The HP H221 Host Bus Adapter is a 2X4 external ports HBA provides customers with the flexibility and speed they have come to expect from HP. The H221 HBA has been optimized for connection to the SAS based HP P2000 G3 SAS Modular Smart Array, D2000 and D6000 Disk Enclosures, and MSA2040 SAN Storage; and provides support for both 6 Gb SAS and SATA Hard Disk Drives. In addition, the H221 HBA controller provides support for SAS tape drives. This SAS HBA is ideal for driving cost-effective and reliable scalability in today's data centers.

What's New

- New HP221 PCIe 3.0 SAS HBA

Model

<table>
<thead>
<tr>
<th>Host Bus Adapter</th>
<th>HP H221 Host Bus Adapter</th>
<th>650931-B21</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP H221 PCIe 3.0 SAS Host Bus Adapter</td>
<td>729552-B21</td>
</tr>
</tbody>
</table>

Kit contents

- HP H221 Host Bus Adapter
- Low profile controller bracket
Compatibility

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

- HP ProLiant DL160 Gen8
- HP ProLiant DL320e Gen8
- HP ProLiant DL320e Gen8 v2
- HP ProLiant DL360e Gen8
- HP ProLiant DL360p Gen8
- HP ProLiant DL380e Gen8
- HP ProLiant DL380p Gen8
- HP ProLiant DL385p Gen8
- HP ProLiant DL560 Gen8

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

- HP ProLiant ML310e Gen8
- HP ProLiant ML310e Gen8 v2
- HP ProLiant ML350e Gen8
- HP ProLiant ML350p Gen8

**ProLiant SL (scalable line):**

- HP ProLiant SL210t Gen8
- HP ProLiant SL270s Gen8
- HP ProLiant SL4540 Gen8 Server
- HP ProLiant SL4545 G7 Server

**NOTE:** This is a list of supported servers. Some may be discontinued.
Performance

Designed to be as flexible as HP servers, HP H221 Host Bus Adapter provides support for the HP P2000 G3 MSA Array Systems. The HP adapter delivers exceptional system performance, with eight 6 Gb/s SAS ports providing up to 48 Gb/s total storage bandwidth.

HP Server Integration

Fully integrated and tested with ProLiant servers and management software.

Key Features

- SAS technology delivers high performance and data bandwidth up to 6 Gb/s per physical link
- Mix-and-match SAS and SATA hard drives; deploy drive technology as needed
- 8 GB/s bandwidth for HP H221 PCIe 3.0 SAS HBA and 4 GB/s bandwidth for HP H221 Host Bus Adapter
- PCIe 3.0 x 8 capable on H221 PCIe 3.0 model or PCIe 2.0 x8 capable on H221 model

Ports

Eight (8) SAS physical links distributed across 2 x4 external SFF8088 Mini-SAS connectors

Performance

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

- 6 Gb/s SAS (bandwidth per physical link)
- 48 Gbps total available bandwidth (8 physical links x 6Gbps)
- PCIe 3.0 host interface x8 (8 GT/s theoretical bandwidth) on H221 PCIe 3.0 model or PCIe 2.0 host interface x8 (5 GT/s theoretical bandwidth) on the H221 model

Capacity

Fulfilling the need for high performance and capacity expansion, the HP H221 SAS HBA offers:

- Up to 280TB of external storage per controller with 1 x HP D6000 Disk Enclosure and 70 x 4TB LFF SAS hard drives
- Up to 200 TB of external storage per controller with 8 x HP D2700 Disk Enclosures and 200 x 1TB SFF SATA hard drives
- Up to 240TB of external storage per controller with 8 x HP D2700 Disk Enclosures and 200 x 1.2TB SFF SAS hard drives
- Up to 384TB of external storage per controller with 8 x HP D2600 Disk Enclosure and 96 x 4TB LFF SAS or SATA hard drives
- Up to 384TB of external storage per controller with 8 x HP P2000 G3 MSA and 96 x 4TB LFF SAS or SATA hard drives
- Up to 179TB of external storage per controller with 1 x HP P2000 G3 MSA SFF plus 5 x HP D2700 Disk Enclosures and 149 x 1.2TB SFF SAS hard drives
- Up to 48TB of external storage per controller with 1 x HP MSA2040 SAN Storage and 12 x 4TB LFF SAS hard drives
- Up to 24TB of external storage per controller with 1 x HP MSA2040 SAN Storage and 24 x 1TB SFF SAS hard drives

Form Factor

- Either high-profile or low-profile. (parts included with option)
Supported Enclosures
- HP P2000 G3 MSA Array Systems
- HP D6000 Disk Enclosure
- HP D2000 Disk Enclosure

Operating Systems
- Microsoft Windows Server 2012
- Microsoft Windows Server 2008 SP2
- Microsoft Windows Server 2008 R2 SP1
- Red Hat Enterprise Linux 5 (x64 & x86)
- Red Hat Enterprise Linux 6 (x64 & x86)
- SUSE Linux Enterprise Server 10 (x64 & x86)
- SUSE Linux Enterprise Server 11 (x64 & x86)
- VMware ESX 4.1 and ESXi 4.1
- VMware ESXi 5.0, 5.1, 5.5

**NOTE:** For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix: [http://h18004.www1.hp.com/products/servers/linux/hplinuxcert.html](http://h18004.www1.hp.com/products/servers/linux/hplinuxcert.html)

Warranty
The warranty for this device is 1 year 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
Service and Support

HP Technology Services
Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That’s why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

Protect your business beyond warranty with HP Care Pack Services
When you buy HP Options, it’s also a good time to think about what level of service you may need. HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HP Foundation Care services offer scalable reactive support-packages for HP servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.

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

<table>
<thead>
<tr>
<th>Optimized Care</th>
<th>3-Year HP 6 hour Call to Repair Response, Proactive Care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Care</th>
<th>3-Year HP 24x7 4 hour response, Proactive Care Service</th>
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<tbody>
<tr>
<td></td>
<td>This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HP’s vast global resources.</td>
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</table>

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<thead>
<tr>
<th>Related Services</th>
<th>HP Installation of ProLiant Add On Options Service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.</td>
</tr>
</tbody>
</table>

Related Services

HP Proactive Care Personalized Support - Environmental Option
The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HP Proactive Care Support.

HP Proactive Select Service
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.
NOTE: Additional HP Care Pack services can be found at: http://hp.com/go/cpc

### Insight Online/Insight Remote Support

### HP Support Center
Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more [http://www.hp.com/go/hpsc](http://www.hp.com/go/hpsc)

HP’s Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

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

NOTE: HP’s Support Center Mobile App is subject to local availability.

### Parts and materials
HP will provide HP-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 HP due to malfunction.

### For more information
To learn more on services for HP ProLiant servers, please contact your HP sales representative or HP Authorized ServiceOne Channel Partner. Or visit: [www.hp.com/services/proliant](http://www.hp.com/services/proliant)
NOTE: This is a list of supported options. Some may be discontinued.

### HP Disk Enclosures

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP D2000 Disk Enclosures</td>
<td>HP D2600 Disk Enclosure</td>
<td>AJ940A</td>
</tr>
<tr>
<td></td>
<td>HP D2700 Disk Enclosure</td>
<td>AJ941A</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Please see the QuickSpecs for additional information and a list of compatible hard drives: <a href="http://h18000.www1.hp.com/products/quickspecs/13404_na/13404_na.html">http://h18000.www1.hp.com/products/quickspecs/13404_na/13404_na.html</a></td>
<td></td>
</tr>
<tr>
<td>HP D2700 Disk Enclosure</td>
<td>HP D2700 Dual I/O Module Disk Enclosure</td>
<td>QQ695A</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Please see the supported Disk Enclosure QuickSpecs for a list of compatible hard drives: <a href="http://h18000.www1.hp.com/products/quickspecs/14419_na/14419_na.html">http://h18000.www1.hp.com/products/quickspecs/14419_na/14419_na.html</a></td>
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### HP Modular Smart Arrays

<table>
<thead>
<tr>
<th>Array Type</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP MSA 2040 Storage</td>
<td>HP MSA 2040 SAS Dual Controller LFF Storage</td>
</tr>
<tr>
<td></td>
<td>HP MSA 2040 SAS Dual Controller SFF Storage</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Please see the QuickSpecs for additional information and a list of compatible hard drives: <a href="http://h18000.www1.hp.com/products/quickspecs/14603_na/14603_na.html">http://h18000.www1.hp.com/products/quickspecs/14603_na/14603_na.html</a></td>
</tr>
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</table>

### HP Disk Storage Systems

<table>
<thead>
<tr>
<th>System Type</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>HP P2000 G3 Modular Smart Array Systems</td>
<td>HP P2000 G3 SAS Controller</td>
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<tr>
<td></td>
<td>HP P2000 G3 SAS MSA Array System Controller</td>
</tr>
<tr>
<td></td>
<td><strong>P2000 Controller-less Chassis (AC-powered)</strong></td>
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<tr>
<td></td>
<td>HP P2000 LFF Modular Smart Array Chassis</td>
</tr>
<tr>
<td></td>
<td>HP P2000 SFF Modular Smart Array Chassis</td>
</tr>
<tr>
<td></td>
<td><strong>Configured Units, 6 Gb SAS Systems</strong></td>
</tr>
<tr>
<td></td>
<td>HP P2000 G3 SAS MSA Dual Controller LFF Array System</td>
</tr>
<tr>
<td></td>
<td>HP P2000 G3 SAS MSA Dual Controller SFF Array System</td>
</tr>
<tr>
<td></td>
<td><strong>SAS Cable for HP P2000 G3 Modular Smart Array Systems</strong></td>
</tr>
<tr>
<td></td>
<td>HP External Mini SAS 2m Cable</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Please see the QuickSpecs for additional part numbers and information at: <a href="http://h18000.www1.hp.com/products/quickspecs/13551_na/13551_na.html">http://h18000.www1.hp.com/products/quickspecs/13551_na/13551_na.html</a></td>
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</table>

### HP Tape Drives

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Model</th>
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<tbody>
<tr>
<td>DAT Tape Drives</td>
<td>HP StoreEver DAT 160 SAS Internal Tape Drive</td>
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<tr>
<td></td>
<td>HP StoreEver DAT 160 SAS External Tape Drive</td>
</tr>
<tr>
<td>LTO Ultrium Tape Drives</td>
<td>HP StoreEver LTO-2 Ultrium 448 SAS Internal Tape Drive</td>
</tr>
<tr>
<td></td>
<td>HP StoreEver LTO-2 Ultrium 448 SAS External Drive</td>
</tr>
<tr>
<td></td>
<td>HP StoreEver LTO-3 Ultrium 920 SAS Internal Tape Drive</td>
</tr>
<tr>
<td></td>
<td>HP StoreEver LTO-3 Ultrium 920 SAS External Tape Drive</td>
</tr>
<tr>
<td></td>
<td>HP StoreEver LTO-4 Ultrium 1760 SAS Internal WW Tape Drive</td>
</tr>
<tr>
<td></td>
<td>HP StoreEver LTO-4 Ultrium 1760 SAS External Tape Drive</td>
</tr>
</tbody>
</table>
HP LTO-4 Ultrium 1760 SAS (1) in 1U Rack-mount Kit  
HP StoreEver LTO-4 Ultrium 1840 SAS Internal Tape Drive  
HP StoreEver LTO-4 Ultrium 1840 SAS External Tape Drive  
HP StoreEver LTO-5 Ultrium 3000 SAS Internal Tape Drive  
HP StoreEver LTO-5 Ultrium 3000 SAS External Tape Drive  
HP StoreEver LTO-5 Ultrium 3000 SAS Tape Drive in 1U Rack-mount  
HP StoreEver LTO-5 Ultrium 3280 SAS Internal Tape Drive  
HP StoreEver LTO-5 Ultrium 3280 SAS External Tape Drive  
HP StoreEver LTO-5 Ultrium 3280 SAS Tape Drive in 3U Rack-mount  
HP StoreEver LTO-6 Ultrium 6650 SAS Internal Tape Drive  
HP StoreEver LTO-6 Ultrium 6650 SAS External Tape Drive  
HP StoreEver LTO-6 Ultrium 6650 SAS Tape Drive  
NOTE: HP internal tape drives are only supported when installed in a Rack-mount Tape Drive Enclosure

Rack-mount Tape Drive Enclosures

HP 1U SAS Rack-mount Kit  
NOTE: The 1U SAS Rack-Mount Kit can support up to (2) half-height internal tape drives and is compatible with the DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS, LTO-4 Ultrium 1760 SAS, LTO-5 Ultrium 3000 SAS and LTO-6 Ultrium 6250 tape drives.  
HP 3U SAS Rack-mount Kit  
NOTE: The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height internal tape drives and compatible with multiple SAS tape drives including DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS, LTO-4 Ultrium 1760 SAS, LTO-4 Ultrium 1840 SAS, LTO-5 Ultrium 3000 SAS, LTO-5 Ultrium 3280 SAS, LTO-6 Ultrium 6250 and LTO-6 Ultrium 6650 tape drives.

Tape AutoLoaders

HP StoreEver 1/8G2 LTO-6 Ultrium 6250 SAS Tape Autoloader  
HP StoreEver 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader  
HP StoreEver 1/8 G2 LTO-5 Ultrium 3000 SAS Tape Autoloader

Tape Libraries

HP StoreEver MSL2024 1 LTO-6 Ultrium 6250 SAS Tape Library  
HP StoreEver MSL2024 2 LTO-6 Ultrium 6250 SAS Tape Library  
HP MSL2024 1 LTO-5 Ultrium 3000 SAS Tape Library  
HP MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library  
HP StoreEver MSL4048 2 LTO-6 Ultrium 6250 SAS Tape Library  
HP MSL4048 2 LTO-5 Ultrium 3000 SAS Tape Library  
HP MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library  
HP MSL4048 0-Drive Tape Library  
HP MSL8048 0-Drive Tape Library  
HP StoreEver MSL8096 2 LTO-6 Ultrium 6250 SAS Tape Library  
HP MSL8096 2 LTO-5 Ultrium 3000 SAS Tape Library

SAS Cables for Tape Drives and Automation
HP SAS Min-Min 1x-2M Cable Assembly Kit

**NOTE:** Use this cable to connect HP SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.

AE470A

HP SAS MIN-MIN 1X-4M Cable Assembly Kit

**NOTE:** Use this cable to connect HP SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.

AE465A

HP SAS MIN-MIN 3X1X-5M Cable Assembly Kit

**NOTE:** This split cable connects internally to SAS Hard Drive Cage (3 channels) and externally to the tape drive (1 channel) with other connector attaching to the controller. The external cable, for the drive, requires a PCI slot to exit the server.

AG452A

HP 2m External Mini-SAS to 4x1 Mini-SAS Cable

**NOTE:** One cable is required for every four drives. Use this cable to connect HP MSL SAS Tape Libraries to Mini-SAS (SFF8088) ports.

AN975A

HP 4m External Mini-SAS to 4x1 Mini-SAS Cable

**NOTE:** One cable is required for every four drives. Use this cable to connect HP MSL SAS Tape Libraries to Mini-SAS (SFF8088) ports.

AN976A
Dimensions (excluding bracket) 6.6 x 2.7 x 0.6 in (16.8 x 6.86 x 1.6 cm)

Disk Drive and Enclosure
Protocol Support 6 Gbps SAS (Serial Attached SCSI)
6 Gbps SATA (Serial Advanced Technology Attachment)

Architecture
Serial Attached SCSI (SAS)
Serial Advanced Technology Attachment (SATA)

SAS Connectors 2x4 external SFF-8088 (Mini-SAS)

Data Transfer Method 600 MB/s bandwidth (1200 MB/s, full duplex) per port for combined throughput of up to 48 Gb/s

PCIe Bus Speed PCIe 3.0 x8 (8 GT/s maximum theoretical bandwidth) or PCIe 2.0 x8 (5 GT/s maximum theoretical bandwidth) depending on the model

Port Transfer Rate 24 Gb/s per x4 Wide SAS Port (4 x 6 Gb/s)

Memory Addressing 64-bit, supporting servers memory greater than 4 GB

Upgradeable Firmware 4-MB flashable ROM online/offline

Environment-friendly Products and Approach
End-of-life Management and Recycling 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: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP 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 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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