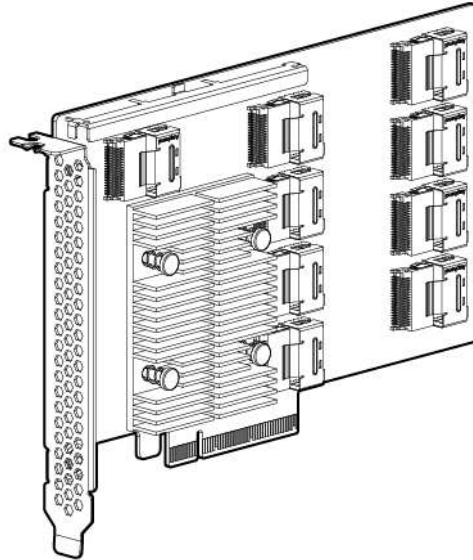


### Overview

#### HP 12G SAS Expander Card

The HP 12G SAS Expander Card provides internal storage expansion within the HP ProLiant Gen9 Server by allowing support for more than 8 internal hard disk drives when connected to a Gen9 supported Smart Array or Smart HBA controller. This full height card supports 12Gb/s SAS connectivity and features 9 internal ports with a maximum of 26 physical links. The 12G SAS Expander Card is ideal for ProLiant DL380, DL180 and ML350 Gen9 Server users who want to RAID more than 8 internal hard disk drives or who want to add additional internal drive cages and RAID across all the internal drives depending on the controller.



### Models

<b>HP SAS Expander Cards</b>	HP 12Gb SAS Expander Card for DL380 Gen9	727250-B21
	HP 12Gb SAS Expander Card for ML350 Gen9	769635-B21
	HP DL180 Gen9 245FF Expander FIO Kit	774876-B21
	<b>NOTE:</b> This is a Factory Installed Option (FIO) only.	

### Kit contents

- HP 12G SAS Expander card
- All the cables required for specified server will be included in the kit

### Standard Features

#### The Smart Array Advantage

HP's innovative design and integration work of the Smart Array family of products, including the HP 12G SAS Expander Cards connected to a SA-P4 series or Smart HBA Hx4 series Controllers creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HP Smart Array family brings an unparalleled return on investment through:

**Data Compatibility** among all models of Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase. Even successive generations of Smart Array controllers understand the data format of other Smart Array Controllers.

**Consistent Configuration and Management Tools.** All Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain the HP server storage.

**Pre-Failure Warranty** means HP Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HP Support Center or refer to your HP Server documentation.

**NOTE:** For more information on features and benefits of Smart Array Controllers please visit: [www.hp.com/products/smartarray](http://www.hp.com/products/smartarray)

#### Key Features

- 12Gb/s SAS technology delivers high performance and data bandwidth up to 1200MB/s per physical link and contains full compatibility with 6Gb/s SATA technology. Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- Supports up to 26 internal drive bays (supports 3 8SFF drive backplanes with each holding 8 drive bays + 2SFF back of the server)
- EDGE BUFFERING – 6G drives buffering to maintain 12G backend speed

#### Management Features

- Upgradeable firmware via HP firmware CD or HP SPP Service Pack for ProLiant

#### Ports

- Upto 28 drives depending on server configuration
- 9 Mini SAS 4i ports
- 2 Mini SAS 4i ports intended for attachment to the Gen9 Smart Array or Smart HBA controller
  - 12Gb/s Gb/s SAS bandwidth = 9600MB/s
- 7 Mini SAS 4i ports intended for attachment to server drive backplanes
  - Supports up to 26 drive bays (3 drive backplanes with each holding 8 drive bays + 2SFF drive cage in the rear of the server above power supply)

#### Performance

HP's High Performance Architecture sets new boundaries of industry performance expectations!

- 12Gb/s SAS (1200MB/s bandwidth per physical link) 6.0Gb/s SATA (600MB/s bandwidth per physical link)

#### Capacity

Given the increasing need for high performance and rapid capacity expansion, the SAS Expander Card and the SA-Px4x or Smart HBA Hx4x Controllers offer:

- Up to 90TB of total storage with 15 x 6TB 3.5" SATA MDL HDD
- Up to of 31.2TB total storage with 26 x 1.2TB 12Gb/s SAS 10K SFF DP ENT HDD

#### Fault Recovery

The HP 12G SAS Expander Cards helps to minimize downtime.

- Recovery ROM: This feature protects the user from a firmware image corruption by storing a redundant copy of the firmware image. If the active firmware image becomes corrupt, the controller will use the redundant firmware image and continue operating.

### Standard Features

**Warranty**

The warranty for this device is 3-years parts only.

**Warranty Upgrade Options**

- Response - Upgrade on-site response from next business day to same day 4 hours
- Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days
- Duration - Select duration of coverage for a period of 1, 3, or 5 years
- Warranty upgrade options can come in the form of Care Packs, which are sold at the HP System level this product attaches too

### Compatibility

#### Server Support

##### **ProLiant DL (rack-optimized):**

- HP ProLiant DL380 Gen9
- HP ProLiant DL180 Gen9

##### **ProLiant ML (expansion-optimized):**

- HP ProLiant ML350 Gen9
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#### Operating Systems

Please reference [Smart Array](#) or [Smart HBA](#) QuickSpecs along with ProLiant Gen9 server for Operating Systems support.

### Service and Support

#### Service and Support

#### **HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI**

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

#### **Protect your business beyond warranty**

When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

#### **HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively**

HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care—from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs—from purchase to equipment retirement.

Learn more: [www.hp.com/services/servers](http://www.hp.com/services/servers) and [www.hp.com/services/storage](http://www.hp.com/services/storage)

**NOTE:** Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at <http://www.hp.com/go/lookuptool>

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## Recommended HP Care Pack Services for optimal satisfaction with your HP product

#### Recommended Services **Hardware Options Support**

HP Care Packs provide support for all HP-branded hardware options qualified for inclusion in your server or storage solution. Any additional HP-qualified options installed within the server are covered at the same service level and for the same period as the server and no additional cost.

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

### Service and Support

#### **3-Year HP Hardware Support Onsite Service, 4-hour response, 24x7**

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

#### **HP Installation and Startup of HP ProLiant Servers**

Provides for the installation of your new HP ProLiant server and operating system to assist you in bringing your new HP ProLiant server and operating system into operation in a timely and professional manner.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Delivery of the service at a mutually scheduled time convenient to your organization
- Availability of an HP service specialist to answer basic questions during the onsite delivery of this service
- Custom installation as detailed in "Delivery specifications" or in a Statement of Work (SOW)
- Verification prior to installation that all service prerequisites are met

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-7572ENN>

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## **Optional HP Care Pack Services that will enhance your HP product experience**

### **Optional Services**

#### **3-Year HP Hardware Support Onsite Call-to-Repair (CTR) Service, 6- or 24-hour**

As an alternative to our recommended support level, for customers who need committed call-to-repair for server hardware.

Provides your IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 or 24 hours of the initial service request to the HP Global Solution Center.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf>

#### **3-Year HP Support Plus 24**

As an alternative to our recommended support level, for customers who need access to responsive 24x7 hardware and software support plus software updates on HP and selected third party products:

For a higher return on your server and storage technology, our 3-year combined reactive support service delivers integrated onsite hardware/software support services available 24x7x365, including access to HP technical resources, 4-hour response onsite hardware support and software updates.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE>

#### **HP Proactive Select Service**

Customer needs on demand access to consulting, technical proactive services and education courses

### Service and Support

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN>

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#### eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

##### Support Portal

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

##### Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: <http://www.hp.com/support>

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

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#### Customer Technical Training

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

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#### HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

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#### Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: [www.hp.com/services/proliant](http://www.hp.com/services/proliant) or [www.hp.com/services/bladeSystem](http://www.hp.com/services/bladeSystem) or <http://www.hp.com/services/storage>

### Technical Specifications

<b>Dimensions</b>	6.6 x 4.4 x 0.6 in (16.8 x 11.13 x 1.5 cm) PCIe full-height, half-length card
<b>Disk Drive Transfer rate</b>	12Gb/s SAS (Serial Attached SCSI) 6.0Gb/s SATA (Serial ATA)
<b>SAS Connectors</b>	9 Mini SAS 4i connectors (2 connecting to controller and up to 7 connectors to attach 3 drive cages and rear drives if applicable)
<b>SAS Speed</b>	If attached to a Smart Array Controller or HBA Controller the total available bandwidth is 9.6GB/s.
<b>Logical Drives Supported</b>	Up to 64 logical drives when connected to a Smart Array Controller
<b>Maximum Logical Drive Capacity</b>	90TB using 15 LFF, 6TB SAS or SATA drives
<b>Upgradeable Firmware</b>	<b>NOTE:</b> Via Gen9 Smart Array Controller or Smart HBA Controller. Upgradeable Firmware via HP Firmware CD or <a href="http://www.hp.com/cgi-bin/hpsupport/index.pl">http://www.hp.com/cgi-bin/hpsupport/index.pl</a>

<b>Environment-friendly Products and Approach</b>	<b>End-of-life Management and Recycling</b>	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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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 web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.