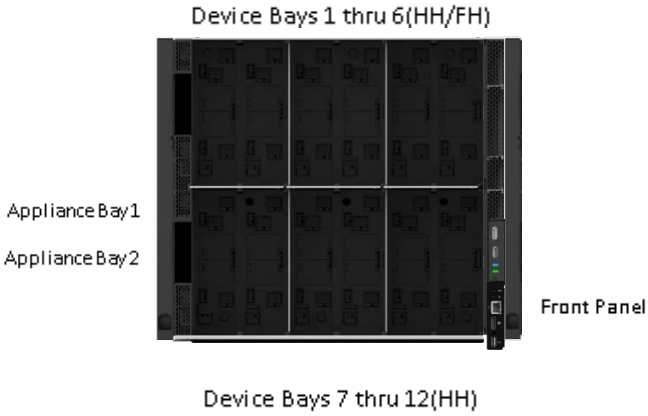
Overview

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

NOTE: See Device Bay Population Guidelines in section below

HPE Synergy 12000 Frame - Rear View

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

What's New

The HPE Synergy 12000 Frame is a key element of HPE Synergy providing the base for an intelligent infrastructure with embedded management and scalable links for expansion as business demand requires. The Frame is the base infrastructure that pools resources of compute, storage, fabric, cooling, power and scalability. With an embedded management solution combining the Synergy Composer and Frame Link Modules, IT can manage, assemble and scale resources on demand. The Synergy Frame is designed for the needs now and in the future with expanded compute and fabric bandwidths and photonics ready.

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 the New Style of Business infrastructure, the HPE Synergy eliminates hardware and operational complexity so IT can deliver infrastructure to applications faster and with greater precision and flexibility.

NOTE: 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 which includes 10 Fans and a single Frame Link Module. 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, additional 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 included with every system
- Two appliance bays for redundant management appliances, embedded OneView (additional solution options in future)
- Up to six 2650 Watt Power Supplies of Titanium class efficiency providing 7950 Watts of redundant power line support
- Up to 6 Interconnect bays for full redundancy of 3 fabrics.
- 2 slots for Frame Link Modules, offers 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 Composer, is a management appliance with 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. Ideal for on demand composability.
- Manages all frame resources through OneView profiles and templates.
- Auto-Discovery of Compute, Memory, Storage and Fabrics within a Frame or multiple connected frames.
- Activity, Health and Power LEDs for immediate status.

NOTE: the USB port is for Hewlett Packard Enterprise Certified Service Parties Only.

HPE Synergy Image Streamer is a management appliance that provides fast image/application changes to compute resources to meet your composable infrastructure needs. It integrates software-defined intelligence from embedded HPE Synergy Composer to deploy and update physical compute nodes with operating environments at extreme speed for fast virtualized image changeovers, secure boot, and compliance. A single point of management for single or scaled frames. Ideal for on demand composability.

- Provisions boot/run storage volumes and deploys OS.
- Personalizes OS per deployment plan.
- Generates iSCSI target for the boot/run volume.

Standard Features

HPE Synergy Frame Link Module (FLM), is the frame resource information control point and link to multiple frames.

- Integrated direct access to a single or multiple Frames through a HPE Synergy Composer – OneView
- A dedicated 10GbE air-gapped management network for multi-frame communications
- Immediate status and health details through OneView
- Reports asset and inventory information for the devices in the frame
- Robust, multi-Frame setup and control via HPE Synergy Composer(OneView)
- Reports thermal and power information, including real-time actual power usage per server and per frame.
- First FLM included in every Synergy Frame. Add a second option for redundancy and links to multi-Frame connectivity.
- Provides HPE Synergy Console interface on Front Panel and each Frame Link Module

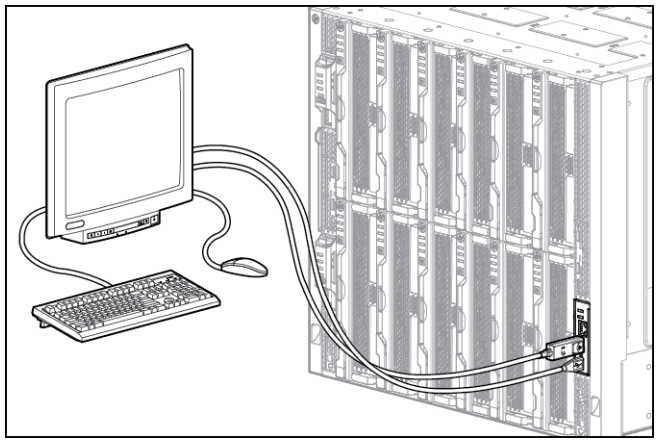
NOTE: See Step 3 for details on the Frame Link Module and cable options.

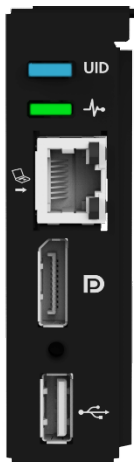
HPE Synergy Console, is the frame resource information control point. Connect here for Technician setup and installation and to login to OneView and/or manage one or more frames.

- Front access to Synergy Console is provided by the **Front Panel** DisplayPort v1.2 and USB 2.0 connectors
- Rear access to Synergy Console is provided on each **Frame Link Module**
- Laptop connect to Synergy Console from Front Panel(RJ45 port) via browsers (future feature)

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 DisplayPort™ requires a monitor that supports DisplayPort™ or an active DisplayPort adaptor for interfacing to VGA, HDMI or DVI monitors. External USB hub required for keyboard and mouse if monitor does not include a hub.

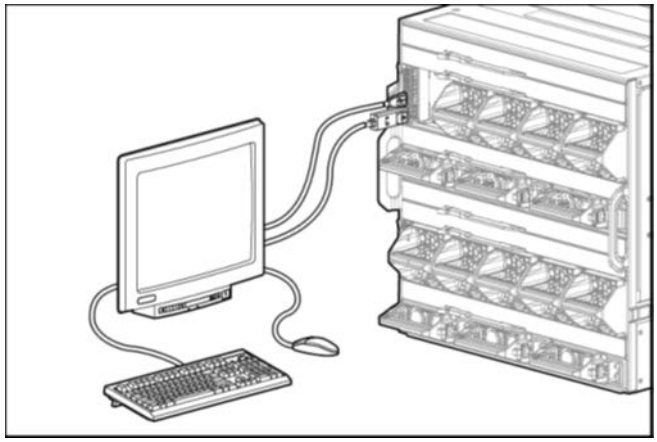
Console Connect to the Front Panel





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 Care Pack 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, 1 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: 1 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: **www. hp.com/synergy**

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.

NOTE: For the complete list of installation requirements, please see the "HPE Synergy Site Planning Guide" at http://www.hp.com/support.

Third-party racks

NOTE: 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.**

Standard Features

- **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: 635 mm (25 in)**
  - **Maximum rail length: 864 mm (34 in)**

NOTE: 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.

NOTE: For the complete list of installation requirements, please see the "HPE Synergy Frame Site Planning Guide" at http://www.hp.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: **http://www.hp.com/go/factory-express.**
Service Pack for Synergy (SPP)	Customers should use the Hewlett Packard Enterprise Service Pack for Synergy (SPP) to perform firmware, driver, and related software updates. • SPP main webpage: **http://www.hp.com/go/spp** • SPP downloads webpage: **http://www.hp.com/go/spp/download**
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: **http://www.HPE.com/go/HPEpoweradvisor**.
Warranty	This product 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

Standard Features

available for an additional fee. Enhancements to warranty services are available through HPE Care Pack services or customized service agreements.

- Frame: Three-year parts and labor, on-site limited global warranty. Certain restrictions and exclusions apply
- Frame options: Fans, power supplies, 1 year parts only or Frame warranty
- HPE Synergy Interconnects: 1 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 QuickSpecs for details.

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 Foundation 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 Proactive 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, automate, 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.

HPE Datacenter Care-Infrastructure Automation (DC-IA) is an extension to HPE Datacenter Care and delivers enterprise-grade support, advice, guidance and best practices for infrastructure automation. The service also includes Enterprise editions of automation tools including Enterprise Chef and selected others. The DC-IA Center of Excellence (CoE) is staffed with highly trained experts who have specific expertise on integrating Chef with HPE OneView.

Service and Support

Choose the right support to maximize uptime, free up your resources, and achieve improved value—as you get the most out of the existing IT assets while accelerating time-to-revenue.

Optimized Support	**HPE Proactive Care Advanced - 24x7 coverage, three year Support Service** Builds and incorporates on Proactive Care and also gives customers personalized technical and operational advice from an assigned, local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help optimize business critical IT, and Critical Incident Management to help so the business is not affected if there is a system or device outage. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues. **http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA5-3259ENW.pdf**
Standard Support	**HPE Proactive Care with 24x7 coverage, three year Support Service** Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center specialists for start to finish case management plus proactive reports and recommendations for firmware and software management and best practice advice. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues. **http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf**
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.
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.
Parts and Materials	Hewlett Packard Enterprise will provide Hewlett Packard Enterprise-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	Additional Support Services can be found at HPE Support Services Central **http://ssc.hp.com**

All Synergy Frame Models

HPE Synergy 12000 Frame Options

NOTE: Hewlett Packard Enterprise does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.

NOTE: If you desire a custom configuration, please see the "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

NOTE: 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 with 1x Frame Link Module 10x Fans
NOTE: This Synergy 12000 CTO Frame 797740-B21 includes 1 Frame Link Module, 10 hot-plug Fans, with KVM ports built-in, and the following blanking based on the configuration of the Frame.

Built To Order

HPE Synergy 12000 Frame with 1x Frame Link Module 2x Power Supplies 10 Fans
This Frame is configured to operate as an entry model for the customer that needs only a single Frame and does not intend to scale and link multiple Frames.
NOTE: This Synergy 12000 Frame 797738-B21 includes 1 Frame Link Module, 2 2650W Hot Plug Titanium Power Supplies each with a worldwide 250W C19 - C20 2.0m jumper cord, 10 hot-plug Fans, with KVM ports built-in, and the blanks based on this configuration of the Frame.
NOTE: An HPE Synergy Composer(see Appliance Section below) is REQUIRED to manage this single Frame. A second Synergy Composer would offer redundancy for your management system.
NOTE: See Step 3 for Frame Link Topology

HPE Synergy 12000 Frame with 2x Frame Link Module 6x Power Supplies 10 Fans
This Frame is configured to operate as a scalable model for the customer that is looking to purchase multiple Frames that will be linked together in a single management domain. Cables for linking Frames are provided in this spec.
NOTE: This Synergy 12000 Frame 797738-B21 includes 1 Frame Link Module, 2 2650W Hot Plug Titanium Power Supplies each with a worldwide 250W C19 - C20 2.0m jumper cord, 10 hot-plug Fans, with KVM ports built-in, and the blanks based on this configuration of the Frame.
NOTE: A pair HPE Synergy Composers (see Appliance Section below) is REQUIRED to manage any domain of multiple Frames to sustain management redundancy. The two Synergy Composers may be placed in any Appliance bay within the linked Frames domain and will manage the Domain.
NOTE: See Step 3 for Frame Link Topology

Related Options

NOTE: 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.
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)

NOTE: 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.
NOTE: 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.

NOTE: For Synergy Compute Module information, please visit: **http://www.HPE.com/synergy**

Select the base Frame configuration (required)

HPE Synergy Frame

NOTE: The Frame listed below includes a single Frame Link Module and 10 Fans. KVM connect for Synergy Console and Synergy Composer/OneView access is on the Front Panel of the Frame. Additional management appliances and frame linking modules, power supply kits, power cables, interconnects, additional fans, etc. are added per the steps below.
NOTE: The Frame 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 with 1x Frame Link Module 10x Fans

Select the Frame power options (required)

HPE Synergy Power Supplies

Synergy Power Supply (Up to 6)

NOTE: 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 System configuration and to review maximum system power ratings for facilities planning purposes. HPE Power Advisor is available at: **http://www.hp.com/go/hppoweradvisor**.
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.
NOTE: 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. OneView will exhibit a mismatch or not available error due to mixed power supplies until all power supplies are matched.
NOTE: 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 publically posts the results on **http://80plus.org/**. DC power supplies are not eligible for 80 PLUS testing; efficiency is per Hewlett Packard Enterprise internal testing.

HPE 6X 2650W AC Titanium Hot Plug FIO Power Supply Kit
NOTE: This option is for factory install only.

Related Options

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

HPE 2650W AC Titanium Hot Plug Power Supply Kit
NOTE: This option contains Intelligent Auto-Discovery features for HPE OneView as well as, enables HPE Power Discovery Services.
NOTE: HPE Synergy Power supplies meet multiple Energy Efficiency Initiatives: 2650W, 96%: Climate Savers Computing Initiative Titanium and ECOS Consulting 80 Plus Titanium.
NOTE: Mixing of Power Supplies Is Not Supported on Synergy 12000 Frames, except during hot swaps to different level power supplies. OneView will exhibit a mismatch error due to mixed power supplies until all power supplies are matched and performance issues may arise.

Step 2: Select Management Appliance options

HPE Synergy Frame Management Appliance Options

HPE Synergy Composer

HPE Synergy Composer provides enterprise-level management to deploy the exact resources to your application needs. Its software-defined intelligence uses embedded HPE OneView to aggregate Compute, Storage, Fabric resources in a manner that scales linearly to your application needs, instead of being restricted to the fixed ratios of traditional resource offerings.
HPE Synergy Composer is a management appliance that directly integrates into the Frame of the system and communicates directly with the Frame Link Module. A single Synergy Composer manages one or more Frames linked through the Frame Link Modules. The Synergy Composer option selected determines the number of Frames linked and managed. Use of two HPE Synergy Composer modules is recommended for redundancy and high availability.
NOTE: Required for the first HPE Synergy Frame system.
NOTE: HIGHLY RECOMMENDED that a second HPE Synergy Composer appliance module be added for high availability or redundancy.
NOTE: No direct license is required. Supports any HPE Synergy Compute module and other installed module options.

HPE Synergy Image Streamer (single unit)
HPE Synergy Image Streamer is a management appliance that provides fast image/workload changes to compute resources to meet your Composable Infrastructure needs. It integrates software-defined intelligence from embedded HPE Synergy Composer to deploy and update physical compute nodes with operating environments at extreme speed for fast virtualized image changeovers, secure boot, and image compliance.
NOTE: HPE Synergy Image Streamer units are always implemented as redundant pairs.
NOTE: No direct license is required. Supports any HPE Synergy Compute module and other installed module options.
NOTE: HPE Synergy Image Streamer requires a minimum of three (3) Synergy Frames with redundant Synergy Composers for operation and must be implemented

Related Options

as redundant pairs. This minimal system requires four (4) cables, two (2) transceivers and one (1) Interconnect Module for complete operation. See below:

Synergy 40Gb F8 Switch Module (2 redundant modules per solution)

HPE VC SE 40Gb F8 Module (2 redundant modules per solution)

HPE Dual 10GBASE-T QSFP+ 30m RJ45 Transceiver

NOTE: 2 transceivers required for redundant connection to above selected ICMs)

10 Ft CAT6A Cable (CBL: CAT6A, GRAY 10 FT 2159610-6 MP-6ARJ45SLGY-010)

NOTE: 4 of these cables are required for the Synergy Image Streamer connection from the Frame Link Modules (MGMT port) to the Transceiver plugged into the HPE Interconnect Module (ICM).

Step 3: Select optional Redundant Synergy Frame Link Modules

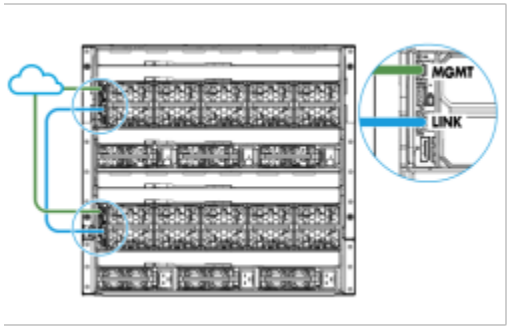
HPE Synergy Frame Link Module 804942-B21

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 (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 OneView along with their resources (compute, storage, networking, and other options) the instant they are plugged in and/or powered on.

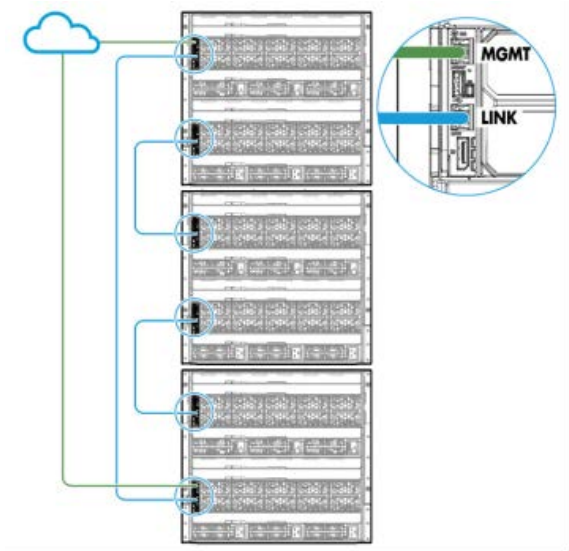
NOTE: Every Synergy 12000 Frame comes with a single Frame Link Module. For redundancy and linking multiple frames it is REQUIRED that a second Frame Link Module be purchased for each additional Frame connected/linked.

NOTE: The Frame Link Module comes with 10 Gb/s private Ethernet networking solution included and requires a CAT6A or CAT7 cabling between Frames for connection to multiple Frames or forming a Management ring between multiple Frames. Multiple CAT6A cables are offered through Hewlett Packard Enterprise below Use 1 meter cables within a frame or between frames and a 3 meter cable to go from a bottom frame in a rack to the top frame or frame in another rack or from the management connector to the management network.

See Frame Link Topology below.



Single Frame
MGMT Port and
LINK Port Topology



Multiple Frame
MGMT Port and
LINK Port Topology

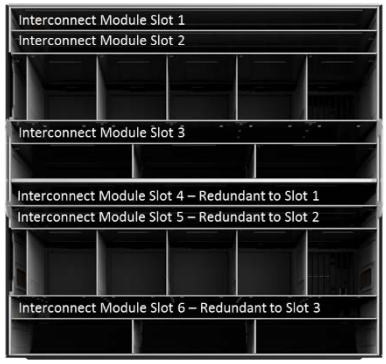
Related Options

HPE Frame Link Topology Cables	HPE FLM 2 foot CAT6A cable **NOTE: For linking consecutive Frames** HPE FLM 10 foot CAT6A gray cable **NOTE: For linking bottom Frames to top Frames in a rack.** HPE FLM 21 foot CAT6A gray cable **NOTE: For linking Management links requiring long runs to Top of Rack or between Racks.**

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.

NOTE: 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.

NOTE: 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.

NOTE: For HPE Best Practices placement see notes with each ICM and place the associated mezzanines in the Compute slots associated with the ICM slots.

NOTE: The HPE Synergy interconnects ship as single units unless otherwise noted. Interconnects must be ordered in quantities of two for redundancy support.

NOTE: 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 40GB F8 Module for HPE Synergy HPE Synergy 40Gb F8 Switch Module HPE Synergy 10Gb Interconnect Link Module HPE Synergy 20Gb Interconnect Link Module HPE Synergy 10/40Gb Pass Thru Module

HPE Storage and SAS Switch	**NOTE: The HPE Synergy Storage Module and 12Gb SAS connection modules are supported on all Synergy 12000 Frame(s).** HPE Synergy D3940 12Gb SAS CTO Enclosure with 40 SFF (2.5in) Drive Bays **NOTE: The HPE Synergy Storage Module requires at least one and a maximum of two 12Gb SAS Connection Modules per frame.** HPE Synergy D3940 12Gb SAS Drive Enclosure with 40 SFF(2.5in) Drive Bays **NOTE: The HPE Synergy Storage Module requires at least one and a maximum of two 12Gb SAS Connection Modules per frame.**

Related Options

	12Gb SAS Connection Modules per frame. HPE Synergy D3940 Redundant I/O Adapter 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 **NOTE: 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 Smart Array P542D Controller **NOTE: Each compute module connecting to a Synergy D3940 storage module must be configured with a Smart Array P542D controller in mezzanine slot 1.**
HPE Synergy SAN Interconnects	**NOTE: HPE Fibre Channel interconnect switches and modules supporting up to an 16Gbps internal port downlink speed (connection speed from the compute modules to the interconnect) (SKUs 779227-B21, K2Q83A, K2Q84A, K2Q86A) are supported on all HPE Synergy 12000 Frames.** **NOTE: For a list of complete 16Gb FC SAN Switch Module SAN management software, hardware, cables and transceiver options for HPE Synergy, please refer to the Brocade 16Gb FC Switch Module QuickSpecs for HPE Synergy at:** **NOTE: Brocade 16Gb FC Switch Module 12-port Upgrade can be used on any FC switch module option, scalable up to 36 FC ports.** Brocade 16Gb/12 Fibre Channel SAN Switch Module for HPE Synergy Brocade 16Gb/24 Fibre Channel SAN Switch Module for HPE Synergy Brocade 16Gb/24 PowerPack+ Fibre Channel SAN Switch Module for HPE Synergy Brocade 16Gb Fibre Channel SAN Switch Module 12-port Upgrade LTU for HPE Synergy Brocade 16Gb Fibre Channel SAN Switch Module 12-port Upgrade E-LTU for HPE Synergy HPE Virtual Connect SE 16Gb FC Module for HPE Synergy
HPE Synergy Converged Network Adaptors	HPE Synergy 3820C 10/20Gb Converged Network Adapter HPE Synergy 3520C 10/20Gb Converged Network Adapter HPE Synergy 3830C 16Gb Fibre Channel Host Bus Adapter HPE Synergy 3530C 16Gb Fibre Channel Host Bus Adapter HPE Synergy 2820C 10Gb Converged Network Adapter
HPE Synergy Transceivers and Cable options	HPE 4x8Gb FC /4x10GbE/FCoE QSFP+ Transceiver HPE B-series 4x16 Short Wave QSFP Transceiver HPE Synergy Interconnect Link 1.1m Direct Attach Copper Cable HPE Synergy Interconnect Link 1.6m Direct Attach Copper Cable HPE Synergy Interconnect Link 2.1m Direct Attach Copper Cable HPE Synergy Interconnect Link 3m Active Optical Cable HPE Synergy Interconnect Link 5m Active Optical Cable HPE Synergy Interconnect Link 10m Active Optical Cable HPE Synergy Interconnect Link 15m Active Optical Cable

Related Options

HPE Best Practices ICM Slot Priority Placement

- Best practice is to have main Ethernet/Converged fabric in Fabric 3 (ICM bays 3 and 6)
- Best practice is to have storage fabric in Fabric 1 (ICM bays 1 and 4)
- Best practice is to have Fabric 2 (ICM bays 2 and 5) used for 2nd Ethernet fabric or 2nd storage fabric if there are two of either of those
- SAS storage ICM takes precedence over FC ICMs for Fabric 1
- Best practice is to populate both respective ICM bays for each fabric in support of module redundancy
- 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 Master or Satellite modules depending on the intended multi-frame configuration.

		ICM Slot Numbers(top to bottom of Frame)						
Part#	Option	1	2	3	4	5	6	Fabric Type
		Slot Priorities for each Options						
	HPE Synergy 40Gb F8 Switch Module	3	5	1	4	6	2	Ethernet
	HPE Virtual Connect SE 40Gb F8 Module for HPE Synergy	3	5	1	4	6	2	Ethernet
	HPE Synergy 10/40Gb Pass Thru Module	3	5	1	4	6	2	Ethernet
	HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports	1			2			SAS
	HPE Synergy 20Gb Interconnect Link Module	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Ethernet
	HPE Synergy 10Gb Interconnect Link Module	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Ethernet
	Brocade 16Gb/12 Fibre Channel SAN Switch Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel
	Brocade 16Gb/24 Fibre Channel SAN Switch Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel
	HPE Virtual Connect SE 16Gb FC Module for HPE Synergy	1	3	5	2	4	6	Fibre Channel

Step 5: HPE Synergy Storage Module(Optional)

HPE Synergy Storage Modules

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

HPE Synergy D3940 12Gb SAS CTO Enclosure with 40 SFF(2.5in) Drive Bays
NOTE: The HPE Synergy Storage Module requires at least one and a maximum of two 12Gb SAS Connection Modules per frame.

HPE Synergy D3940 12Gb SAS Drive Enclosure with 40 SFF(2.5in) Drive Bays
NOTE: 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
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
NOTE: 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 Smart Array P542D Controller
NOTE: Each compute module connecting to a Synergy D3940 storage module must be configured with a Smart Array P542D controller in mezzanine slot 1.

Step 6: Select your Rack (optional)

Related Options

HPE Data Center Racks

NOTE: 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 **http://www.hp.com/go/rackandpower**.

HPE Advanced Series Racks

HPE 42U 600mm x 1200mm Advanced Pallet Rack

HPE 42U 600mm x 1200mm Advanced Shock Rack

HPE 42U 800mm x 1200mm Advanced Pallet Rack

HPE 42U 800mm x 1200mm Advanced Shock Rack

HPE Enterprise Series Racks

HPE 36U 600mm x 1200mm Enterprise Pallet Rack

HPE 36U 600mm x 1200mm Enterprise Shock Rack

HPE 42U 600mm x 1200mm Enterprise Pallet Rack

HPE 42U 600mm x 1200mm Enterprise Shock Rack

HPE 42U 600mm x 1200mm Enterprise Air Duct Rack

HPE 42U 600mm x 1200mm Enterprise Shock Network Rack

HPE 42U 800mm x 1200mm Enterprise Pallet Rack

HPE 42U 800mm x 1200mm Enterprise Shock Rack

HPE 42U 800mm x 1200mm Enterprise Shock Network Rack

HPE 42U 600mm x 1200mm Grey Enterprise Shock Rack

HPE 42U 600mm x 1200mm Grey Enterprise Air Duct Rack

HPE 42U 800mm x 1200mm Grey Enterprise Shock Rack

HPE 42U 800mm x 1200mm Grey Enterprise Shock Network Rack

HPE 47U 600mm x 1200mm Enterprise Pallet Rack

HPE 47U 600mm x 1200mm Enterprise Shock Rack

NOTE: 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.

NOTE: 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)

NOTE: A pair of PDUs must be ordered for AC feed redundancy.

NOTE: Additional HPE Power Distribution Units (PDUs) are available than those listed below. For a complete list of all Hewlett Packard Enterprise PDUs, please visit: **http://www.hp.com/go/rackandpower**.

HPE Power Distribution Units (PDUs)

HPE Basic 1 Phase Power Distribution Units

HPE 4.9kVA 208 Volt L6-30 Input (24xC13/6xC19) NA/JP Basic PDU

HPE 8.3kVA 208 Volt CS8265C Input (30xC13/6xC19) NA/JP Basic PDU

HPE 7.3kVA 230 Volt IEC309 32A Input (24xC13/6xC19) INTL Basic PDU

Related Options

HPE Hardwired 200-240 Volt Input (30xC13/6xC19) WW Basic PDU

HPE 11kVA 230 Volt IEC309 63A Input (30xC13/6xC19) INTL Basic PDU

HPE 2.8kVA 24A Low Voltage NA/JP Modular Power Distribution Unit*

HPE 3.6kVA 16A High Voltage Power Distribution Unit*

HPE 4.9kVA 24A High Voltage NA/JP Core Modular Power Distribution Unit

HPE 4.9kVA 24A High Voltage NA/JP Power Distribution Unit*

HPE 7.3kVA 32A High Voltage INTL Power Distribution Unit*

HPE 7.3kVA 32A High Voltage INTL Core Modular Power Distribution Unit

HPE 8.3kVA 40A High Voltage WW Power Distribution Unit*

HPE 8.3kVA 40A High Voltage NA/JP Core Modular Power Distribution Unit

HPE 8.3kVA 40A High Voltage NA/JP Power Distribution Unit*

NOTE: Where indicated with an asterisk (*), model includes both core power distribution unit and either 2 or 4 7-outlet extension bars with C-13 outlets.

Basic Power Distribution Units – Three Phase

HPE 8.6kVA 208 Volt L15-30 3-Phase Input (24xC13/6xC19) NA/JP Basic PDU

HPE 8.6kVA 208 Volt L21-30 3-Phase Input (24xC13/3xC19/3xNEMA 5-20R) NA/JP Basic

HPE 11kVA 400 Volt IEC309 16A 3-Phase Input (30xC13/6xC19) INTL Basic PDU

HPE 11kVA 400 Volt IEC309 16A 3-Phase Input (36xC13/6xC19) INTL Basic PDU

HPE 11kVA 400 Volt IEC309 30A 3-Phase Input (36xC13/6xC19) NA Basic PDU

HPE 8.6kVA 24A Three Phase NA/JP Modular Power Distribution Unit

HPE 11kVA 16A Three Phase INTL Modular Power Distribution Unit

HPE 14.4kVA 40A Three Phase NA/JP Modular Power Distribution Unit

HPE 17.3kVA 48A Three Phase NA/JP Modular Power Distribution Unit

HPE 22kVA 32A Three Phase INTL Core Modular Power Distribution Unit

Monitored Power Distribution Units – Single Phase

HPE 4.9kVA 208 Volt L6-30 Input (20xC13/4xC19) NA/JP Monitored PDU

HPE 7.3kVA 230 Volt IEC309 32A Input (20xC13/4xC19) INTL Monitored PDU

HPE 7.3kVA 230 Volt IEC309 32A Input (32xC13/4xC19) INTL Monitored PDU

HPE 8.3kVA 208 Volt CS8265C Input (30xC13/3xC19) NA Monitored PDU

Monitored Power Distribution Units – Three Phase

HPE 8.6kVA 208 Volt L21-30 3-Phase Input (20xC13/3xC19/3xNEMA 5-20R) NA/JP Monitored PDU

HPE 8.6kVA 208 Volt L15-30 3-Phase Input (18xC13/3xC19) NA/JP Monitored PDU

HPE 11kVA 400 Volt IEC309 16A 3-Phase Input (18xC13/3xC19) INTL Monitored PDU

HPE 11kVA 400 Volt IEC309 16A 3-Phase Input (30xC13/3xC19) INTL Monitored PDU

HPE 14.4kVA 208 Volt CS8365C 3-Phase Input (12xC13/12xC19)NA Monitored PDU

HPE 16.6kVA 400 Volt IEC309 30A 3-Phase Input (12xC13/12xC19) NA Monitored PDU

HPE 16.6kVA 400 Volt IEC309 30A 3-Phase Input (30xC13/3xC19) NA Monitored PDU

HPE 17.3kVA 208 Volt IEC309 60A 3-Phase Input (24xC13/3xC19) NA/JP Monitored PDU

HPE 17.3kVA 208 Volt IEC309 60A 3-Phase Input (12xC13/12xC19) NA/JP Monitored PDU

HPE 17.3kVA 208 Volt IEC309 60A 3-Phase Watertight Input (12xC13/12xC19) NA/JP Monitored PDU

Related Options

HPE 22kVA 400 Volt IEC309 32A 3-Phase Input (12xC13/12xC19) INTL Monitored PDU

HPE 22kVA 400 Volt IEC309 32A 3-Phase Watertight Input (12xC13/12xC19) INTL Monitored

HPE 22kVA 400 Volt IEC309 32A 3-Phase Input (30xC13/3xC19) INTL Monitored PDU

Managed Power Distribution Units – Single Phase

HPE 4.9kVA 208 Volt L6-30 Input (20xC13/4xC19) NA/JP Managed PDU

HPE 7.3kVA 200-240 Volt IEC309 32A Input (20xC13/4xC19) INTL Managed PDU

Managed Power Distribution Units – Three Phase

HPE 8.6kVA 208 Volt L15-30 3 Phase Input (18xC13/6xC19) NA/JP Managed PDU

HPE 8.6kVA 208 Volt L21-30 3 Phase Input (20xC13/3xC19/1x NEMA 5-20) NA/JP Managed

HPE 11kVA 400 Volt IEC309 16A 3 Phase Input (21xC13/3xC19) INTL Managed PDU

HPE 14.4kVA 208V CS8365C 3 Phase Input (12xC13/12xC19) NA/JP Managed PDU

HPE 17.3kVA 208V IEC309 48A 3 Phase Input (12xC13/12xC19) NA/JP Managed PDU

Intelligent Power Distribution Units – Single Phase

HPE 4.9kVA 24A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit

HPE 7.3kVA 32A Single Phase INTL Core Intelligent Modular Power Distribution Unit

HPE 8.3kVA 40A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit

HPE 4.9kVA 24A Single Phase NA/JP Intelligent Modular Power Distribution Kit*

HPE 7.3kVA 32A Single Phase INTL Intelligent Modular Power Distribution Kit*

Intelligent Power Distribution Units – Three Phase

HPE 8.6kVA 24A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit

HPE 11kVA 16A Three Phase INTL Core Intelligent Modular Power Distribution Unit

HPE 11.4kVA 16A 415V Three Phase L22-20 NA Core Intelligent Power Distribution Unit

HPE 14.4kVA 40A Three Phase NA/JP Intelligent Modular Power Distribution Unit

HPE 17.3kVA 48A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit

HPE 17.3kVA 24A 415V Three Phase L22-30 NA Core Intelligent Power Distribution Unit

HPE 17.3kVA 24A 415V Three Phase IEC309 NA Core Intelligent Power Distribution Unit

HPE 22kVA 32A Three Phase INTL Core Intelligent Modular Power Distribution Unit

HPE 17.3kVA 48A 208V Three Phase 12 Outlet Core NA/JP Intelligent Power Distribution Unit

HPE 17.3kVA 24A 415V Three Phase 12 Outlet Core NA/JP Intelligent Power Distribution Unit

HPE 22kVA 32A 400V Three Phase 12 Outlet Core INTL Intelligent Power Distribution Unit

HPE 8.6kVA 24A Three Phase NA/JP Intelligent Modular Power Distribution Kit*

NOTE: Where indicated with an asterisk (*), kits include one Core Unit, LED Display, and 4 Standard (non-intelligent) Extension Bars.

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

NOTE: 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 http://www.hp.com/go/rackandpower.

HPE R5000 Uninterruptible Power System (UPS)

Related Options

HPE Uninterruptible Power Systems (UPSs)	HPE R5000 3U L630 High Voltage NA/JP Uninterruptible Power System
	HPE R5000 3U IEC309-32A High Voltage INTL Uninterruptible Power System
	HPE R7000 Uninterruptible Power System (UPS)
	HPE R7000 4U 50A High Voltage NA/JP Uninterruptible Power System
	HPE R7000 4U IEC-32A High Voltage INTL Uninterruptible Power System
	HPE R8000/3 Uninterruptible Power System (UPS)
	HPE R8000/3 8000kVA Three Phase NA 6U Rackmount Uninterruptible Power System
	HPE R8000/3 8000kVA Three Phase INTL 6U Rackmount Uninterruptible Power System
	HPE R12000/3 Uninterruptible Power System (UPS)
	HPE R12000/3 12000VA Three Phase NA 6U Rackmount Uninterruptible Power System
	HPE R12000/3 12000VA Three Phase INTL 6U Rackmount Uninterruptible Power System
	HPE DirectFlow Three Phase Uninterruptible Power System (UPS)
	HPE R12000 DirectFlow - 1U Rackmount Uninterruptible Power System
	HPE R18000 DirectFlow - 2U Rackmount Uninterruptible Power System
	NOTE: HPE DirectFlow UPS models can be configured with either 1 or 2 valve-regulated lead-acid (VRLA) or Lithium-Ion (Li-Ion) batteries. You will also need to select the appropriate power I/O module for your region or country.

Step 9: Select power cords (optional)

NOTE: For additional power cable information, please visit: **http://h18000.www1.hp.com/products/servers/proliantstorage/power-protection/options/power-cable.html**.

HPE Intelligent Power Distribution Units Power cords (HPE C19 to C20)	**NOTE:. These power cables enable Power Discovery Services communications between the HPE Synergy 12000 Frame and HPE Intelligent PDUs.**
	NOTE: These power cables are designated by bright blue IEC connectors.
	HPE 1.37m 250V 16A C19-C20 WW Single IPD Enabled Jumper Cord
	HPE 1.37m 250V 16A C19-C20 WW 3PC Kit IPD Enabled Jumper Cord
	HPE 2.0m 250V 16A C19-C20 WW Single IPD Enabled Jumper Cord
	HPE 2.0m 250V 16A C19-C20 WW 3PC Kit IPD Enabled Jumper Cord
	HPE 2.5m 250V 16A C19-C20 WW Single IPD Enabled Jumper Cord
	HPE 2.5m 250V 16A C19-C20 WW 3PC Kit IPD Enabled Jumper Cord
	HPE 3.0m 250V 16A C19-C20 WW Single IPD Enabled Jumper Cord
	HPE 3.0m 250V 16A C19-C20 WW 3PC Kit IPD Enabled Jumper Cord
HPE Power Distribution Units Power cords (HPE C19 to C20)	HPE C19 - C20 WW 250V 16Amp Flint Gray 1.20m Jumper Cord
	HPE C19 - C20 WW 250V 16Amp Flint Gray 2.0m Jumper Cord
	HPE C19 - C20 WW 250V 16Amp 2.5m Jumper Cord
	HPE C19 - C20 WW 250V 16Amp 4.5m Jumper Cord
Additional HPE power Cords	**HPE High Line Power Cords 200 - 240V AC**
	HPE C19 -Nema L6-30P US/CA 250V 16Amp 4.5m Power Cord
	HPE C19 - Nema L6-20P NA/JP 250V 20Amp High Voltage 3.6m Power Cord
	HPE C19 - NBR-14136 BR 250V 16Amp 2.5m Power Cord
	HPE C19 - BS-1363/A UK/HK/SG 250V 13Amp 3.6m Power Cord
	HPE C19 - CEE-VII EU 250V 16Amp 3.6m Power Cord

Related Options

HPE C19 - AS3112-3 AU/NZ 250V 15Amp 3.6m Power Cord
HPE C19 - SABS-164 ZA 250V 16Amp 3.6m Power Cord
HPE C19 - CEI-23-50 IT/CL 250V 16Amp 3.6m Power Cord
HPE C19 - IEC-309 DK/SE/AR 250V 16Amp 3.6m Power Cord
HPE C19 - IS-1293 IN/PK/BD 250V 16Amp 2.5m Power Cord
HPE C19 - ISI-32 IL 250V 16Amp 2.5m Power Cord
HPE C19 - GB-1002 CN 250V 16Amp 2.5m Power Cord

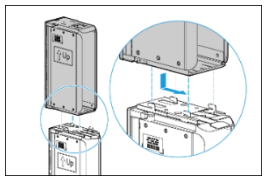
HPE Synergy Spares Options

HPE Synergy 12000 Frame Options

For purchasing any of the following option spares please go to HPE Parts Store at **https://h20141.www2.hp.com/hpparts/Default.aspx?mscssid=678685762F0E45A0AA7EAAFBD3BE00EC**

HPE Synergy Fan Module Option Kit
NOTE: 10 Fans come included in every Synergy 12000 Frame

HPE Synergy Compute Bay Half-Height Blank Option Kit
NOTE: 1 blank for half-height server bay



HPE Synergy Compute Bay Full-Height Blank-Coupler Option Kit
NOTE: 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.
NOTE: For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Half-Shelf Option Kit
NOTE: 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.
NOTE: For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Full-Shelf Option Kit
NOTE: 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.
NOTE: For optimal cooling and operating performance there should be no open bays or slots.

HPE Synergy Frame Lift Handle Option Kit
NOTE: The Lift Handle option comes with four handles that latch to the side of the Synergy Frames for a 4 person lift. **CAUTION:** All Frames, chassis or enclosures generally require multiple people when lifting from the shipping container to a work

Related Options

	bench, table or into the rack. The Synergy 12000 Frame requires 4 people to lift when empty to install. **NOTE: 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.** HPE Synergy Interconnect Module/Switch Blank Option Kit **NOTE: This is a single blank for open interconnect module/switch bays.** **NOTE: For optimal cooling and operating performance there should be no open bays or slots.** HPE Synergy Frame Rack Rail Option Kit **NOTE: This is a single rack rail kit for installing Synergy Frames into desired racking solutions.** HPE Synergy Appliance Bay Blank Option Kit **NOTE: This blank is for an open Appliance Bay.** **NOTE: For optimal cooling and operating performance there should be no open bays or slots.** HPE Synergy Frame Link Module Bay Blank Option Kit **NOTE: This blank is for an open Appliance Bay.** **NOTE: For optimal cooling and operating performance there should be no open bays or slots.** HPE Synergy Power Supply Bay Blank Option Kit **NOTE: This blank is for an open Appliance Bay.** **NOTE: For optimal cooling and operating performance there should be no open bays or slots.**
HPE Tape Backup	**NOTE: For the complete range of tape drives, autoloaders, libraries and media see: http://www.hp.com/go/tape. For hardware and software compatibility of** Hewlett Packard Enterprise **tape backup products see: http://www.hp.com/storage/SPOCK.** HPE StoreEver LTO-6 Ultrium 6250 Tape Drive in 1U Rack-mount Kit HPE StoreEver LTO-6 Ultrium 6250 Internal Tape Drive HPE StoreEver LTO-6 Ultrium 6250 External Tape Drive
HPE System Management Options	**NOTE: 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.** **NOTE: For additional information regarding Rack Options, please see the following URL: http://www.hp.com/go/rackandpower.** **HPE 1U Rackmount Keyboard with USB** 1U Rackmount Keyboard with USB US 1U Rackmount Keyboard with USB UK 1U Rackmount Keyboard with USB JPN2 1U Rackmount Keyboard with USB INTL **NOTE: Single to multi-port USB Adaptor required for Keyboard and Mouse.** HPE USB BFR with PVC Free US Keyboard/Mouse Kit

Related Options

HPE USB BFR with PVC Free UK Keyboard/Mouse Kit
HPE USB BFR with PVC Free FR Keyboard/Mouse Kit
HPE USB BFR with PVC Free ES Keyboard/Mouse Kit
HPE USB BFR with PVC Free DE Keyboard/Mouse Kit
HPE USB BFR with PVC Free JP Keyboard/Mouse Kit
HPE USB BFR with PVC Free IT Keyboard/Mouse Kit
HPE USB BFR with PVC Free CN Keyboard/Mouse Kit
HPE USB BFR with PVC Free AE Keyboard/Mouse Kit
HPE USB BFR with PVC Free RU Keyboard/Mouse Kit
HPE KVM Console USB 2.0 Virtual Media CAC Interface Adapter
HPE LCD8500 1U US Rackmount Console Kit
HPE LCD8500 1U UK Rackmount Console Kit
HPE LCD8500 1U DE Rackmount Console Kit
HPE LCD8500 1U FR Rackmount Console Kit
HPE LCD8500 1U JP Rackmount Console Kit
HPE LCD8500 1U RU Rackmount Console Kit
HPE LCD8500 1U INTL Rackmount Console Kit
HPE LCD8500 1U US TAA Rackmount Console Kit

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

HPE LCD8500 1U Rackmount Console Kit Models

HPE Kit LCD 1.83m Latch Display Port Cable

HPE KVM Analog Console Switches

HPE 1x4 USB/PS2 KVM Console Switch
HPE 0x1x8 G3 KVM Console Switch
HPE 0x2x16 G3 KVM Console Switch
HPE TAA 0x2x16 G3 KVM Console Switch

HPE KVM Analog Console Switches with Virtual Media

HPE 0x2x16 KVM Server Console Switch G2 with Virtual Media CAC Software
HPE 0x2x32 KVM Server Console Switch G2 with Virtual Media CAC Software

HPE KVM IP Console Switches

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

HPE Synergy Services	Proactive Care Services Installation & Start-up Services

Power Supply Specifications

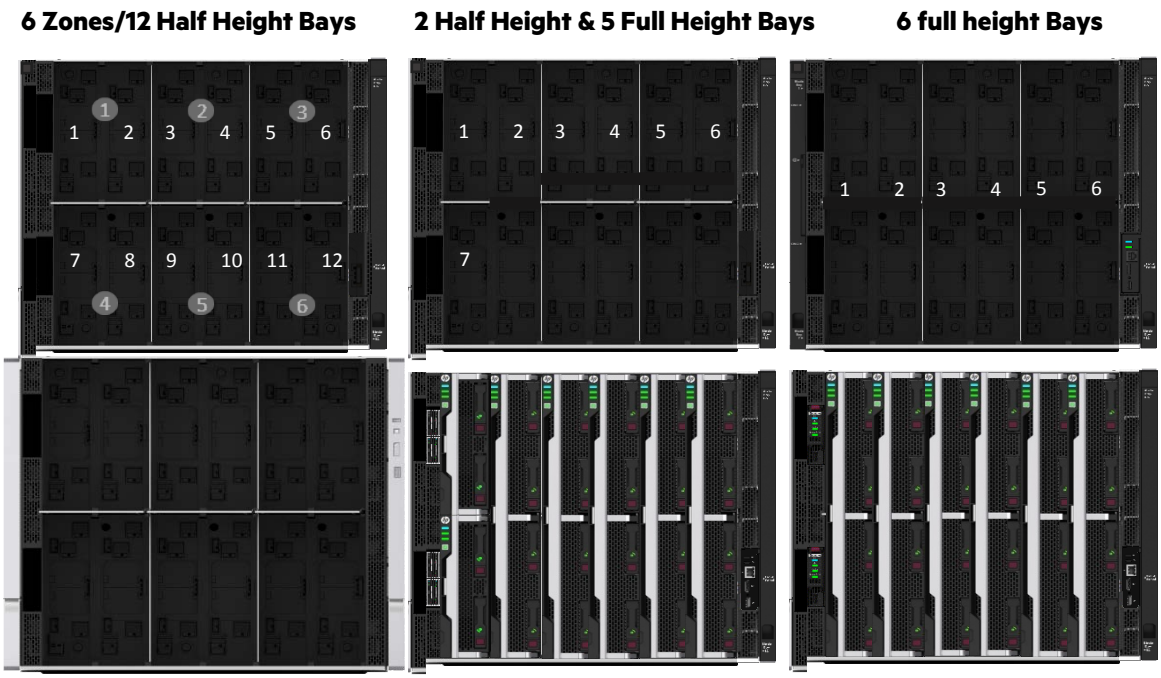
NOTE: HPE highly recommends using the HPE Power Advisor tool to ensure the number of power supply options you have selected can fully support your Synergy Frame configuration and to review maximum system power ratings for facilities planning purposes. HPE Power Advisor is available at: **http://www.hp.com/go/hppoweradvisor**.

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	.9	.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.The blue power connectors indicate HPE Power Discovery Services capability.HPE Power Discovery Services are enabled when used with an Intelligent Power Distribution Unit (iPDU), iPDU cables, and the Titanium power supply kits. See the iPDU, iPDU cable, and Power Supply sections for these options.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. The Onboard Administrator will exhibit a mismatch error due to mixed power supplies until all power supplies are matched.Power cables with APP Saf-D-Grid connectors are ordered separately.

HPE Synergy Frame Device Bay Numbering and Population Guidelines

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

NOTE: 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.

Technical Specifications

HPE Synergy 12000 Frame	**Dimensions**	Height	17.4 in (442 mm)
		Width	18.98 in (482 mm)
		Depth	36.88 in (936 mm)
	Shipping Dimensions	Height	30.13 in (mm)
		Width	24.50 in (mm)
		Depth	40.50in (mm)
	Frame Weight	Unboxed	137 lb (62 kg)
		Shipping	495 lb (kg)

NOTE: 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 Onboard Administrator(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)	4.8 lbs (2 kg)	
HPE Synergy Fan Weight (minimum 0, maximum 10)	1.5 lbs (1 kg)	
Management Appliances (minimum 1, maximum 2)	3 lbs (1.4 kg)	
Frame Link Modules (minimum 1 maximum 2)	1.4 lbs (1 kg) Unboxed	521 lb (236 kg)
Maximum Frame Weight (approximate)	Shipping	495 lb (kg)

NOTE: The approximate maximum Frame weight above includes 12 Compute Modules, 6 six power supplies, 10 fans, 6 interconnect modules, 2 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.

NOTE: 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.
NOTE: For detailed environmental and other installation requirements, please see the "HPE Site Planning Guide" at http://www.hp.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.hp.com/go/green**. To recycle your product, please go to: **http://www.hp.com/go/green** or contact your nearest

Technical Specifications

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.hp.com/go/green**. 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
1-Dec-2015	Version 1	Created	New QuickSpecs

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