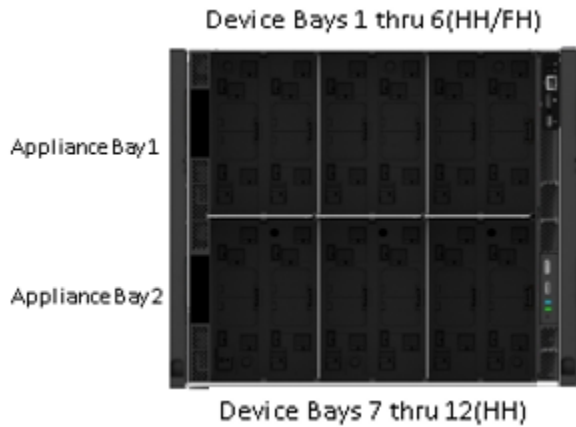


Overview

HPE Synergy 12000 Frame – Carrier Grade Supplement



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

Standard Features

At a Glance

This document covers the NEBS Level 3 certified HPE Synergy 12000 Frame. This document covers the compute modules, interconnect modules, etc. which have passed the NEBS Level 3 and ETSI EN 300 386-2 certifications. For more information on HPE Synergy 12000 Frame Components please see the following QuickSpecs:

<https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04815113>

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.

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.

Platform 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.

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

Notes: 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 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.

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.
 - 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.
-

Related Options

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 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.

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.
- 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.

Select the Frame power options (required)

Synergy Power Supplies (Up to 6)

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: <https://www.hpe.com/info/hpepoweradvisor>.
- 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.

Related Options

- 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.

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

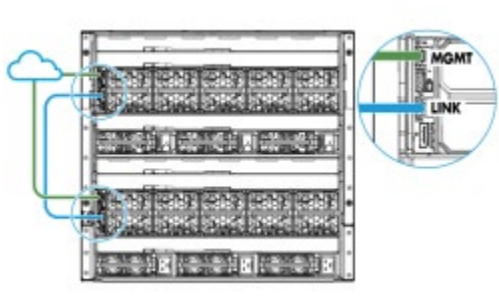
Notes: The 4-port Frame Link Module comes with 10 Gb/s private Ethernet networking solution included and requires a DAC or AOC cabling between Frames for connection to multiple Frames or forming a Management ring between multiple Frames. Multiple DAC and AOC cables are offered through Hewlett Packard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

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.

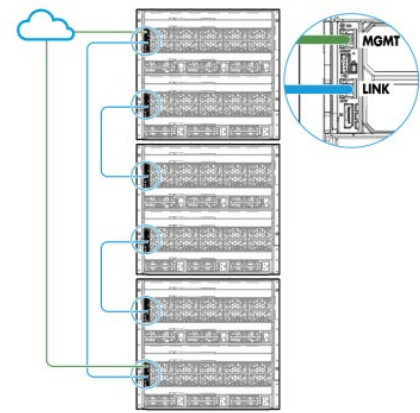
Related Options

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

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)
- Fibercable 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

Related Options

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

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

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

HPE BladeSystem CClass Virtual Connect 1G SFP RJ45 Transceiver	453154-B21
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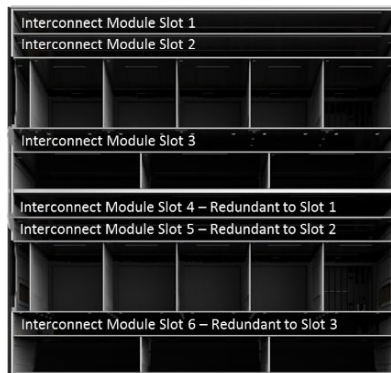
Notes: Typical 1Gb transceiver for connecting CAT cables to SFP+ ports on the HPE Synergy 4-port FLM.

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.

Related Options



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 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/12 2SFP+ Fibre Channel SAN Switch Module for HPE Synergy	Q2E55A
Brocade 32Gb/20 4SFP+ Fibre Channel SAN Switch Module for HPE Synergy	Q2E56A
Brocade 32Gb/20 4SFP+ Power Pack+ Fibre Channel SAN Switch Module for HPE Synergy	Q2E57A
Brocade 32Gb Fibre Channel SAN Switch Module 8-port Upgrade LTU for HPE Synergy	Q2E58A
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

Related Options

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
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HPE Synergy Fibre Channel Host Bus Adapters

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

HPE Synergy Frame

HPE Synergy 12000 Configure-to-order Frame with 1x Frame Link Module 10x Fans	797740-B21
HPE Synergy 12000 TAA-compliant Configure-to-order Frame with 2x FLM 6x Power Supplies 10x Fans	797740-B22

HPE Synergy Power Supplies

HPE Synergy DC Power Grounding Kit	872034-B21
HPE 6x 2650W -48VDC Hot Plug Power Factory Integrated Supply Kit	798100-B21
HPE 2650W -48VDC Hot Plug Power Supply Kit	798099-B21
HPE 6x 2650W Performance Hot Plug Titanium Plus FIO Power Supply Kit	798096-B21
HPE 2650W Performance Hot Plug Titanium Plus Power Supply Kit	798095-B21

HPE Synergy Frame Management Appliance Options

HPE Synergy Composer	804353-B21
HPE Synergy TAA-compliant Composer	804353-B22
HPE Synergy Image Streamer	804937-B21
	804937-B22

Related Options

HPE Synergy Frame Link Modules

HPE Synergy Frame Link Module	804942-B21
HPE Synergy TAA-compliant Frame Link Module	804942-B22



HPE Frame Link Topology Cables

HPE Synergy Frame Link Module CAT6A 1.2m Cable	861412-B21
HPE Synergy Frame Link Module CAT6A 3m Cable	861413-B21
HPE Synergy Frame Link Module CAT6A 6.4m Cable	861414-B21

HPE Synergy Network Interconnects

HPE Virtual Connect SE 40Gb F8 Module for Synergy	794502-B23
Mellanox SH2200 TAA-compliant Switch Module for HPE Synergy	866573-B21
HE Synergy 10Gb Pass-Thru Module	799330-B21

HPE Storage and SAS Switch

HPE Synergy D3940 12Gb SAS CTO Drive Enclosure with 40 SFF (2.5in) Drive Bays	835386-B21
HPE Synergy D3940 12Gb SAS Drive Enclosure with 40 SFF (2.5in) Drive Bays	755984-B21
HPE Synergy D3940 Redundant I/O Adapter	757323-B21
HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports	755985-B21
HPE Smart Array P542D/2GB FBWC 12Gb Mezzanine SAS Controller	759557-B21

HPE Synergy Converged Network Adapters

HPE Synergy 3820C 10/20Gb Converged Network Adapter	777430-B21
HPE Synergy 2820C 10Gb Converged Network Adapter	794538-B21

HPE Synergy Ethernet Adapters

HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
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HPE Synergy Transceivers and Cable options

HPE Synergy 40GbE/4x10GbE/4x8Gb FC QSFP+ Transceiver	817040-B21
HPE Synergy Dual 10GBASE-T QSFP+ 30m RJ45 Transceiver	838327-B21
HPE B-series 4x16 Short Wave QSFP Transceiver	K2Q87A
HPE Synergy Interconnect Link 1.1m Direct Attach Copper Cable	804095-B21
HPE Synergy Interconnect Link 1.6m Direct Attach Copper Cable	804098-B21
HPE Synergy Interconnect Link 2.1m Direct Attach Copper Cable	804155-B21
HPE Synergy Interconnect Link 3m Active Optical Cable	804101-B21
HPE Synergy Interconnect Link 5m Active Optical Cable	804104-B21
HPE Synergy Interconnect Link 10m Active Optical Cable	804107-B21

Related Options

HPE Synergy Interconnect Link 15m Active Optical Cable	804110-B21
HPE 100Gb QSFP28 to QSFP28 7m Active Optical Cable	845410-B21
HPE 100Gb QSFP28 to QSFP28 10m Active Optical Cable	845412-B21
HPE 100Gb QSFP28 to QSFP28 15m Active Optical Cable	845414-B21

HPE -48VDC Power Kits

Cable kits used with -48VDC Power Supply

HPE Synergy DC Power Grounding Kit	872034-B21
HPE Synergy -48VDC Power Cable Kit	872035-B21

Notes: This cable kit is comprised of 12 cables Which are designed to connect 6 Synergy -48VDC Power Supplies to 1 HPE Breaker Panel.

Power Supply Specifications

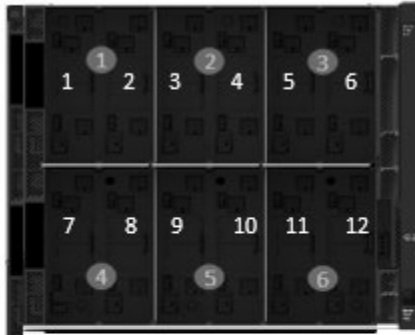
Notes: HPE highly recommends using the HPE Power Advisor tool to ensure the number of power supply options you have selected can fully support your Synergy Frame configuration and to review maximum system power ratings for facilities planning purposes. HPE Power Advisor is available at: <http://www.hpe.com/info/hpepoweradvisor>.

HPE 2650 Watts Hot Plug -48VDC Power Supply					
Part Number	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	N/A	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		

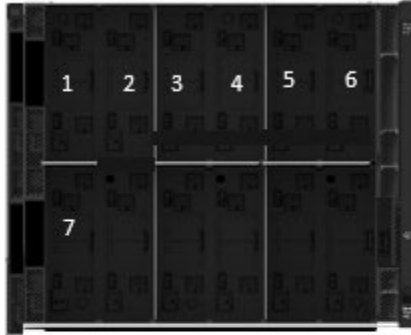
HPE Synergy Frame Device Bay Numbering and Population Guidelines

Mixed Configuration - Full Height and Half-Height Population rules

6 Zones/12 Half Height Bays



2 Half Height & 5 Full Height Bays



6 full height Bays



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.

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)	
	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)	4.8 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)		
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.				
Notes: For detailed environmental and other installation requirements, please see the “HPE Site Planning Guide” at http://www.hpe.com/support .				

Technical Specifications

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
07-Nov-2022	Version 3	Changed	Platform Information and Related Options sections were updated.
7-May-2018	Version 2	Changed	Platform Information and Related Options sections were updated.
		Added	SKUs added in Platform Information and Related Options sections: 798096-B21, 798095-B21, 804937-B21, 804937-B22, 799330-B21, 845410-B21, 845412-B21, 845414-B21.
4-Sep-2017	Version 1	Created	New QuickSpecs



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a00019671enw - 16023 - Worldwide - V3 - 07-November-2022