P9S21A, P9S22A, P9S23A, P9S24A, P9S25A, AF522A, AF526A, AF533A, AF523A, AF901A, AF527A, AF535A, AF538A, AF532A, P9Q66A, AF547A, AF528A.

Summary of Changes

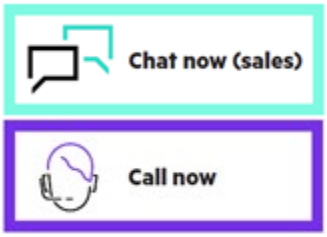
Date	Version History	Action	Description of Change
07-May-2018	Version 13	Changed	Standard Features, Models, Configure-to-Order – Factory Integrated Models, and Related Options sections were updated. Obsolete SKUs were deleted: 797738-B21, 797739-B21, 798349-B21, 798102-B21, 798100-B21, 804942-B22, 861414-B21, 755984-B21, 804095-B21, 804107-B21, 755984-B21, P9B76A.
04-Dec-2017	Version 12	Changed	Overview, Standard Features, and Related Options sections were updated. SKU added in Relate Options section: 871749-B21. SKUs deleted in Related Options section: 872033-B21, 872036-B21, 872034-B21.OBS SKUs deleted: 779224-B21.
25-Sep-2017	Version 11	Changed	Related Options section was updated. SKUs added in Related Options section: 779224-B21, 866573-B21, 794502-B23, 845410-B21, 845412-B21, 845414-B21, P9K09A, P9K10A, P9K15A, P9K16A, P9K18A, P9K39A, P9K40A, P9K45A, P9K46A, P9K48A, P9K51A, P9K52A, P9K57A, P9K58A, P9K60A, P9Q39A, P9Q40A, P9Q41A, P9Q42A, P9Q43A, P9Q44A, P9Q45A, P9Q46A, P9Q47A, P9Q48A, P9Q49A, P9Q50A, P9Q51A, P9Q52A, P9Q53A, P9Q54A, P9Q55A, P9Q56A, P9Q57A, P9Q58A, P9Q59A, P9Q60A, P9Q61A, P9Q62A, P9Q63A, P9Q64A, P9Q65A, P9R51A, P9R52A, P9R53A, P9R54A, P9R55A, P9R56A, P9R57A, P9R77A, P9R58A, P9R59A, P9R78A, P9R60A, P9R61A, P9R79A, P9R80A, P9R82A, P9R83A, P9R86A, P9R81A, P9R87A, P9R84A, P9R85A, P9S13A, P9S14A, P9S16A, P9S17A, P9S15A, P9S18A, P9S19A, P9S20A, P9S21A, P9S22A, P9S23A, P9S24A, P9S25A, P9Q66A, P9Q67A, P9Q68A, AF547A, AF528A, Q0R19A, Q0P71A, Q0P72A, Q0P73A, Q0R15A, Q0R16A, Q0R17A, Q0R18A, 813562-001. SKUs removed from Related Options section: H5M59A, H5M60A, H5M75A, H5M71A, 252663-D71, 252663-B24, 252663-D72, 252663-B33, 252663-B21, 252663-D75, 252663-D73, H5M62A, H5M64A, H5M72A, H5M73A, H5M67A, AF512A, AF513A, AF519A, AF511A, AF518A, D9N47A, D9N48A, D9N50A, D9N49A, D9N53A, D9N55A, D9N57A, D9N58A, D9N62A, D9N61A, D9N54A, D9N59A, G9Z07A, D9N60A, G9Z08A, D9N56A, H8B50A, H8B51A, H8B52A, H8B53A, H8B54A, H8B55A, H8B56A, 813570-001.
07-Aug-2017	Version 10	Changed	Overview, Service and Support, Related Options, and Power Supply Specifications sections were updated. SKUs were added in Related Options section: 798102-B21, 798101-B21, 798100-B21, 798099-B21, 872033-B21, 872036-B21, 872034-B21, 872035-B21, AF592A, 359615-031, AF576A, AF577A, AF579A, AF580A, AF581A, AF582A, AF583A, AF584A, P9B75A, P9B76A, P9B77A, U8JM3E , U8JM4E. SKUs removed from Related Options sections: U8JM3E, U8JM4E, H5M70A, 252663-D74.
11-Jul-2017	Version 9	Changed	Overview, Standard Features, Service and Support, Platform Information, and Related Options sections were updated SKUs added in Platform Information and Related Options sections: 797740-B22, 804942-B21, 804942-B22, 794502-B23, 779224-B21, 779215-B21, 866573-B21, 779215-B22, 779218-B22, 799330-B22, 867322-B21, 777452-B21, 777454-B21, 817040-B21, Obsolete SKUs were deleted: 779224-B21

Summary of Changes

Date	Version History	Action	Description of Change
05-Jun-2017	Version 8	Changed	Service and Support, Related Options, Power Supply Specifications, and Technical Specifications sections were updated. SKUs added in Related Options section: 798349-B21, 798342-B21, AF575A, J6W98A, J6W99A, J6X00A, J6X01A, J6X02A, J6X03A. Obsolete SKUs were deleted in Related Options section: 794502-B21, AF900A, AF537A, H0VL6E, H0VL9E.
13-Jan-2017	Version 7	Changed	Service and Support, All Synergy Frame Models, and Related Options sections were updated.
26-Sep-2016	Version 6	Changed	QuickSpecs sections were updated. SKU added in Related Options: 838327-B21
29-Jul-2016	Version 5	Changed	QuickSpecs deleted. SKU deleted: 777434-B21
06-Jun-2016	Version 4	Changed	Related Options section was updated. SKUs added in Related Options section: 799330-B21 Obsolete SKUs were deleted: 804937-B21, 779224-B21, AF902A, AG072A, AG073A, AG084A, AG086A.
15-Apr-2016	Version 3	Changed	Format changes all over document to solve HTML/PB issues.
31-Mar-2016	Version 2	Changed	Overview and Related Options sections were updated. SKUs added to QuickSpecs: 797740-B21, 797738-B21, 797739-B21, 798096-B21, 798095-B21, 804353-B21, 804937-B21, 804942-B21, 861412-B21, 861413-B21, 861414-B21, 794502-B21, 779215-B21, 779218-B21, 835386-B21, 755984-B21, 757323-B21, 755985-B21, 759557-B21, K2Q83A, K2Q84A, K2Q86A, D4U69A, D4U69AAE, 779227-B21, 777430-B21, 777434-B21, 777452-B21, 777454-B21, 794538-B21, 817040-B21, K2Q87A, 804095-B21, 804098-B21, 804155-B21, 804101-B21, 804104-B21, 804107-B21, 804110-B21, 835386-B21, H6J67A, H6J68A, H6J69A, H6J70A, BW899A, BW900A, BW907A, BW908A, BW910A, BW966A, BW919A, BW920A, BW968A, TK756A, TK766A, TK760A, TK772A, BW913A, BW914A, BW936A, H5M59A, H5M60A, H5M70A, H5M75A, H5M71A, 252663-D71, 252663-B24, 252663-D74, 252663-D72, 252663-B31, 252663-B33, 252663-B21, 252663-D75, 252663-D73, H5M62A, H5M64A, H5M72A, H5M73A, H5M67A, AF512A, AF513A, AF519A, AF511A, AF518A, D9N47A, D9N48A, D9N50A, D9N49A, D9N53A, D9N51A, D9N55A, D9N57A, D9N58A, D9N62A, D9N61A, D9N54A, D9N59A, G9Z07A, D9N60A, G9Z08A, D9N56A, H8B50A, H8B51A, H8B52A, H8B53A, H8B54A, H8B55A, H8B56A, AF520A, AF525A, AF521A, AF531A, AF534A, AF522A, AF526A, AF900A, AF533A, AF523A, AF902A, AF901A, AF527A, AF535A, AF537A, AF538A, AF532A, AF460A, AF461A, AF462A, AF463A, AF431A, AF432A, AF429A, AF430A, G9Y75A, AF479A, TK744A, TK745A, TK738A, TK739A, TK740A, TK741A, TK742A, TK743A, AF575A, AF574A, 295633-B22, E7804A, E7805A, AF593A, AF592A, 359615-031, AF576A, AF577A, AF579A, AF580A, AF581A, AF582A, AF583A, AF584A, 807967-B21, 813561-B21, 417894-B21, 813570-001, 813569-001, 813567-001, 813563-001, 813568-001, 813560-001, 813564-001, C0L99A, EH969A, EH970A, AG072A, AG073A, AG084A, AG086A, 631341-B21, 631344-B21, 631346-B21, 631348-B21, 631358-B21, 631360-B21, 631362-B21, 631364-B21, 638212-B21, 638214-B21, AF629A, AF630A, AF631A, AF632A, AF633A, AF642A, AF643A, AF644A, AF645A, G7T29A, AF611A, AF651A, AF652A, AF653A, AF618A, AF619A, AF620A, AF621A, AF622A, H0VL5E, H0VL6E, H0VL8E, H0VL9E, HA454A1-300, HA454A1-301, U8JM3E, U8JM4E.
1-Dec-2015	Version 1	Created	New QuickSpecs

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