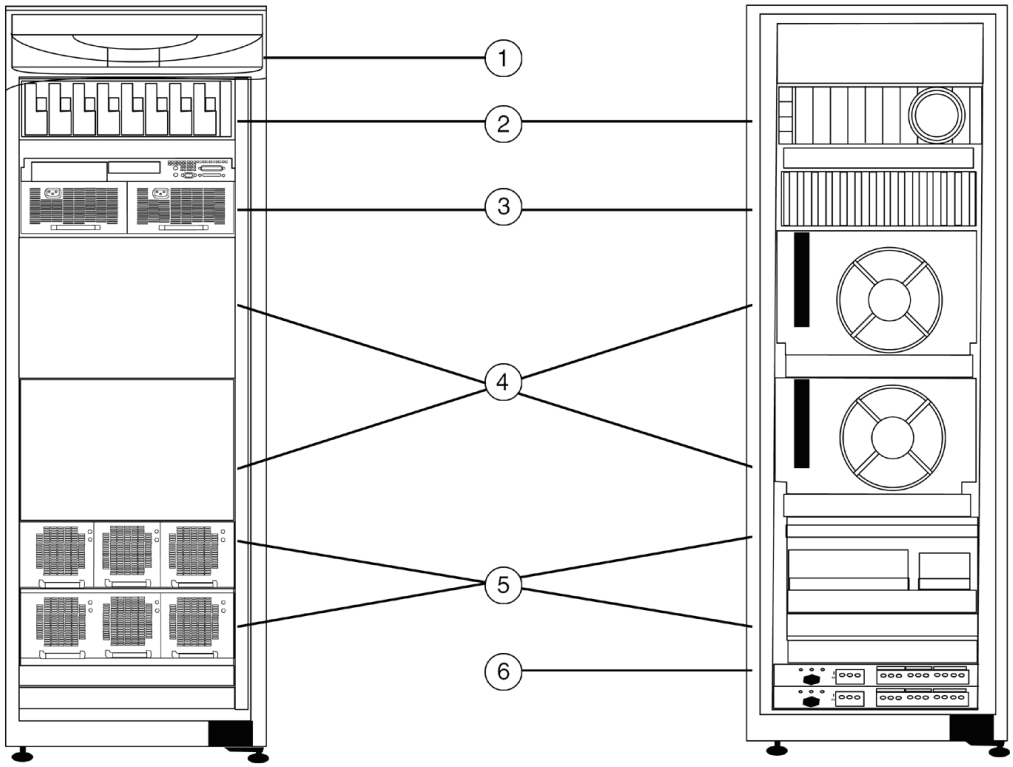
*Overview*




1. Operator control panel
2. One optional PCI or StorageWorks drawer
3. Standard 14-slot PCI I/O Master Drawer
4. System drawers each with 1 QBB (Model 4 includes 1 drawer with space reserved for 2nd drawer; Model 8 includes 2 drawers)
5. 48-volt DC power shelves, 2 power supplies per shelf (Model 4 includes 1 shelf; Model 8 includes 2 shelves)
6. AC input controller(s)

## At A Glance

AlphaServer GS80 systems include:

- One 1224-MHz CPU module; up to eight 1224-MHz Alpha 21264 processors are supported
- Optional HP Capacity on Demand (CoD) SMP processors for non-disruptive performance growth
- 16-MB on-board cache per processor
- Advanced crossbar switch with 7-GB/s of memory bandwidth per building block; up to 14-GB/s memory bandwidth per system
- Up to 64-GB memory
- Up to 16 64-bit PCI buses with 3.2-GB/s aggregate I/O bandwidth
- PCI I/O master drawer with 12 configurable PCI slots
- PCI dual 10/100 Mbit dual Ethernet adapter
- 18.2-GB SCSI disk drive
- 600-MB CD-ROM drive
- Enhanced reliability with ECC-protected memory, processor cache, and system data paths
- Security of RAID storage and online add and removal of CPUs
- Optional redundant power supplies with N+1 power option (hot-swappable processors are available on GS160 and GS320 models)
- Up to 56 64-bit PCI slots supported
- Tru64 UNIX or OpenVMS factory installed software (FIS); optional high availability support with Tru64 UNIX and OpenVMS cluster solutions
- Product warranty, one-year hardware, on-site next business day

## Standard Features

| | |
|---|---|
| Processor | Up to eight Alpha 21264 6/1224-MHz CPUs (one CPU per module) |
| Cache Memory | 64-K I and D caches on-chip; 16-MB ECC on-board cache per CPU |
| Architecture | AlphaServer GS80 utilizes a modular crossbar switch structure<br>AlphaServer GS80 uses either one or two system drawers as building blocks. Each drawer houses a Quad building block (QBB) system module, which supports up to four CPUs, four memory modules, and eight PCI buses on a 7-GB/s non-blocking backplane switch<br>Up to two system drawers are connected by a direct internal interconnect with 3.3-GB/s of bandwidth |

**CPUs, Memory, and I/O Slots**

Base systems contain one CPU and one master PCI I/O drawer

| | Model 4 | Model 8 |
|---|---|---|
| Maximum CPUs supported | 4 | 8 |
| Maximum memory supported | 32 GB (4 modules) | 64 GB (8 modules) |
| Maximum PCI slots supported | 28 | 56 |

NOTE: Model 4 and Model 8 base systems include 12 configurable PCI slots. System capacities shown are available with both Tru64 UNIX and OpenVMS operating systems.

| | | |
|---|---|---|
| Network and I/O Controllers | Ethernet | PCI Dual 10/100 Mbit Fast Ethernet adapter (DE602) included in master PCI shelf box; additional Ethernet adapters available as options |
| | Console ports | One bi-directional parallel port with 25-pin D-subminiature connector |
| | | Two EIA-232 full duplex asynchronous modem control serial ports, 9-pin D-subminiature connectors |
| | | One PS/2 compatible keyboard port; one PS/2 compatible mouse port |

**Boot/Diagnostic Devices**

Boot/diagnostic devices included in master PCI shelf box

| | |
|---|---|
| CD-ROM | One 5.25-inch half height 600-MB CD-ROM drive |
| Hard Drives | One 18.2-GB 10,000 rpm SCSI disk drive |

| | | |
|---|---|---|
| Internal Disk Expansion | Total Internal Drive Bays | Up to 14 146-GB drives (2,044 GB) can be mounted in one optional storage shelf in the system cabinet |

| | |
|---|---|
| Power Supplies | Single-phase power subsystem with power cords; optional redundant 48 VDC hot swap power supplies |

## *Standard Features*

| | |
|---|---|
| OS Support | Tru64 UNIX systems include preinstalled software, Base license, Unlimited User license, Server Extension license, Internet Express, and Secure Web Server<br>NOTE: Tru64 UNIX refers to versions 4.0G, 5.1, 5.1A, or later. Refer to the "Supported Options List" – http://www.hp.com/alphaserver/products/options.html – for any unique limitations based on OS version.<br>NOTE: This web site is available in English only.<br>OpenVMS systems include preinstalled software, Base license and Enterprise Integration Package V3.0<br>Support for up to two total instances of Tru64 UNIX or OpenVMS, or a combination of both, in hardware partitions on a single AlphaServer GS80 Model 8 hardware platform<br>NOTE: OpenVMS refers to versions 7.2-1H1, 7.2-2, 7.3. or later. Refer to the "Supported Options List" – http://www.hp.com/alphaserver/products/options.html – for any unique limitations based on OS version.<br>NOTE: This web site is available in English only. |
| Service and Support | Protected by HP Services including a one-year on-site hardware warranty. Training, consulting, network integration, software support, comprehensive system maintenance and guaranteed uptime services are also available for customers requiring higher levels of service and support. |

## Step 1 - Assess Application Requirements

- Selection of system components must be made in the context of total application requirements. Although the configuration of system components must be done in steps (for example, base packages, CPUs, memories, etc.), these steps cannot be done in isolation.
- The order in which requirements are assessed is also important, since one requirement may impact others. Before proceeding, it would be useful to assess the total application requirements in the following order:
- What level of availability is required?
- If no single points of failure are allowed, then the solution should be configured as a multi-system cluster.
- If access to specific devices must be assured, consider redundant adapters, RAID, N+1 power, redundant PCI drawers, and redundant consoles.
- If software redundancy is required, consider clusters and/or hardware partitioning. The choice of hardware partitioning will generate a need for multiple master PCI drawers, multiple consoles, and I/O adapters.
- If the "CPU On-Line Add and Remove" feature is required, refer to document EK-GSHPG-RM for configuration and operational requirements.
- Is hardware partitioning required for optimal system management?
- What overall capacities are required in terms of processor performance, memory capacity, and disk storage?
- What are the near-term system expansion needs?
- How will system cabinets be physically arranged? This will determine if expansion cabinets are required and what cable lengths are required.

NOTE: Most configuration steps require that these data be considered in whole or in part. Be sure to execute each step in the context of the total application requirements.

### System Ordering Requirements:

Certain system components or services are either required for normal operation or are recommended for best system performance and/or operation. This document uses the following definitions to specify these options:

- **Mandatory purchase**: The system cannot function without this option or service - the option or service must be ordered with the system.
- **Required to function**: This option or service is needed to support a working system - the option or service must be ordered with the system or be available onsite.
- **Recommended**: System performance or function will be enhanced if this option or service is ordered.

## Step 2 - Select base system

AlphaServer GS80 systems require selection of the following items:

### Mandatory Purchases:

- Base system with operating system license (either OpenVMS or Tru64 UNIX) that includes one 1224-MHz CPU module
- Minimum of one memory module

### Required Options and Services:

- Software media and documentation for first system onsite
- Installation and/or startup services
- System management console or device and software with equivalent functionality

### Recommended Services:

- HP Care Pack Service Package
- VIS Services

NOTE: The base system package should be selected in the context of the number of hardware partitions required, the total capacity required, and the anticipated near-term system growth.

*Systems*

| AlphaServer GS80 (1224-MHz) Base Systems | | | | | | |
|---|---|---|---|---|---|---|
| Model | OS | Drawers (QBBs) Included | Total CPUs Supported | Geography | Input Power | Order Number |
| Model 4 | Tru64 UNIX | 1 | 4 | U.S./Canada | 120V | DA-A80AG-AC |
| Model 4 | Tru64 UNIX | 1 | 4 | Europe | 220-240V | DA-A80AG-AD |
| Model 4 | Tru64 UNIX | 1 | 4 | Japan | 200-240V | DA-A80AG-AE |
| Model 4 | OpenVMS | 1 | 4 | U.S./Canada | 120V | DY-A80AG-AC |
| Model 4 | OpenVMS | 1 | 4 | Europe | 220-240V | DY-A80AG-AD |
| Model 4 | OpenVMS | 1 | 4 | Japan | 200-240V | DY-A80AG-AE |
| | | | | | | |
| Model 8 | Tru64 UNIX | 2 | 8 | U.S./Canada | 120V | DA-A80BG-AC |
| Model 8 | Tru64 UNIX | 2 | 8 | Europe | 220-240V | DA-A80BG-AD |
| Model 8 | Tru64 UNIX | 2 | 8 | Japan | 200-240V | DA-A80BG-AE |
| Model 8 | OpenVMS | 2 | 8 | U.S./Canada | 120V | DY-A80BG-AC |
| Model 8 | OpenVMS | 2 | 8 | Europe | 220-240V | DY-A80BG-AD |
| Model 8 | OpenVMS | 2 | 8 | Japan | 200-240V | DY-A80BG-AE |

Step 3 - Additional SMP CPUs

- AlphaServer GS80 base systems contain one CPU module. Additional SMP CPUs may be added, up to the limits shown in above table. SMP CPU options include an operating system SMP license.

| | |
|---|---|
| GS80 SMP upgrade CPU, 68/1224-MHz with 16-MB on-board cache, Tru64 UNIX | 3X-KN8AC-AB |
| GS80 SMP upgrade CPU, 68/1224-MHz with 16-MB on-board cache, OpenVMS | 3X-KN8AC-AC |

**HP Capacity on Demand** (CoD) CPUs

- AlphaServer GS80 base systems can be configured with optional HP Capacity on Demand (CoD) CPUs for non-disruptive future capacity expansion. The CPUs will be field installed as part of the system installation. The total number of CPUs – base CPU, SMP CPUs, and CoD CPUs – must adhere to the limits shown in the above table. Refer to the HP Capacity on Demand Program described in the "Upgrades" section.

| | |
|---|---|
| GS80 CoD SMP CPU, includes one 68/1224-MHz CPU module with 16-MB on-board cache, Tru64 UNIX SMP license, and CoD program license | 3X-KN8CC-AB |
| GS80 CoD SMP CPU, includes one 68/1224-MHz CPU module with 16-MB on-board cache, OpenVMS SMP license, and CoD program license | 3X-KN8CC-AC |

*Options*

## Step 4 - Select Memory Options

- Memory options are engineered specifically for use with this series and include additional components, which are integral to the system architecture.
- Memory options consist of a series of base modules that contain one memory array. A second array (called "upgrades" in the table) may be added to a base module in the factory or in the field.

| | |
|---|---|
| 0.5-GB GS80/160/320 base memory module | 3X-MS8AA-AB |
| 0.5-GB GS80/160/320 memory DIMM upgrade | 3X-MS8AA-AU |
| 1-GB GS80/160/320 base memory module | 3X-MS8AA-BB |
| 1-GB GS80/160/320 memory DIMM upgrade | 3X-MS8AA-BU |
| 2-GB GS80/160/320 base memory module | 3X-MS8AA-CB |
| 2-GB GS80/160/320 memory DIMM upgrade | 3X-MS8AA-CU |
| 4-GB GS80/160/320 base memory module | 3X-MS8AA-DB |
| 4-GB GS80/160/320 memory DIMM upgrade | 3X-MS8AA-DU |

### Memory Configuration Guidelines

Memory options should be selected in the context of the application's sensitivity to memory bandwidth and memory capacity, and the number of hardware partitions. This will determine the number of memory base modules and upgrades needed. The total capacity required will determine the size of the arrays to be chosen.

The configuration of memory may influence the performance of applications, and there are numerous ways to configure the choices of memory base modules and upgrade DIMMs. The following general guidelines can lead to several configuration choices. Application-specific guidelines will help narrow down the choices.

- Configuring for capacity: The highest capacity is achieved when the 3X-MS8AA-DB/DU combination is used.
- Configuring for performance: Interleaved operations reduce the average latency and increase the memory throughput over non-interleaved operations. Each memory base module is capable of 4-way interleaving with one array (no upgrades added) or 8-way interleaving with two arrays (base module plus one upgrade). A system drawer is configured with eight arrays (four base modules plus four array upgrades) provides 32-way interleaving and has the maximum potential memory bandwidth. Refer to "Memory Applications Examples" below to determine which applications gain the most benefit from this bandwidth.
- Memory modules should be configured in powers of 2: That is, 0, 1, 2, or 4 base modules in a system drawer. Upgrades should also be installed in powers of 2: 0, 1, 2, or 4 base modules in a system drawer.
- Although mixed-capacity memory modules may be configured, the highest bandwidth is achieved when a system drawer is populated with eight identical arrays: four base modules and four upgrades. The next-highest bandwidth would be four base modules (four arrays).
- If it is not possible to match the capacities of all the arrays, the next best choice is to configure pairs of identical base modules, or base module/upgrade combinations. For example, a configuration of two 2-GB base modules (3X-MS8AA-CB), each with a 1-GB upgrade (3X-MS8AA-BU) is a better choice than a configuration of three 2-GB modules (3X-MS8AA-CB).

### Memory Application Examples

Configuring memory is a compromise between cost, total memory capacity, and memory bandwidth requirements. The behavior of the application must be used to define the most-desired configuration. Some applications are sensitive to memory capacity, some are sensitive to memory bandwidth, and some are sensitive to neither. If actual application measurements are not available, the following may be used as guidelines:

- Large memory (VLM) applications, in which large amounts of memory can substantially reduce I/O, may be optimized for total memory capacity and future capacity growth. In VLM applications, the right balance might be one memory base module, with upgrade, for every two CPUs. This would result in one memory array per CPU.
- Typical commercial applications, such as transaction processing (OLTP) and multi-user timesharing, usually operate efficiently from cache and may not be materially affected by memory bandwidth. Memory configuration is a balance between memory bandwidth and future capacity growth. It is advisable to match the number of arrays to the number of CPUs.
- Data mining can benefit from additional memory bandwidth. It is best to match the number of memory base modules to the number of CPUs.
- The most demanding high-performance technical applications (HPTC) achieve a performance level that is directly proportional to memory bandwidth. In these cases, configure one memory base module, with upgrade, per CPU. This results in two memory arrays per CPU.

The following table represents how 8 GB could be configured in a 4-CPU QBB system drawer in each of the four referenced applications. The numbers under each application represent how many of each memory option should be ordered.

| Memory Configuration Examples – Configuring a system drawer with a total of 8 GB for specific applications | | | | | |
|---|---|---|---|---|---|
| | | Application | | | |
| | | VLM | OLTP, Timesharing | Data Mining | HPTC |
| 1-GB base module | (3X-MS8AA-BB) | - | - | - | 4 |
| 1-GB upgrade | (3X-MS8AA-BU) | - | - | - | 4 |
| 2-GB base module | (3X-MS8AA-CB) | 2 | 2 | 4 | - |
| 2-GB upgrade | (3X-MS8AA-CU) | 2 | 2 | - | - |
| | | | | | |
| The following additional configuration options utilizing the 4-GB base module are available: | | | | | |
| 4-GB base module | (3X-MS8AA-DB) | 2 | 2 | N/R | N/R |
| 4-GB upgrade | (3X-MS8AA-DU) | - | - | | |
| NOTE: N/R = Not recommended - For these applications, configure either four or eight like-sized memory options rather than one or two. | | | | | |

### Step 5 - Evaluate Configuration Requirements to Support Optional Partitioning

### Configuration Requirements for Partitions

- Configuring partitions requires some attention to detail with respect to minimum requirements for option selection, population, and option placement.
- A single AlphaServer GS80 Model 8 can be divided into two logical hardware partitions, each running an instance of Tru64 UNIX or an instance of OpenVMS. Each partition is allocated its own dedicated ² shared-nothing² set of hardware resources: System Drawer (s), CPU module(s), memory module(s), and I/O.
- Multiple-drawer (QBB) hard partitions within a GS80 server do not provide complete hardware failure isolation across hard partitions. Single hard partitioned drawers (QBBs) within the server do provide hardware failure isolation.
- Each hardware partition is viewed as a unique node, from a system point-of-view, with its own instance of Tru64 UNIX or OpenVMS operating system and application software, independent system console, and error log.
- In the AlphaServer GS80, each of the two hardware partitions is defined by a single system drawer.
- One system management console (3X-DS8BA-xx or 3X-DS8DA-xx) and one console hub (3X-DS8AA-AA) recommended per system.
- Supported option rules apply for maximum configurations of each AlphaServer GS80 system partition. Care must be exercised to ensure that any planned reconfiguration of hardware partitions will not violate option support rules.

### Minimum Hardware Required per AlphaServer GS80 Hardware Partition

Each hardware partition requires one system drawer and that drawer must be configured with the minimum hardware listed below. Each system drawer can be configured with additional hardware once this minimum requirement is met.

## Options

- One Alpha 21264 6/1224-MHz CPU module
- One 3X-MS8AA-BB/CB/DB memory module (1 GB, 2 GB, 4 GB)
- One 3X-KFWHA-BA system I/O module and one 3X-DWWPA-AA master PCI drawer. Depending upon the configuration, this may require the use of a 3X-H9A20-AD/AE/AF expansion cabinet.
- AlphaServer GS80 systems are normally configured according to standard module placement rules, and are shipped with one copy of the operating system installed at the factory (Tru64 UNIX or OpenVMS). However, systems with hardware partitions offer hardware and software configuration flexibility. Factory Integration Services (VIS) are recommended to enable custom module configuration and factory installation of multiple copies of the operating system on hardware partitioned systems.

### Optimizing System Resources

The following configuration guidelines can be used to improve performance in systems or in each partition of a hardware-partitioned system.

- Balance the resources in the system (or hardware partition) based upon the available backplane space and the proposed option populations:
- Sparsely configured systems, those that are using half or less than half of their available capacity for CPUs, memory, and PCI drawers, should be configured with the options concentrated in as few system drawers as possible. For example, a GS80 Model 8 with four CPUs, four memory modules, and two PCI drawers would usually be configured in the first system drawer. The first system drawer would be "active" and the second system drawer would be available for expansion.
- Densely populated systems, those that are using more than half of their available capacity for CPUs, memory, and PCI drawers, should be configured with the options spread out across both system drawers.
- Configure active system drawers symmetrically, each with CPUs, memory, and PCI drawers.
- Configure the I/O adapters so that each active system drawer has direct access to the most frequently accessed data.

### System Software Required for AlphaServer GS80 Hardware Partition Support

### Software Licensing for Hardware Partitions

- Base systems include operating system license (Tru64 UNIX or OpenVMS) that licenses up to two hardware partitions

User and capacity-based licensing is unaffected by hardware partitions. Examples:

- If a product is licensed for 200 concurrent users, these users can be split among the partitions, but cannot exceed 200 total users.
- If users have a departmental (license code "G") capacity license for a product, that license can be loaded into the license databases on each of the hardware partitions.

### Licensing Partitioned AlphaServer GS80 Systems for Both OpenVMS and Tru64 UNIX

- If the system requires both OpenVMS and Tru64 UNIX operating systems be licensed, one operating system license is included in the base system and the second is added as a line item. The second operating system license upgrade, which includes the license for only one CPU, would be added to the order using the following part numbers. Order appropriate media and documentation kits from Step 13.

| | |
|---|---|
| OpenVMS software upgrade for GS80 | QB-63PAG-AG |
| Tru64 UNIX software upgrade for GS80 | QB-595AM-AA |

- Only those SMP processors intended for use with the second operating system must be similarly licensed. Use the following license-only part numbers to add an SMP license for any CPUs intended for use with the second operating system:

| | |
|---|---|
| OpenVMS Alpha SMP license for GS80 | QL-MT1A9-6Q |
| Tru64 UNIX Alpha SMP license for GS80 | QL-MT4A9-6Q |

- The order of licensing is not important, but the following examples are similarly constructed for clarity: The configuration starts with a Tru64 UNIX base system part number and the addition of OpenVMS licenses.

Example 1: 8-CPU GS80 system in which all processors are licensed for both OpenVMS and Tru64 UNIX:

- Base system order would include a DA-A80BE-Ax and seven 3X-KN8AB-AB SMP upgrade CPUs
- Add one QB-63PAG-AG OpenVMS software upgrade and seven QL-MT1A9-6Q OpenVMS Alpha SMP licenses

Example 2: 8-CPU GS80 system in which all the processors are licensed for Tru64 UNIX and four processors are also licensed for OpenVMS:

- Base system order would include a DA-A80AE-Ax and seven 3X-KN8AB-AB SMP upgrade CPUs
- Add one QB-63PAG-AG OpenVMS software upgrade and three QL-MT1A9-6Q OpenVMS Alpha SMP licenses
- User and capacity-based licenses would be added for the second operating system environment as though it were a standalone system.

*Options*

## Step 6 - Configure Packaging Options

### Step 6a - Redundant (N+1) Power Supplies

- Power supplies included with Model 4 and Model 8 systems can support all combinations of CPUs, memory, and I/O that can be configured within the system boxes.
- Additional 48V power regulators can be ordered to provide N+1 power redundancy.
- For Model 4 systems, order one power supply to achieve N+1 capability; for Model 8 systems, order two power supplies to achieve N+1 capability.

| | |
|---|---|
| 1000W 48V power supply | H7510-BA |

### Step 6b - Internal System Expansion

- AlphaServer GS80 Model 4 and Model 8 systems can support one additional PCI drawer (master or expansion) or DS-SL13R-xx StorageWorks shelf in the system cabinet.

**Internal StorageWorks Expansion**

- System cabinet provides space for one forward facing StorageWorks shelf
- One DS-SL13x-xx Ultra3 SCSI (LVD) shelf; shelf supports a maximum of 14 Ultra3 disk drives
- Each UltraSCSI StorageWorks shelf requires a SCSI controller and a SCSI cable to connect controller to shelf
- StorageWorks drives are listed in a subsequent section

**Configuring DS-SL13R-xx Ultra3 (LVD) Shelves**

- Single-bus Ultra3 shelf requires a 3X-KZPCA-AA Ultra2 (LVD) SCSI adapter or DS-KZPCC-xx RAID controller and a SCSI cable to connect controller to shelf
- Split-bus Ultra3 shelf requires two 3X-KZPCA-AA Ultra2 (LVD) SCSI adapters, at least one dual-channel 3X-KZPEA-DB Ultra3 (LVD) SCSI adapter, or DS-KZPCC-xx RAID controllers and SCSI cables to connect controller to shelf
- Ultra3 shelves connected to 3X-KZPCA-AA adapters in the power cabinet require BN38C-02 2-meter cables; DS-KZPCC-xx RAID controllers require BN37A-02 2-meter cables
- Ultra3 shelves connected to 3X-KZPCA-AA adapters in an attached expander cabinet require BN38C-10 10-meter cables; DS-KZPCC-xx RAID controllers require BN37A-10 10-meter cables
- Ultra3 shelves connected to 3X-KZPCA-AA adapters in a remote expander cabinet require 10 20-meter BN38C-xx cables, depending upon physical cabinet location; DS-KZPCC-xx RAID controllers require BN37A-xx cables

  Ultra3 Universal drives are listed in a subsequent section

| | |
|---|---|
| StorageWorks Model 4314R Ultra3 SCSI (LVD) single-bus Universal drive rackmount shelf, International except Japan | DS-SL13R-AA |
| StorageWorks Model 4314R Ultra3 SCSI (LVD) single-bus Universal drive rackmount shelf, Japan | DS-SL13R-AJ |
| StorageWorks Model 4354R Ultra3 SCSI (LVD) split-bus Universal drive rackmount shelf, International except Japan | DS-SL13R-BA |
| StorageWorks Model 4354R Ultra3 SCSI (LVD) split-bus Universal drive rackmount shelf, Japan | DS-SL13R-BJ |

NOTE: Model 4314 shelf with DS-KZPCC-CE RAID controller does not support a disk drive in the last slot.

## Options

**Power Option for DS-SL13R-xx Shelves**

- Additional power supply provides N+1 power for 4314R Ultra3 (LVD) StorageWorks shelves; power supply uses a dedicated location in the shelf.
- Not required for 4354R shelves.

| | |
|---|---|
| Redundant power supply for 4314R Ultra3 (LVD) StorageWorks shelf, North America | DS-SE2UP-AA |
| Redundant power supply for 4314R Ultra3 (LVD) StorageWorks shelf, International | DS-SE2UP-AI |

**System I/O Expansion**

- Model 4 systems support up to two PCI drawers; Model 8 systems support up to four PCI drawers. One PCI drawer included in Model 4 and Model 8 base systems.
- Model 4 and Model 8 system cabinets provide space for one additional PCI drawer or one internal storage shelf.
- Additional PCI drawers and storage shelves can be configured in 3X-H9A20-AD/AE/AF I/O expansion cabinet, described in a subsequent section.
- All PCI drawers contain 14 PCI slots configured into four PCI buses; two of the buses have four slots each, the other two buses have three slots each.
- There are two types of PCI drawers: expansion drawers and master drawers. Base system configurations include one PCI master drawer with 12 configurable PCI slots.
- Expansion drawers contain 14 PCI slots and N+1 redundant power system; expansion drawers are used for most PCI expansion applications.
- Optional master PCI drawers contain 13 configurable PCI slots, N+1 redundant power system, plus the console ports and storage devices required for use as a system console. (These devices are listed on page 2. Note that the Fast Ethernet adapter is not included in optional master PCI drawers.) Optional master PCI drawers have two applications:
  - As redundant console sub-systems
  - As consoles for individual partitions in hardware partitioned systems
- PCI drawers are connected to a drawer utilizing a 3X-KFWHA-BA system I/O module that connects to the PCI drawer using two BN39B cables.

**PCI Drawer Expansion**

- PCI drawers are connected to a drawer utilizing a 3X-KFWHA-BA system I/O module that connects to the PCI drawer using two BN39B cables.
- Maximum one additional drawer in the system power cabinet see "External Expansion Cabinets" for more details.
- PCI drawers can be split between multiple system drawers as long as all system drawers are contained within the same hardware partition.
- PCI drawers mounted in a common H9A20 Expansion Cabinet can serve multiple systems.

| | |
|---|---|
| Master PCI shelf mount box for system and I/O expansion cabinets with standard I/O PCI module and 13 PCI expansion slots. (The 1st master comes standard with all systems and includes a standard dual Ethernet network card and the system module and cable pair for connection to the system drawer). | 3X-DWWPA-AA |
| Expansion PCI shelf mount box for system and I/O expansion cabinets with 14 PCI expansion slots | 3X-DWWPA-BA |
| System I/O module for connecting to master or expansion PCI shelves | 3X-KFWHA-BA |
| I/O module cable for connection between I/O module and master or expansion PCI shelves is mounted in system cabinet; two are mandatory per system I/O module | BN39B-04 |

*Options*

Step 6c - External Expansion Cabinets

- Additional PCI drawers and storage shelves can be installed in an optional 3X-H9A20-AD/AE/AF expansion cabinet. One 3X-H9A20-AD/AE/AF expansion cabinet is supported
- The 3X-H9A20-AD/AE/AF I/O expansion cabinet can be configured to hold all disk BA36R StorageWorks shelves or DS-SL13R-xx Ultra3 StorageWorks shelves or combination of StorageWorks shelves and PCI drawers.
- If no PCI drawers are configured, cabinet supports up to eight BA36R or five DS-SL13R-xx StorageWorks shelves.
- If one PCI drawer is configured, cabinet supports up to five BA36R or four DS-SL13R-xx StorageWorks shelves.
- If two PCI drawers are configured, cabinet supports up to four BA36R or three DS-SL13R-xx StorageWorks shelves.
- If three PCI drawers are configured, cabinet supports up to two BA36R or two DS-SL13R-xx StorageWorks shelves.
- BA36R and DSSL13x-xx StorageWorks shelves can be combined in the same expansion cabinet.

| | |
|---|---|
| Black I/O expansion cabinet for use with GS80 systems, includes two 120V single-phase power controllers and cords for use in U.S. and Canada – does not support dual AC input configurations | 3X-H9A20-AD |
| Black I/O expansion cabinet for use with GS80 systems, includes two 220-240V single-phase power controllers and cords for use in Europe – supports dual AC input configurations | 3X-H9A20-AE |
| Black I/O expansion cabinet for use with GS80 systems, includes two 200-240V single-phase power controllers and cords for use in U.S., Canada, and Japan – supports dual AC input configurations | 3X-H9A20-AF |

- If large quantities of disks are required, the use of StorageWorks Storage Array cabinets and components is highly recommended.
- Systems installed in the US and Canada may use the 3X-H9A20-AD cabinet when 120V input power is required. In all other cases, the 3X-H9A20-AF cabinet is preferred because of the ability to support dual AC input.
- 3X-H9A20-AD/AE/AF cabinets may be joined to a GS80 system. PCI drawers placed in these cabinets require 7-meter I/O cables.
- 3X-H9A20-AD/AE/AF cabinets may be placed up to 6 meters from the system cabinet. Multiple expander cabinets may be connected to one another or placed separately. Each group of free-standing H9A20 cabinets requires an end-panel trim kit (CK-H9A20-AB).
- PCI drawers placed in remote cabinets require 10-meter I/O cables.

| | |
|---|---|
| Black end-panel trim kit for remote 3X-H9A20-AD/AE/AF cabinets | CK-H9A20-AB |
| I/O module cables for connection between I/O module and master or expansion PCI drawers mounted in 3X-H9A20-AD/AE/AF expansion cabinet adjacent to system; two cables (BN39B-07 or BN39B-10) are mandatory per PCI drawer | BN39B-07 |
| I/O module cables for connection between I/O module and master or expansion PCI drawers mounted in second expansion cabinet or in remote 3X-H9A20-AD/AE/AF expansion cabinets; two cables (BN39B-07 or BN39B-10) are mandatory per PCI drawer | BN39B-10 |

*Options*

## Step 7 - Storage

### Step 7a - Storage Adapters and Controllers

- Tru64 UNIX can support more SCSI controllers per hardware partition than can be configured in the AlphaServer GS80 system. Refer to the "Supported Options List" for specific rules.
- OpenVMS supports 24 KZPBA-CB/3X-KZPBA-CC SCSI controllers per system.
- Each master PCI drawer contains an embedded SCSI controller that must be included in the total count of SCSI controllers configured in the system (or partition). Tru64 UNIX counts FIS disk and CD-ROM as an embedded SCSI device. OpenVMS counts the FIS disk only as an embedded SCSI device. Therefore, one (OpenVMS) or two (Tru64 UNIX) SCSI controllers per master PCI drawer must be included in the total count of SCSI devices in the system.
- For cluster configurations, use Y cable (BN39A-0G).
- Manufacturing may substitute correct cable lengths depending on configuration.

NOTE: "Per System" quantities apply to systems or to each hardware partition. The SCSI adapters included in the base system or in 3x-DWWPA-AA master PCI drawers must be included in this calculation.

| | Maximum # Supported | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tru64 UNIX | | | OpenVMS | | | |
| | Per System | Per System Drawer | Per PCI Drawer | Per System | Per System Drawer | Per PCI Drawer | |
| PCI Fibre Channel adapter (uses one PCI slot); requires Fibre Channel with SC connector for adapter | 26/54* | 26/26* | 13 | 26 | 26 | 13 | DS-KGPSA-CA |
| 2-GB PCI Fibre Channel adapter, (uses one PCI slot); requires Fibre Channel cable with LC connector for adapter | 54 | 26 | 13 | 26 | 26 | 4 | DS-KGPSA-DA |
| 2-GB PCI-X Fibre Channel adapter | 8 | 8 | | 8 | 8 | | DS-KGPSA-EA |
| Fibre Channel SC-SC cable (BNGBX-xx), xx=02, 03, 05, 10, 15, 30, 50 meters | | | | | | | BNGBX-xx |
| Fibre Channel SC-LC cable, 2-meter (2976), 5-meter (2977), 15-meter (2978), 30-meter (3458), 50-meter (3459) | | | | | | | 3R-Axxxx-AA |
| Fibre Channel LC-LC cable, 2-meter (2979), 5-meter (2980), 15-meter (2981), 30-meter (3454), 50-meter (3455) | | | | | | | 3R-Axxxx-AA |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PCI 1-port UltraSCSI single-ended host adapter (uses one PCI slot) | 8 | 8 | 8 | 8 | 8 | 8 | KZPBA-CA |
| PCI 1-port UltraSCSI differential host adapter (uses one PCI slot); requires BN38C-xx cable | 24/54* | 24/26* | 12/13* | 24 | 24 | 12 | 3X-KZPBA-CC |
| VHDCI male-to-68-pin HD male UltraSCSI cable xx=02, 05, 10, 20 (use -02 for connecting SCSI adapter to SCSI devices when both the PCI shelf and StorageWorks shelf are in the system cabinet or in an adjacent expansion cabinet; use -05, -10, and -20 for connecting SCSI adapter to SCSI devices when the PCI shelf and StorageWorks shelf are in two different cabinets) | | | | | | | BN38C-xx |
| NOTE: * = Tru64 UNIX V5.1 is required to support 54 adapters per partition and 13 adapters per PCI drawer. Tru64 UNIX 4.0G supports 24 adapters per partition. | | | | | | | |

## Options

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PCI 1-port Ultra 2 (LVD) SCSI adapter, 32-bit, single-channel (uses one PCI slot); includes external 68-pin HD connectors; requires BN38C-xx cable to connect adapter to Ultra2 or Ultra3 shelf; HSZxx RAID controllers not supported | 8 | 8 | 8 | 8 | 8 | 8 | 3X-KZPCA-AA |
| 68-pin HD male-to-VHDCI male UltraSCSI cable; xx=02, 03, 05, 10, 20 meter | | | | | | | BN38C-xx |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PCI 2-channel Ultra3 (LVD) SCSI adapter, 64-bit/66-MHz (uses one PCI slot); includes internal 68-pin HD and external 68-pin VHDCI connectors; requires 3X-BC56J-xx cable to connect adapter to DS-SL13R-Bx/ DS-SSL14-xx Ultra3 shelf. NOTE: OpenVMS 7.2-2, or later, is required; Tru64 UNIX 5.1B PK4, or later is required, maximum cable length is 12 meters. | 4 | 4 | 4 | 4 | 4 | 4 | 3X-KZPEA-DB |
| 68-pin VHDCI male-to-VHDCI male UltraSCSI cable; xx=02, 03, 04, for 6, 12, & 24 meters respectively | | | | | | | 3X-BC56J-xx |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PCI 1-channel Ultra2 (LVD) SCSI RAID controller, 16-MB cache, (uses one PCI slot); supports 14 disks per channel with DS-SL13R-xx Ultra3 shelves; requires BN37A-xx cable to connect adapter to DS-SL13R-xx Ultra3 shelf. | 8** | 8 | 8 | | | | DS-KZPCC-AC |
| PCI 3-channel Ultra2 (LVD) SCSI RAID controller, 64-MB cache, (uses one PCI slot); supports 14 disks per channel with DS-SL13R-xx Ultra3 shelves; requires BN37A-xx cable to connect adapter to DS-SL13R-xx Ultra3 shelf. | 8** | 8 | 8 | | | | DS-KZPCC-CE |
| 68-pin VHDCI male-to-VHDCI male UltraSCSI cable; xx=02, 03, 05, 10, 20 meter | | | | | | | BN37A-xx |
| NOTE: ** = Requires a Graphics Adapter or Graphical Display Station for its configuration utility (other than the base system console). | | | | | | | |
| NOTES: Use 2-meter cable to connect adapters, controllers, and shelf within the GS80 cabinet. Use 10-meter cable to connect adapters, controllers to shelves in attached H9A20 expander cabinets. Use 10-to 25-meter cables to connect adapters, controllers to shelves in remote expander cabinets. | | | | | | | |

### HVD to LVD Converters

HVD (High Voltage Differential) adapters and LVD (Low Voltage Differential) devices are normally incompatible due to their different signaling voltage levels. This incompatibility does not allow direct communication between the different technologies. The HVD to LVD converter allows connectivity between legacy HVD Host Bus Adapters and today's LVD devices. The converter provides:

- Connectivity in direct attach or shared configurations of all currently available LVD devices, including disks, tapes, libraries, and shelves (4314 or 4354) when used with the KZPBA-CB and 3X-KZPBA-CC HVD adapters. With the retirement of StorageWorks 1 disks and HVD shelves (BA36R), converters are desirable where upgrades to LVD HBAs, or upgrades to current operating system versions are not possible.
- Shared and direct attach configurations are interconnected much the same as those previously configured with homogeneous HVD solutions, except that the HVD output is now passed through the converter before proceeding to the LVD device. Where required, Y cables (BN21W-0B), terminators (H879-AA), cables (BN38C-10, BN37A-20), one or two HVD/LVD converters (one-port, two-port), Memory Channel adapters (CCMAB), one Memory Channel cable
  (BN39B-10), are used in conjunction with the LVD device of choice.

| | |
|---|---|
| HVD to LVD one-port converter | 3X-DWZCV-BA |
| HVD to LVD two-port converter | 3X-DWZCV-CA |

## Options

| | | |
|---|---|---|
| **CI Adapters** (OpenVMS only) | PCI CI adapter, maximum 26 per system or hardware partition (12 per drawer, six per PCI drawer); requires two PCI slots | CIPCA-BA |
| | Computer interconnect cable set, connects CIPCA to star coupler; select length xx=10, 20, 45 meter | BNCIA-xx |

### Step 7b - Internal Storage

| | | |
|---|---|---|
| **Ultra3 SCSI** (LVD) **Storage Devices** (for use with DS-SL13R-xx Shelves) | 18.2-GB Ultra3 SCSI 15,000 rpm Universal 1-inch disk drive | 3R-A3848-AA |
| | 36.4-GB Ultra3 SCSI 10,000 rpm Universal 1-inch disk drive | 3R-A3838-AA |
| | 36.4-GB Ultra3 SCSI 15,000 rpm Universal 1-inch disk drive | 3R-A3849-AA |
| | 72.8-GB Ultra3 SCSI 10,000 rpm Universal 1-inch disk drive | 3R-A3839-AA |
| | 72.8-GB Ultra3 SCSI 10,000 rpm Universal 1-inch disk drive | 3R-A3851-AA |
| | 146-GB Ultra3 SCSI 10,000 rpm Universal 1-inch disk drive | 3R-A3841-AA |
| **Ultra2 SCSI** (LVD) **Tape Devices** (for use with DS-SL13R-xx Shelves) | AIT-351B, 35-GB tape drive embedded in hot-plug Universal carrier | 3R-A2396-AA |
| | AIT-50, 50-GB tape drive embedded in hot-plug Universal carrier | 3R-A2779-AA |
| | SDT-10,000, 20/40-GB DAT tape drive embedded in hot-plug Universal carrier | 3R-A2780-AA |
| | AIT-100, 2000-GB tape drive embedded in hot-plug Universal carrier | 3R-A3621-AA |

### Step 7c - Tape Devices

| | | |
|---|---|---|
| **3U Rackmount Tape Drive Enclosure** | 3U LVD Rackmount Tape Drive Enclosure for use in H9Axx Series Cabinets, 0 drives, carbon black | 274338-B21 |
| | Rackmount kit for H9Axx Series Cabinet, carbon black – required for mounting 3U Rackmount Tape Drive Enclosure in H9Axx cabinets | 3R-A3804-AA |
| | NOTE: The 3U Tape Drive Enclosure supports up to four internal half-height removable devices, or up to two full height devices. Select up to four AIT or DAT devices, or two DLT/SDLT devices with 3U Rackmount Tape Drive Enclosure (274338-B21), or select preconfigured configurations listed below. | |
| **Tape Drives for Use in 3U Rackmount Tape Drive Enclosure** (Requires 3X-KZPCA-AA or 3X-KZPEA-DB LVD Adapter) | AIT 35/70-GB 3U internal tape drive, carbon black | 216884-B21 |
| | AIT 50/100-GB 3U internal tape drive, carbon black (157766-B22) | 3R-A3753-AA |
| | DAT 20/40-GB 3U internal tape drive, carbon black (157769-B22) | 3R-A3752-AA |
| | DLT8000 40/80-GB internal tape drive, carbon black | 146196-B22 |
| | SDLT 110/220-GB internal tape drive, carbon black | 192106-B25 |
| | SDLT 160/320-GB internal tape drive, carbon black | 257319-B21 |
| **Preconfigured Configurations** | AIT 50-GB, 3U rackmount kit, carbon black | 274333-B21 |
| | DLT 40/80-GB, 3U rackmount kit, carbon black | 274332-B21 |
| | DLT 40/80-GB, dual-drive, 3U rackmount kit, carbon black | 274335-B21 |
| | SDLT 110/220-GB, single drive, 3U rackmount kit, carbon black | 274331-B21 |
| | SDLT 110/220-GB, dual-drive, 3U rackmount kit, carbon black | 274334-B21 |

## Options

| | | |
|---|---|---|
| **5U Rackmount Tape Drive Enclosure** (Requires 3X-KZPCA-AA or 3X-KZPEA-DB LVD Adapter) | 5U Rackmount Tape Drive Enclosure (Requires 3X-KZPCA-AA or 3X-KZPEA-DB LVD Adapter) | 274339-B21 |
| | Rackmount Kit for H9Axx Series Cabinet, carbon black – required for mounting 5U Rackmount Tape Drive Enclosure in H9Axx cabinets | 254795-001 |
| | NOTE: The 5U Rackmount Tape Drive Enclosure supports four full-height devices; select up to four DLT or SDLT devices with 274339-B21, or select preconfigured configurations listed below. | |
| **Tape Drives for Use in 5U Tape Drive Enclosure** | DLT8000 40/80-GB tape drive, carbon black | 146196-B22 |
| | SDLT 110/220-GB tape drive, carbon black | 192106-B25 |
| | SDLT 160/320-GB tape drive, carbon black | 257319-B21 |
| **Preconfigured Configurations** | SDLT 110/220-GB Tape Array III, 5U rackmount kit, carbon black | 274336-B21 |
| | DLT 40/80-GB Tape Array III, 5U rackmount kit, carbon black | 274337-B21 |
| | DLT Tape Array III Model 0 enclosure, U.S. | 168047-001 |
| | Same as above, International | 168047-B31 |
| | Same as above, Japan | 168047-291 |
| **AIT Tabletop Tape Drives** | AIT 35/70-GB 8-mm LVD tabletop tape drive, North America, carbon black; requires LVD adapter | 216885-001 |
| | Same as above, International | 216885-B31 |
| | Same as above, Japan | 216885-291 |
| | AIT 50/100-GB 8-mm SCSI tabletop tape drive with 120V North America power cord, carbon black; requires Ultra2 (LVD) adapter | 157767-002 |
| | Same as above, International | 157767-B32 |
| | Same as above, Japan | 155767-292 |
| **AIT Hot-plug Tape Drives** | AIT 35/70-GB hot-plug LVD Universal tape drive, uses two slots in 43xxx shelves | 3R-A2396-AA |
| | AIT 50/100-GB hot-plug LVD Universal tape drive, uses two slots in or 43xxx shelves | 3R-A2779-AA |
| | AIT-100, 2000-GB tape drive embedded in hot-plug Universal carrier | 3R-A3621-AA |
| **AIT Autoloaders** | AIT 35-GB tabletop autoloader, 8 cartridge, U.S. | 292355-001 |
| | Same as above, International | 292355-B31 |
| | AIT 35-GB rackmount autoloader, 8 cartridge, U.S. | 280349-001 |
| | Same as above, International | 280349-B31 |
| | AIT Rail kit for rackmount autoloader | 284930-001 |
| **AIT Tape Libraries** | SSL2020 AIT tabletop library with one AIT 50-GB drive and 20 slots, LVD | 175195-B21 |
| | SSL2020 AIT tabletop library with two AIT 50-GB drives and 20 slots, LVD | 175195-B22 |
| | SSL2020 AIT rackmount library with one AIT 50-GB drive and 20 slots, LVD | 175196-B21 |
| | SSL2020 AIT rackmount library with two AIT 50-GB drives and 20 slots, LVD | 175196-B22 |
| **DAT Tabletop Tape Drives** | DAT 12/24-GB 4-mm narrow single-ended tabletop SCSI tape drive with 120V North American power cord; requires BN31W-xx SCSI cable | DS-TLZ10-DB |
| | DAT 20/40-GB 4-mm Wide Ultra2 (LVD) tabletop SCSI tape drive with 120V North American power cord, carbon black; requires Ultra2 (LVD) adapter | 157770-002 |
| | Same as above, International | 157770-B32 |
| | Same as above, Japan | 157770-292 |

## Options

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|---|---|---|
| DAT Hot-plug Tape Drive | DAT 20/40-GB DDS4 hot-plug LVD Universal tape drive, uses two slots in 43xxx shelves | 3R-A2780-AA |
| DAT Autoloaders | DAT 20/40-GB auto loader external; requires BN31W-xx SCSI cable and 3X-KZPCA-AA, 3X-KZPEA-DB, or 3X-DEPVZ-AA adapter, North America | 166505-001 |
| | Same as above, International | 166505-B31 |
| | Same as above, Japan | 166505-291 |
| DLT/SDLT Tabletop Tape Drives (Requires 3X-KZPCA-AA or 3X-KZPEA-DB LVD Adapter) | DLT8000 tabletop 40/80-GB DLT external tape drive, carbon black - U.S. | 146197-B23 |
| | Same as above – Japan | 146197-292 |
| | SDLT tabletop 110/220-GB external tape drive, carbon black- U.S. | 192103-002 |
| | Same as above – International | 192103-B32 |
| | Same as above – Japan | 192103-292 |
| | SDLT tabletop 160/320-GB external tape drive, carbon black - U.S. | 257319-001 |
| | Same as above - International | 257319-B31 |
| | Same as above - Japan | 257319-291 |
| Library Rackmount Kit for MSL5xxx Tape Libraries in H9Axx Cabinet Series | Rackmount kit for H9Axx Series cabinets – required for mounting MSL5000 series in H9Axx cabinets | 254795-001 |
| SDLT Tape Libraries | SDLT Tape Libraries require the use of either a 3X-KZPCA-AA or 3X-KZPEA-DB adapter; Tru64 UNIX 5.1B requires a minimum level of PK4 | |
| StorageWorks MSL5026SL SDLT 110/220-GB Tape Library | MSL5026SL, SDLT tabletop library with one 110/220-GB SDLT tape drive, LVD; graphite | 302511-B21 |
| | MSL5026SL, SDLT tabletop library with two 110/220-GB SDLT tape drives, LVD; graphite | 302511-B22 |
| | MSL5026SL, SDLT rackmount library with one 110/220-GB SDLT tape drive, LVD; graphite – requires rackmount kit (254795-001) | 302512-B21 |
| | MSL5026SL, SDLT rackmount library with two 110/220-GB SDLT tape drives, LVD; graphite – requires rackmount kit (254795-001) | 302512-B22 |
| StorageWorks MSL5026S2 SDLT 160/320-GB Tape Library | MSL5026S2, SDLT rackmount library with 0 drives, LVD; graphite – requires rackmount kit (254795-001) | 293472-B21 |
| | MSL5026S2, SDLT rackmount library with one 160/320-GB SDLT tape drive, LVD; graphite – requires rackmount kit (254795-001) | 293472-B22 |
| | MSL5026S2, SDLT rackmount library with one 160/320-GB SDLT tape drive, LVD; graphite – requires rackmount kit (254795-001) | 293472-B23 |
| | MSL5026S2, SDLT rackmount library with one 160/320-GB SDLT tape drive, Fibre Channel Interface; graphite – requires rackmount kit (254795-001) | 293472-B24 |
| | MSL5026S2, SDLT rackmount library with two 160/320-GB SDLT tape drives, Fibre Channel Interface; graphite – requires rackmount kit (254795-001) | 293472-B25 |
| | MSL5026S2, SDLT tabletop library with one 160/320-GB SDLT tape drive, LVD; graphite | 293473-B21 |
| | MSL5026S2, SDLT tabletop library with two 160/320-GB SDLT tape drives, LVD; graphite | 293473-B21 |
| | MSL5000 SDLT2 upgrade drive, all | 293475-B21 |

## Options

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|---|---|---|
| StorageWorks MSL5052SL SDLT 110/220-GB Tape Library | MSL5052, 0 drives, LVD, rackmount | 255102-B21 |
| | MSL5052SL SDLT tabletop library with two 110/220-GB tape drives, LVD | 249490-B21 |
| | MSL5052SL SDLT rackmount library with two 110/220-GB tape drives, LVD – requires rackmount kit (254795-001) | 249491-B21 |
| | MSL5052SL SDLT 110/220-GB drive field upgrade, LVD | 231823-B22 |
| StorageWorks MSL5052S2 SDLT 160/320-GB Tape Library | MSL5052S2, SDLT rackmount library with two 160/320-GB SDLT tape drives, LVD; graphite – requires rackmount kit (254795-001) | 293474-B21 |
| | MSL5052S2, SDLT rackmount library with two 160/320-GB SDLT tape drives, Fibre Channel Interface; graphite – requires rackmount kit (254795-001) | 293474-B24 |
| | MSL5052S2, SDLT tabletop library with two 160/320-GB SDLT tape drives, LVD; graphite | 293476-B21 |
| StorageWorks ESL9322S2 SDLT 160/320-GB Tape Library | ESL9322S2 SDLT tape library, with two 160/320-GB SDLT tape drives, 222 slots | 293409-B22 |
| | ESL9322S2 SDLT tape library, with eight 160/320-GB SDLT tape drives, 222 slots | 293409-B28 |
| | ESL9322S2 SDLT tape library, with two 160/320-GB SDLT tape drives, 322 slots | 293410-B22 |
| | ESL9322S2 SDLT tape library, with eight 160/320-GB SDLT tape drives, 322 slots | 293410-B28 |
| | ESL9000 SDLT2 LVD upgrade drive | 293414-B21 |
| StorageWorks ESL9595SL SDLT 110/220-GB Tape Library | ESL9595SL SDLT tape library, 0 drives, 400 slots | 274672-B21 |
| | ESL9595SL SDLT tape library, two 110/220-GB SDLT tape drives, 400 slots | 274672-B22 |
| | ESL9595SL SDLT tape library with 16 110/220-GB SDLT tape drives, 400 slots | 274672-B28 |
| | ESL9595SL SDLT tape library with 0 drives, 500 slots | 281627-B21 |
| | ESL9595SL SDLT tape library with two 110/220-GB SDLT tape drives, 500 slots | 281627-B22 |
| | ESL9595SL SDLT tape library with 16 110/220-GB SDLT tape drives, 500 slots | 281627-B28 |
| | ESL9595SL SDLT tape library, 0 drives, 595 slots | 281628-B21 |
| | ESL9595SL SDLT tape library with two 110/220-GB SDLT tape drives, 595 slots | 281628-B22 |
| | ESL9595SL SDLT tape library with 16 drives 110/220-GB SDLT tape drives, 595 slots | 281628-B28 |
| StorageWorks ESL9595S2 SDLT 160/320-GB Tape Library | ESL9595S2 SDLT2 tape library, two 160/320-GB tape drives, 400 slots | 293411-B22 |
| | ESL9595S2 SDLT2 tape library with 16 160/320-GB tape drives, 400 slots | 293411-B28 |
| | ESL9595S2 SDLT2 tape library with two 160/320-GB tape drives, 500 slots | 293412-B22 |
| | ESL9595S2 SDLT2 tape library with 16 160/320-GB tape drives, 500 slots | 293412-B28 |
| | ESL9595S2 SDLT2 tape library with two 160/320-GB tape drives, 595 slots | 293413-B22 |
| | ESL9595S2 SDLT2 tape library with 16 160/320-GB tape drives, 595 slots | 293413-B28 |
| | ESL9000 SDLT2 LVD upgrade drive | 293414-B21 |

### Step 7d – External Storage

#### External Storage Arrays

- ESA 10000 Storage is supported on Tru64 UNIX and OpenVMS systems.
- SW800 CI Storage Arrays (HSJ5x product set) are supported on OpenVMS systems.
- Complete ordering and configuring information is available at http://www.hp.com/products/StorageWorks/ (Only Tru64 UNIX and OpenVMS operating systems options are supported.) NOTE: This web site is available in English only.

#### Storage Array Controllers

The following controllers are used in StorageWorks array packaging:

## Options

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|---|---|---|
| HSV110 Enterprise Virtual Storage Array 5000 | Enterprise Virtual Array Model 2C6D-B 60-Hz, includes 41U graphite storage cabinet, M3220 controller assembly with dual HSV110 controllers, six M5214 dual-redundant FC loop 14-bay drive enclosures, four 12-port FC loop switches; requires DS-KGPSA-xx (283198-B21) | DS-SV110-JA |
| | Enterprise Virtual Array Model 2C6D-B 50-Hz, includes 41U graphite storage cabinet, M3220 controller assembly with dual HSV110 controllers, six M5214 dual-redundant FC loop 14-bay drive enclosures, four 12-port FC loop switches; requires DS-KGPSA-xx (283198-B22) | DS-SV110-JB |
| | Enterprise Virtual Array Model 2C12D-B 60-Hz, includes 41U graphite storage cabinet, M3220 controller assembly with dual HSV110 controllers, 12 M5214 dual-redundant FC loop 14-bay drive enclosures, four 12-port FC loop switches; requires DS-KGPSA-xx, (283199-B21) | DS-SV110-KA |
| | Enterprise Virtual Array Model 2C12D-B 50-Hz, includes 41U graphite storage cabinet, M3220 controller assembly with dual HSV110 controllers, 12 M5214 dual-redundant FC loop 14-bay drive enclosures, four 12-port FC loop switches; requires DS-KGPSA-xx (283199-B22) | DS-SV110-KB |
| | Enterprise Virtual Array Model 8C8D 60-Hz, includes 41U graphite storage cabinet, four M3220 controller assembly with eight HSV110 controllers, eight M5214 dual FC loop 14-bay drive enclosures; requires DS-KGPSA-xx (283263-B21) | DS-SV110-LA |
| | Enterprise Virtual Array Model 8C8D 50-Hz, includes 41U graphite storage cabinet, four M3220 controller assembly, with eight HSV110 controllers, eight M5214 dual FC loop 14-bay drive enclosures; requires DS-KGPSA-xx (283263-B22) | DS-SV110-LB |
| | Enterprise Virtual Array Model 0C6D-B 60-Hz, includes 41U graphite storage cabinet, six M5214 dual-redundant FC loop 14-bay drive enclosures, 12 16.4-feet/5-meter interconnect cables (to 2C12D-B); requires DS-KGPSA-xx (283264-B21) | DS-SV110-MA |
| | Enterprise Virtual Array Model 0C6D-B 50-Hz, includes 41U graphite storage cabinet, six M5214 dual-redundant FC loop 14-bay drive enclosures, 12 16.4-feet/5-meter interconnect cables (to 2C12D-B); requires DS-KGPSA-xx (283264-B22) | DS-SV110-MB |
| | Enterprise Virtual Array Model 0C12D-B 60-Hz, includes 41U graphite storage cabinet, 12 M5214 dual-redundant FC loop 14-bay drive enclosures, 24 16.4-feet/5-meter interconnect cables (to two 2C12D-Bs); requires DS-KGPSA-xx (283265-B21) | DS-SV110-NA |
| | Enterprise Virtual Array Model 0C12D-B 50-Hz, includes 41U graphite storage cabinet, 12 M5214 dual-redundant FC loop 14-bay drive enclosures, 24 16.4-feet/5-meter interconnect cables (to two 2C12D-Bs); requires DS-KGPSA-xx (283265-B22) | DS-SV110-NB |
| SAN Solutions Kits | Tru64 UNIX SAN Solutions Kit for Enterprise Virtual Array V3.0 (333683-B21)<br>NOTE: Tru64 UNIX V5.1A requires Patch Kit 4 (BL21): T64V51AB21AS0004-20030206.tar, NHD6<br>Tru64 UNIX V5.1B requires Patch Kit 2 (BL22): T64V51BB22AS0002-20030415.tar | QB-720AB-SA |
| | OpenVMS SAN Solutions Kit for Enterprise Virtual Array V3.0 (333684-B21)<br>NOTE: OpenVMS V7.2-2 requires Tima Kit: DEC-AXPVMS-VMS722_FIBRE_SCSI-V0400<br>OpenVMS V7.3 requires TIMA Kit: DEC-AXPVMS-VMS73_FIBRE_SCSI_V0500<br>OpenVMS V7.3-1 requires TIMA Kit: DEC-AXPVMS-VMS731_UPDATE-V0100-4.PCS | QB-720AC-SA |
| Enterprise Virtual Array 3000 | Enterprise Virtual Array 3000, 60 Hz, includes one 3U controller assembly, two HSV100 controllers, two M5114 dual-redundant FC loop 14-bay disk enclosures, 42U graphite storage cabinet (321618-B21) | DS-SWR20-AA |
| | Enterprise Virtual Array 3000, 50 Hz, includes one 3U controller assembly, two HSV100 controllers, two M5114 dual-redundant FC loop 14-bay disk enclosures, 42U graphite storage cabinet (321619-B21) | DS-SWR20-AB |

## Options

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|---|---|---|
| EVA 3000 SAN Solution Kits | Tru64 UNIX SAN Solutions Kit for Enterprise Virtual Array 3000 V2.0 (250193-B22)<br>NOTE: Tru64 UNIX V5.1A requires Patch Kit 4 (BL21): T64V51AB21AS0004-20030206.tar, NHD6<br>Tru64 UNIX V5.1B requires Patch Kit 2 (BL22): T64V51BB22AS0002-20030415.tar | QB-6RPAB-SB |
| | OpenVMS SAN Solutions Kit for Enterprise Virtual Array 3000 V2.0 (250194-B22)<br>NOTE: OpenVMS V7.2-2 requires TIMA Kit: DEC-AXPVMS-VMS722_FIBRE_SCSI-V0400<br>OpenVMS V7.3 requires TIMA Kit: DEC-AXPVMS-VMS73_FIBRE_SCSI-V0500<br>OpenVMS V7.3-1 requires TIMA Kit: DEC-AXPVMS-VMS731_UPDATE-V0100-4.PCSI | QB-6RPAC-SB |
| Modular SAN Array 1000 (msa 1000) | Modular SAN Array 1000, supported on Tru64 UNIX and two-node clusters (maximum); supported with DS-KGPSA-CA and DS-KGPSA-DA adapters; requires connection via a switch - no direct connect; no support for FC arbitrated loop<br>Tru64 UNIX V5.1A requires Patch Kit 4: T64V51AB21AS0004-20030206.tar<br>Tru64 UNIX V5.1B requires Patch Kit 1: T64V51BB03AS0001-20021229.tar | 3R-A4328-AA |
| StorageWorks Disk Array Family | NOTE: The HP StorageWorks Disk Array Family, specifically the XP128 and XP1024, are supported on AlphaServer GS160 systems. For product and ordering information, refer to the following Web pages:<br>http://www.hp.com/products1/storage/products/disk_arrays/highend/xp1024/index.html<br>http://www.hp.com/products1/storage/products/disk_arrays/highend/xp128/index.html<br>The following part numbers have been assigned for reference purposes only: | |

| | | |
|---|---|---|
| 3R-A4417-AA | A7876A | XP128 Disk Array Control Frame |
| 3R-A4418-AA | A7906A | XP1024 Disk Array Control Frame |

### Step 7e – Fibre Channel Options

| | | |
|---|---|---|
| | The following hubs, data routers, switches, and cables are used in Fibre Channel configurations using the DS-KGPSA-xx adapter. | |
| Fibre Channel Disk Drives | 36-GB 10K rpm dual-port 2-Gb/sec FC-AL 1-inch (25.4 mm) drive (238590-B21) | 3R-A3239-AA |
| | 36-GB 15K rpm dual-port 2-Gb/sec FC-AL 1-inch (2.54 cm) drive (236205-B21) | 3R-A3210-AA |
| | 72-GB 10K rpm dual-port 2-Gb/sec FC-AL 1-inch (2.54 cm) drive (238921-B21) | 3R-A3260-AA |
| | 72-GB 15K rpm dual-port 2-Gb/sec FC-AL 1-inch (2.54 cm) drive (293568-B21) | 3R-A3971-AA |
| | 146-GB 10K rpm dual-port 2-Gb/sec FC-AL 1-inch (25.4 mm) drive (293556-B21) | 3R-A3975-AA |
| Fibre Channel Data Routers | 1 Fibre Channel x 2 HVD data router (163082-B21) | 3R-A2673-AA |
| | 1 Fibre Channel x 2 LVD data router (163083-B21) | 3R-A2774-AA |
| | 2 x 4 LVD Fiber Channel to SCSI Network Storage Router (262653-B21) | 3R-A3740-AA |
| | 2 x 4 HVD Fiber Channel to SCSI Network Storage Router (262654-B21) | 3R-A3741-AA |
| Fibre Channel Switches | Fibre Channel 2-Gb 8-port SAN switch (Base) (322120-B21) | DS-DSGGD-BC |
| | Fibre Channel 2-Gb 8-port SAN switch (Power pack) (322121-B21) | DS-DSGGD-CC |
| | Fibre Channel 2-Gb 16-port SAN switch (Base) | DS-DSGGD-CA |
| | Fibre Channel 2-Gb 16-port SAN switch (Power pack) (322119-B21) | DS-DSGGD-CB |
| | Fibre Channel 2-Gb 32-port SAN switch (Base) (240603-B21) | DS-DSGGD-AB |
| | Fibre Channel 2-Gb 32-port SAN switch (Power pack) (333764-B21) | DS-DSGGD-DB |
| | Fibre Channel 2-Gb 64-port core switch (Base) (332177-B21) | DS-DSGGE-BA |
| | Fibre Channel 2-Gb 64-port core switch (Power pack) (332178-B21) | DS-DSGGE-CA |

## Options

| | | |
|---|---|---|
| McData 64-port Fibre Channel SAN Director Class Switches | SAN Director 64 (2 Gb) 32 ports, base model | DS-DMGGD-BA |
| | SAN Director 140 (2 Gb) 140 ports | DS-DMGGD-CA |
| | SAN Edge Switch 2 Gb, 24 ports | DS-DMGGE-BD |
| | SAN Edge Switch 2 Gb, 32 ports | DS-DMGGE-BC |
| | NOTE: Connection for, or between, 1-Gb and/or 2-Gb SAN switches requires different cables. Refer to the Switches, Hubs, and Interconnects QuickSpecs at: http://www.compaq.com/products/quickspecs/North_America/10490.html | |
| Fibre Channel Cables | NOTE: The following LC-SC connector cables support connectivity between 1-Gb and 2-Gb devices. | |
| | 2-meter LC-SC multi-mode Fibre Channel cable (221691-B21) | 3R-A2976-AA |
| | 5-meter LC-SC multi-mode Fibre Channel cable (221691-B22) | 3R-A2977-AA |
| | 15-meter LC-SC multi-mode Fibre Channel cable (221691-B23) | 3R-A2978-AA |
| | 30-meter LC-SC multi-mode Fibre Channel cable (221691-B26) | 3R-A3458-AA |
| | 50-meter LC-SC multi-mode Fibre Channel cable (221691-B27) | 3R-A3459-AA |
| | NOTE: The following LC-LC connector cables support connectivity between 2-Gb and 2-Gb devices. | |
| | 2-meter LC-LC multi-mode Fibre Channel cable (221692-B21) | 3R-A2979-AA |
| | 5-meter LC-LC multi-mode Fibre Channel cable (221692-B22) | 3R-A2980-AA |
| | 15-meter LC-LC multi-mode Fibre Channel cable (221692-B23) | 3R-A2981-AA |
| | 30-meter LC-LC multi-mode Fibre Channel cable (221692-B26) | 3R-A3454-AA |
| | 50-meter LC-LC multi-mode Fibre Channel cable (221692-B27) | 3R-A3455-AA |

### Step 8 - Networks and Communications

- One Fast Ethernet adapter included in base systems. Connection of system to Ethernet requires twisted-pair cable.

### PCI LAN Communications Controllers

- Requires 3X-DWWPA-AA /BA PCI shelf mount box
- Each adapter/controller uses one PCI slot
- A maximum of 16 network adapters - 3X-DE602-xx, DEGPA-xx, 3X-DEFPA-xx - are supported per system or hardware partition.

NOTE: "Per System" quantities apply to systems or to each hardware partition. The 3X-DE602-xx included in base system must be included in these calculations. Operating System limitations may further limit the maximum number of configurable options.

*Options*

| | Maximum # Supported | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tru64 UNIX | | | OpenVMS | | | |
| | Per System | Per System Drawer | Per PCI Drawer | Per System | Per System Drawer | Per PCI Drawer | |
| 10/100-Mbit Fast Ethernet Adapter | | | | | | | |
| PCI Dual-port 10/100 UTP Fast Ethernet adapter and base module | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DE602-BB |
| PCI Dual-port Fast Ethernet "TX" add-on daughter card | 8 | 8 | 4 | 8 | 8 | 6 | 3X-DE602-TA |
| Single-port multi-mode fiber (MMF) add-on daughter card | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DE602-FA |
| Category 5 cross-over cable for point-to-point, unshielded xx=01, 03, 04, 07, 0E for 1, 3, 4, 7, 0.5 meters | | | | | | | BN24Q-xx |
| Category 5 cross-over cable for point-to-point, shielded xx=01, 03, 04, 07, 0E for 1, 3, 4, 7, 0.5 meters | | | | | | | BN28Q-xx |
| Category 5 straight through for system to repeater or hub, unshielded, xx=01, 03, 04, 07, 0E, 0B for 1, 3, 4, 7, 0.5, 0.2 meters | | | | | | | BN25G-xx |
| Twisted pair, shielded cable, xx=01, 03, 04, 07, 0E for 1, 3, 4, 7, 0.5 meters | | | | | | | BN26M-xx |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FDDI Controllers | | | | | | | |
| PCI FDDIcontroller, fiber, single-attachment station multimode fiber, requires BN34x SC type connecting cable | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DEFPA-AC |
| PCI FDDIcontroller, fiber, dual-attachment station multimode fiber, requires BN34x SC type connecting cable | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DEFPA-DC |
| Multimode fiber optic duplex cable, SC connector-to-ST connector, xx=01, 03, 10, 20, 30, 2E, 4E for 01, 03, 10, 20, 30, 2.5, 4.5 meters | | | | | | | BN34A-xx |
| Multimode fiber optic duplex cable, SC connector-to-SC connector, xx=01, 03, 10, 20, 30, 2E, 4E for 01, 03, 10, 20, 30, 2.5, 4.5 meters | | | | | | | BN34B-xx |
| Multimode fiber optic duplex cable, SC connector-to-MIC connector, xx=01, 03, 10 for 01, 03, 10 meters | | | | | | | BN34D-xx |
| PCI FDDIcontroller, copper, dual-attachment station UTP, requires BN26x or BN25H connecting cables | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DEFPA-MC |
| PCI FDDIcontroller, copper, single-attachment station UTP, requires BN26x or BN25H connecting cables | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DEFPA-UC |
| 8-pin MP-to-8-pin MP, screened, EIA/TIA category 5 cable | | | | | | | BN26M-xx |
| 8-pin MP-to-8-pin MP, screened, crossover, EIA/TIA category 5 cable, 3 meters | | | | | | | BN26S-03 |
| 3-meter unshielded twisted pair RJ45 connectors | | | | | | | BN25H-03 |

*Options*

| Gigabit Ethernet Adapter | | | | | | | |
|---|---|---|---|---|---|---|---|
| For maximum performance, HP recommends configuring two DEGPA-SA adapters (or less) per PCI drawer, however, eight adapters per PCI drawer may be configured to achieve maximum connectivity. | | | | | | | |
| PCI Gigabit Ethernet adapter, does not support network boot (BN34B) | 8/16* | 8/16* | 8 | 16 | 16 | 8 | DEGPA-SA (EOL 12/03) 3X-DEGXA-SA |
| PCI-to-Gigabit Ethernet UTP adapter (32-/64-bit) does not support network boot uses BN 24Q, BN28Q, BN25Q, BN26M cables | 4 | 4 | 4 | 4 | 4 | 4 | DEGPA-TA (EOL 12/03) 3X-DEGXA-TA |
| Multimode fiber optic duplex cable, SC connector-to-SC connector, xx=01, 03, 10, 20, 30, 2E, 4E for 01, 03, 10, 20, 30, 2.5, 4.5 meters | | | | | | | BN34B-xx |
| Category 5 cross-over cable for point-to-point, unshielded xx=01, 03, 04, 07, 0E for 1,3,4, 7, 0.5 meters | | | | | | | BN24Q-xx |
| Category 5 cross-over cable for point-to-point, shielded xx=01, 03, 04, 07, 0E for 1,3,4, 7, 0.5 meters | | | | | | | BN28Q-xx |
| Category 5 straight through for system to repeater or hub, unshielded, xx=01, 03, 04, 07, 0E, 0B for 1,3,4, 7, 0.5, 0.2 meters | | | | | | | BN25G-xx |
| Twisted pair, shielded cable, xx=01, 03, 04, 07, 0E for 1,3,4, 7, 0.5 meters | | | | | | | BN26M-xx |
| NOTE: * = Tru64 UNIX V5.1 is required to support 16 adapters per System/Drawer. Tru64 UNIX 4.0G supports 8 adapters per system/drawer. | | | | | | | |

| ATM Adapters | | | | | | | |
|---|---|---|---|---|---|---|---|
| For maximum performance, HP recommends configuring four 3X-DAPCA-FA adapters (or less) per PCI drawer; however, eight adapters per PCI drawer may be configured to achieve maximum connectivity. | | | | | | | |
| PCI-to-ATMworks 155-Mbit adapter, fiber, uses BN34B cable | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DAPBA-FA |
| PCI-to-ATMworks 155-Mbit adapter, UTP, uses BN25G and BN26M cables | 8 | 8 | 8 | 8 | 8 | 8 | 3X-DAPBA-UA |
| Multimode fiber optic duplex cable, SC connector-to-SC connector, xx=01, 03, 10, 20, 30, 2E, 4E for 01, 03, 10, 20, 30, 2.5, 4.5 meters | | | | | | | BN34B-xx |
| Category 5 straight through for system to repeater or hub, unshielded, xx=01, 03, 04, 07, 0E, 0B for 1,3,4, 7, 0.5, 0.2 meters | | | | | | | BN25G-xx |
| Category 5 straight through for system to repeater of hub, shielded xx=01, 03, 04, 07, 0E for 1,3,4, 7, 0.5 meters | | | | | | | BN26M-xx |

| Synchronous Controllers | | | | | | | |
|---|---|---|---|---|---|---|---|
| PCI 2-port intelligent synchronous controller (OpenVMS/Tru64 UNIX systems require a WAN/X.25 Kit. Refer to the latest option QuickSpecs for further information | 4 | 4 | 4 | 10 | 10 | 10 | 3X-PBXDD-AA |
| PCI 4-port intelligent synchronous controller (OpenVMS/Tru64 UNIX systems require a WAN/X.25 Kit. Refer to the latest option QuickSpecs for further information. | 4 | 4 | 4 | 10 | 10 | 10 | 3X-PBXDD-AB |
| DataFire SYNC 2000 EIA-530 single-port cable | | | | | | | 3X-BC34G-06 |
| DataFire SYNC 2000 V.11/x.21 single-port cable | | | | | | | 3X-BC34S-06 |
| DataFire SYNC 2000 V.35 single-port cable | | | | | | | 3X-BC34T-06 |
| DataFire SYNC 2000 V.24/EIA232 single-port cable | | | | | | | 3X-BC34L-06 |

*Options*

Step 9 - MEMORY CHANNEL

- Up to two PCI System Area Network controllers supported on a GS80 partition
- Two-node clusters can be configured by ordering a CCMAB-AA for each node and one BN39B-04 or BN39B-10 cable; cable connects directly to CCMAB-AA in each node.
- For a two-node cluster that will not be rebooted when adding additional members, order one CCMAB-AA adapter and one BN39B-04 or BN39B-10 cable for each node, and one CCMHB-AA hub for the cluster.
- For three or four node clusters, order one CCMAB-AA adapter and one BN39B-04 or BN39B-10 cable for each node and one CCMHB-AA hub for the cluster
- CCMHB-AA includes four CCMLB-AA line cards and supports up to four nodes; expansion up to eight system nodes can be achieved by adding up to four additional CCMLB-AA line cards
- If two or more CCMAB-AA controllers are configured in each node (dual rail), a second CCMHB-AA hub is required
- If using a MEMORY CHANNEL adapter module (54-24962-01) prior to revision D02, up to two MEMORY CHANNEL adapters can be placed on a PCI bus, however, no additional PCI devices can be placed on the same PCI bus, and the remaining slots must be left empty

| | |
|---|---|
| Tru64 UNIX Systems (V5.1 and later) in Clusters using MEMORY CHANNEL Interconnect | • Each system in the cluster requires a TruCluster™ Server software license (QL-6BRAG-AA)<br>• Alternately a TruCluster Plus Software package including licenses for: TruCluster Server, Logical Storage Manager, and AdvFS Utilities can be ordered (QP-6R9AG-AA) |
| OpenVMS Systems in Clusters using MEMORY CHANNEL Interconnect | • Requires OpenVMS V7.2-1H1 or later and OpenVMS Cluster license (QL-MUZAG-AA) |
| MEMORY CHANNEL Fiber Optic Cable Option | • In cases where nodes must be separated by a longer distance than standard copper cables allow, the CCMFB option converts the output of the standard CCMAB controller or CCMLB line card to single-mode fiber optic cable. The fiber optic connection may be up to 2,000 meters long between two CCMAB controllers connected in virtual hub mode, or 3,000 meters between a CCMAB controller and a CCMHB hub. (The connection from the CCMHB hub to a second system may also be 3,000 meters).<br>The CCMFB option requires a second PCI slot in the system from which it draws power only. It is normally connected to the corresponding CCMAB controller with the short BN39B-01 cable. The CCMFB is also used in the CCMHB hub where it occupies a slot normally used by the CCMLB line card, limiting expansion to four radial fiber optic connections.<br>• The CCMHB-BA hub expansion box provides additional slots for up to eight fiber optic connections. Two standard length, single-mode fiber optic cables are available (BN34R-10 and BN34R-31); however, users normally provide this connection. Customers should reference the TIA/EIA 568-A Commercial Building Telecommunications Cabling Standard, Section 12.3.4. Fiber optic connectivity is completely transparent to the systems using it and has no performance impact.<br>• Up to two CCMHB-AA hubs may be mounted in a 3X-H9A20-AD expansion cabinet by utilizing a 2T-MAVRK-AA rack-mounting kit for each hub. A second MEMORY CHANNEL Hub (CCMHB-AA or CCMHM-BA) mounted in an expansion cabinet reduces the amount of StorageWorks shelves by one. |

## Options

| | | |
|---|---|---|
| MEMORY CHANNEL Controller | PCI System Area Network controller, maximum two per system, two per node | CCMAB-AA |
| | System Area Network hub with four line cards; includes BN19P-2E power cord for Canada, Japan, and U.S. operations; country-specific power cord for other regions is required | CCMHB-AA |
| | MEMORY CHANNEL hub expansion box with no line cards | CCMHB-BA |
| | MEMORY CHANNEL hub rack-mounting kit | 2T-MAVRK-AA |
| | Expansion line card for CCMHB hub | CCMLB-AA |
| | 1-meter cable for CCMAB and CCMHB | BN39B-01 |
| | 4-meter cable for CCMAB and CCMHB | BN39B-04 |
| | 10-meter cable for CCMAB and CCMHB | BN39B-10 |
| | Copper-to-single mode fiber optic converter | CCMFB-AA |
| Country-specific Power Cords for Standalone MEMORY CHANNEL Hubs | Australia, New Zealand | BN19H-2E |
| | Central Europe | BN19C-2E |
| | Denmark | BN19K-2E |
| | Egypt, India | BN19S-2E |
| | Ireland, United Kingdom | BN19A-2E |
| | Israel | BN18L-2E |
| | Italy | BN19M-2E |
| | Japan | 3X-BN46F-02 |
| | Switzerland | BN19E-2E |
| Power Cord for MEMORY CHANNEL Hubs Rackmounted in 3X-H9A20- ADAE/AF Cabinets | IEC 320 power cord (one mandatory per hub) | BN35S-02 |
| | NOTE: MEMORY CHANNEL hubs mounted in 3X-H9A20-AD cabinets do not require additional power cords. | |

*Options*

Step 10 - System Console Support

**System Management Console**

- AlphaServer GS80 systems require the ability to log console messages, provide remote access for service and support, and, in some cases, manage multiple hardware partitions. The system management console is mandatory if the customer has no other means to provide these capabilities.
- PC-based system management console is required for system power-up, diagnostics, console partitioning, and console display and logging for use with AlphaServer GS80 systems.
- Includes network interface cards, universal modem, console software, 101-key keyboard, mouse, and console documentation kit
- A monitor is required for use with the system management console. Choose monitor listed in Step 12.
- Systems configured with redundant consoles or employing hardware partitioning require the ability to connect multiple consoles. A console hub is mandatory if the customer has no other means to provide these capabilities.
- Console printer recommended, but not required.

| | |
|---|---|
| PC-based Windows 2000 system management console in tower package, includes network interface cards and console software, U.S./Canada/Japan | 3X-DS8DA-AA |
| PC-based Windows 2000 system management console in mini-tower package, includes network interface cards and console software, Europe | 3X-DS8DA-AB |
| PC-based Windows 2000 system management console in desktop package, includes network interface cards and console software, U.S./Canada/Japan | 3X-DS8DA-BA |
| PC-based Windows 2000 system management console in desktop package, includes network interface cards and console software, Europe | 3X-DS8DA-BB |
| Console hub for use with system management console, includes console concentrator, cables, and universal power supply; mounts in system cabinet and communicates with the system management console over Ethernet using the Telnet protocol. | 3X-DS8AA-AA |

**System Management Console - ConsoleWorks Upgrade Licenses**

- System management consoles include ConsoleWorks, which support s up to eight partitions on a single system
- Support for additional GS Series partitions on a second GS system require the purchase of an add on license for 2, 4, or 8 partitions on that system
- Use of a single console for management of multiple GS systems requires use of a multiple port Ethernet Hub such as HP Procurve Series

| | |
|---|---|
| AlphaServer GS System Management, 2 Partition ConsoleWorks License from TECSys Development LP | QM-6K4AA-AB |
| AlphaServer GS System Management, 2 Partition ConsoleWorks License from TECSys Development LP | QM-6K4AA-AC |
| AlphaServer GS System Management, 8 Partitions ConsoleWorks License from TECSys Development LP | QM-6K4AA-AD |

## Options

### System Management Console - Modem Localization Kits

System management consoles include one adapter kit

- 3X-DS8xA-AA/BA includes a localization kit for use in US, Canada, Japan, Mexico, Brazil, Argentina, Peru, and Taiwan
- 3X-DS8xA-AB/BB includes a localization kit for use in Great Britain, Ireland, Hong Kong, Singapore, and Malaysia

In all other cases, the appropriate localization kit is required:

| | |
|---|---|
| Australia | 3R-A1608-AA |
| Austria | 3R-A1607-AA |
| Belgium | 3R-A1609-AA |
| China | 3R-A1594-AA |
| Denmark | 3R-A1596-AA |
| Finland, Norway | 3R-A1597-AA |
| France | 3R-A1598-AA |
| Germany | 3R-A1595-AA |
| Greece | 3R-A1606-AA |
| India | 3R-A1600-AA |
| Italy | 3R-A1601-AA |
| Netherlands | 3R-A1602-AA |
| New Zealand | 3R-A1603-AA |
| Sweden, Iceland | 3R-A1604-AA |
| Switzerland | 3R-A1610-AA |

### System Management Console - Country-specific Power Cords

- System management console includes a line cord for use in North America. Order a country-specific line cord if required

| | |
|---|---|
| Australia, New Zealand | BN19H-2E |
| Central Europe | BN19C-2E |
| Denmark | BN19K-2E |
| Egypt, India | BN19S-2E |
| Ireland, United Kingdom | BN19A-2E |
| Israel | BN18L-2E |
| Italy | BN19M-2E |
| Japan | 3X-BN46F-02 |
| North America | BN26J-1K |
| Switzerland | BN19E-2E |

### Step 11 - Graphics Support

- Graphics support for an AlphaServer GS80 can be provided through use of a graphics adapter

| | |
|---|---|
| 2D RADEON 7500 PCI graphics card, maximum one per system or hardware partition | 3X-PBXGG-AA (Q4 03) |

*Options*

Step 12 - Monitors, Keyboards, Mouse

- Graphics monitors other than those listed below can be used if compatible with SVGA graphics ordered with system.
- Selection of video extension cable and country-specific power cord is mandatory for all monitors; order power cord as appropriate.
- Add or order appropriate keyboard and mouse
- Monitors will ship with, but not be integrated with systems.

| | | |
|---|---|---|
| Keyboard or Mouse Extension Cable | 6-foot (1.8-meter) keyboard or mouse extension cable (order two cables to extend both keyboard and mouse) | 3X-BC34A-06 |
| Video Extension Cable | 6-foot (1.8-meter) video extension cable | BN39C-02 |
| Mouse | 3-button mouse – carbon | 3R-A3480-AA |
| Carbon/Silver Monitors | V7550 17-inch (16-inch viewable image size) flat-faced shadow mask color monitor, two-tone (carbon/silver), 0.25mm dot pitch, VGA to 1024 x 768 @85 Hz, MPRII/TCO99/Energy Star compliant, Northern Hemisphere with North America power cord, VGA cable | 3R-A4002-AA |
| | Same as above, with Euro power cord | 3R-A4201-AA |
| | Same as above, APD, no power cord | 3R-A4202-AA |
| | Same as above, Southern Hemisphere, with Australia/New Zealand power cord | 3R-A4203-AA |
| | S7500 17-inch (16-inch viewable image size) FST multi-frequency color monitor, 2-tone (carbon/silver), 0.24-mm dot pitch, VGA to 1024 x 768 @ 85 Hz, MPRII/TCO 99/Energy Star Compliant, Northern Hemisphere with PRC power cord CCIB, VGA cable | 3R-A4800-AA |
| | P930 19-inch (18-inch viewable image size) auto-scanning color monitor, Diamondtron NF, 0.24-mm aperture grille pitch, VGA to 1600 x 1200 @85 Hz, MPRII/TCO 99/Energy Star Compliant, Northern Hemisphere with North America power cord, VGA cable | 3R-A4215-AA |
| | Same as above, with Euro power cord | 3R-A4391-AA |
| | Same as above, Taiwan, with North America power cord | 3R-A4392-AA |
| | Same as above, Southern Hemisphere, 0.25 to 0.27 mm aperture grille pitch, with Australia/New Zealand power cord | 3R-A4393-AA |
| | S9500 19-inch (18-inch viewable image size) FST multi-frequency color monitor, 2-tone (carbon/silver), 0.24-mm dot pitch, VGA to 1280 x 1024 @ 85 Hz, MPRII/TCO 99/Energy Star Compliant, Northern Hemisphere with PRC power cord CCIB, VGA cable | 3R-A4801-AA |
| | P1130 21-inch (19.8-inch viewable image size) FD Trinitron auto-scanning color monitor, 0.24-mm aperture grille pitch, VGA to 1792 x 1344 @85Hz, dual video input, USB Hub, MPRII/TCO 99/Energy Star Compliant, Northern Hemisphere with North America power cord, VGA cable | 3R-A4216-AA |
| | Same as above, with Euro power cord | 3R-A4396-AA |
| | Same as above, Taiwan, no power cord | 3R-A4397-AA |
| | Same as above, with PRC power cord, CCIB | 3R-A4400-AA |
| | Same as above, Southern Hemisphere, with Australia/New Zealand power cord | 3R-A4398-AA |

## Options

| | | |
|---|---|---|
| Carbon/Silver Flat Panel Monitors | TFT1825, 18-inch (18-inch viewable image size) TFT flat panel monitor, 0.28-mm pixel pitch, 1600 x 1200 @60 Hz, multi-mode support, MPRII/TCO99/Energy Star compliant, one VGA, one DVI-I input connector, North America power cord, VGA, and DVI-I cables | 3R-A4292-AA |
| | TFT1520, 15-inch (15-inch viewable image size) TFT flat panel monitor, 0.297-mm pixel pitch, 1024 x 768 @75 Hz, multi-mode support, MPRII/TCO99/Energy Star compliant, two video input connectors (one VGA and one DVI-I), North America power cord, VGA, and DVI-I cables | 3R-A4249-AA |
| Monitor Power Cords | Australia, New Zealand | BN19H-2E |
| | Central Europe | BN19C-2E |
| | Denmark | BN19K-2E |
| | Egypt, India | BN19S-2E |
| | Ireland, United Kingdom | BN19A-2E |
| | Israel | BN18L-2E |
| | Italy | BN19M-2E |
| | Japan | 3X-BN46F-02 |
| | North America | BN26J-1K |
| | Switzerland | BN19E-2E |

**Keyboards**

- Select a keyboard and mouse
- Select an opal OpenVMS keyboard for use with VT5xx text terminals
- All keyboards listed may not be available in all geographies

*Options*

| | Opal | Carbon | |
|---|---|---|---|
| Keyboard/Language | OpenVMS | Tru64 UNIX | OpenVMS |
| U.S./English keyboard | LK461-A2 | 3R-A4362-AA | 3X-LK462-A2 |
| Arabic keyboard | - | 3R-LKQ48-BR | - |
| Belgian keyboard | LK461-AB | 3R-LKQ48-AB | 3X-LK462-AB |
| BHCSY keyboard | - | 3R-LKQ48-AX | - |
| Canadian/English keyboard | LK461-AQ | - | 3X-LK462-AQ |
| Canadian/French keyboard | LK461-AC | 3R-LKQ48-AC | 3X-LK462-AC |
| Cyrillic keyboard (Russian) | LK461-BT | 3R-LKQ48-BT | 3X-LK462-BT |
| Czech keyboard | LK461-BV | 3R-LKQ48-BV | 3X-LK462-BV |
| Danish keyboard | LK461-AD | 3R-LKQ48-AD | 3X-LK462-AD |
| Dutch keyboard | LK461-AH | 3R-LKQ48-AH | 3X-LK462-AH |
| Finnish keyboard | LK461-AF | 3R-LKQ48-AF | 3X-LK462-AF |
| French keyboard | LK461-AP | 3R-LKQ48-AP | 3X-LK462-AP |
| German keyboard | LK461-AG | 3R-A4358-AA | 3X-LK462-AG |
| Greek keyboard | LK461-BH | 3R-LKQ48-BH | 3X-LK462-BH |
| Hebrew keyboard | LK461-AT | 3R-LKQ48-AT | 3X-LK462-AT |
| Hungarian keyboard | LK461-BQ | 3R-LKQ48-BQ | 3X-LK462-BQ |
| International keyboard | | 3R-A4362-AA | - |
| Italian keyboard | LK461-AI | 3R-A4363-AA | 3X-LK462-AI |
| Japanese keyboard | - | 3R-LKQ48-AJ | - |
| Korean keyboard | - | 3R-LKQ48-BK | - |
| Latin-American keyboard | - | 3R-LKQ48-AR | - |
| Norwegian keyboard | LK461-AN | 3R-LKQ48-AN | 3X-LK462-AI |
| Polish keyboard | LK461-BP | 3R-LKQ48-BP | 3X-LK462-BP |
| Portuguese keyboard | LK461-AV | 3R-LKQ48-AV | 3X-LK462-AV |
| Romanian keyboard | LK461-BL | - | 3X-LK462-BL |
| Simplified Chinese keyboard | - | 3R-A4370-AA | - |
| Slovak keyboard | LK461-CZ | 3R-LKQ48-CZ | 3X-LK462-CZ |
| Spanish keyboard | LK461-AS | 3R-A4372-AA | 3X-LK462-AS |
| Swedish keyboard | LK461-AM | 3R-LKQ48-AM | 3X-LK462-AM |
| Swiss/French keyboard | LK461-AK | 3R-A4374-AA | 3X-LK462-AK |
| Swiss/German keyboard | LK461-AL | - | 3X-LK462-AL |
| Traditional Chinese keyboard | - | 3R-LKQ48-BI | - |
| Thai keyboard | - | 3R-LKQ48-CB | - |
| Turkish Q keyboard | LK461-BU | 3R-LKQ48-BU | 3X-LK462-BU |
| Turkish/F keyboard | LK461-BW | - | 3X-LK462-BW |
| UK keyboard | - | 3R-A4378-AA | - |
| Yugoslavian keyboard | LK461-BY | - | 3X-LK462-BY |

*Options*

Step 13 - System Software

- Media and documentation required for first system on site
- Software Processor Code = G

Tru64 UNIX

- Tru64 UNIX base systems include pre-installed software, Base license, Unlimited User license, Server Extension license, Internet Express, and Secure Web Server

| | | |
|---|---|---|
| When using Tru64 UNIX V5.1 or later | Tru64 UNIX media and online documentation on CD-ROM | QA-6ADAA-H8 |
| | Tru64 UNIX full hard copy documentation | QA-6ADAA-GZ |
| | TruCluster Plus Software Package with licenses for TruCluster Server, Logical Storage Manager, and AdvFS Utilities | QP-6R9AG-AA |
| | TruCluster Server license | QL-6BRAG-AA |
| | Logical Storage Manager License | QL-2GVAG-AA |
| | AdvFS Utilities License | QL-0EGAG-AA |
| | Advanced Server for Tru64 UNIX, 25 client concurrent use license | QL-5U29M-3D |
| | Advanced Server for Tru64 UNIX, 50 client concurrent use license | QL-5U29M-3E |
| | Advanced Server for Tru64 UNIX, 100 client concurrent use license | QL-5U29M-3F |
| | Advanced Server for Tru64 UNIX, 250 client concurrent use license | QL-5U29M-3G |
| | Advanced Server for Tru64 UNIX, 500 client concurrent use license | QL-5U29M-3H |
| | Layered products media and documentation for Tru64 UNIX on CD-ROM | QA-054AA-H8 |
| | DECnet/OSI end-system license for Tru64 UNIX | QL-MTJAG-AA |
| | DECnet/OSI extended function license for Tru64 UNIX | QL-MTKAG-AA |

| | | |
|---|---|---|
| When using Tru64 UNIX V4.0G | Tru64 UNIX media and online documentation on CD-ROM | QA-MT4AA-H8 |
| | Tru64 UNIX full hard copy documentation | QA-MT4AA-GZ |
| | StorageWorks software package with licenses for Logical Storage Manager and AdvFS Utilities | QB-5RXAG-AA |
| | TruCluster Available Server license | QL-05SAG-AA |
| | TruCluster Production Server license | QB-3RLAG-AA |
| | Tru64 UNIX Driver for MEMORY CHANNEL license | QB-4ZCAG-AA |
| | Advanced Server for Tru64 UNIX, 25 Client Concurrent License | QL-5U29M-3D |
| | Advanced Server for Tru64 UNIX, 50 Client Concurrent License | QL-5U29M-3E |
| | Advanced Server for Tru64 UNIX, 100 Client Concurrent License | QL-5U29M-3F |
| | Advanced Server for Tru64 UNIX, 250 Client Concurrent License | QL-5U29M-3G |
| | Advanced Server for Tru64 UNIX, 500 Client Concurrent License | QL-5U29M-3H |
| | Layered products media and documentation for Tru64 UNIX on CD-ROM | QA-054AA-H8 |
| | DECnet/OSI end-system license | QL-MTJAG-AA |
| | DECnet/OSI extended function license | QL-MTKAG-AA |

## Options

**OpenVMS**

- OpenVMS system base packages include Base license and HP Enterprise Integration Server for OpenVMS License Package Revision V3.0A
- OpenVMS Concurrent Use licenses provide the right to interactively use the operating system by the specified number of concurrent users on a designated OpenVMS system. OpenVMS Concurrent Use licenses can be moved from one system to another at user discretion and can be shared in a mixed OpenVMS VAX and OpenVMS Alpha cluster.

| | |
|---|---|
| Concurrent Use 1-user license | QL-MT3AA-3B |
| Concurrent Use 2-user license | QL-MT3AA-3C |
| Concurrent Use 4-user license | QL-MT3AA-3D |
| Concurrent Use 8-user license | QL-MT3AA-3E |
| Concurrent Use 16-user license | QL-MT3AA-3F |
| Concurrent Use 32-user license | QL-MT3AA-3G |
| Concurrent Use 64-user license | QL-MT3AA-3H |
| Concurrent Use 128-user license | QL-MT3AA-3J |
| Concurrent Use 256-user license | QL-MT3AA-3K |
| Traditional unlimited-user license | QL-MT2AG-AA |
| OpenVMS V7.2-1H1 media and online documentation on CD-ROM | QA-MT1AU-H8 |
| OpenVMS media and documentation on CD-ROM | QA-MT1AA-H8 |
| OpenVMS base hard copy documentation | QA-09SAA-GZ |
| Layered products media and documentation for OpenVMS on CD-ROM; includes HP Enterprise Integration Server for OpenVMS media and documentation | QA-03XAA-H8 |
| DECnet/OSI end-system license | QL-MTFAG-AA |
| DECnet/OSI extended-function license | QL-MTGAG-AA |
| Cluster License for OpenVMS Alpha | QL-MUZAG-AA |

## Options

**OpenVMS Galaxy**

**OpenVMS Galaxy Licensing Requirements**

For more details about OpenVMS Galaxy licensing requirements, refer to the Software Product Description for the Galaxy Software Architecture on OpenVMS Alpha: SPD 70.44.xx - OpenVMS Update 05 is required.

- One OpenVMS Base Operating System License (included in base system) is mandatory for AlphaServer GS80 configured as an OpenVMS Galaxy system.
- One SMP Extension License (included in SMP CPU upgrade) is mandatory for each CPU after the first CPU.
- For each AlphaServer GS80 CPU in an OpenVMS Galaxy, one OpenVMS Galaxy License is mandatory.
- HP layered products are licensed as follows:
  - - One capacity license per system
  - - One user license per use
- Up to two instances of OpenVMS are supported in OpenVMS Galaxy configurations on AlphaServer GS80 systems.
  For more information about OpenVMS Galaxy requirements, configurations, and procedures, refer to the OpenVMS Alpha Galaxy Guide. The latest version is always available at http://www.openvms.hp.com/gsseries/index.html
  NOTE: This Web site is not available in English only.

| | |
|---|---|
| Galaxy 1-CPU License | QL-66XAA-3B |
| Galaxy 2-CPU License | QL-66XAA-3C |
| Galaxy 4-CPU License | QL-66XAA-3D |
| Galaxy 8-CPU License | QL-66XAA-3E |

- Example: 8 CPU GS80 system in which all processors are licensed for OpenVMS with two hard partitions (each with four CPUs) and all CPUs licensed for Galaxy:
- Base system order would include a DY-A80BE-Ax and seven 3X-KN8AB-AC SMP upgrade CPUs
- Add one QL-66XAA-3E Galaxy 8-CPU License
- No other licenses are required for OpenVMS on the SMP instance in the second hard partition with four CPUs.

## Step 14 - Hardware and Software Support Services

- Installation or Installation and Startup is required for all AlphaServer GS80 systems.
- Select one of the optional Care Pack Service Packages described below that best supports the customer's operational requirements for system availability.

**HP Care Pack Services**

- HP Care Pack Services are available for AlphaServer systems running Tru64 UNIX or OpenVMS operating systems. HP Care Pack Services are designed for customers who require support beyond that provided by the hardware product warranty with coverage for both Principal server systems and SSPs (Subsequent System Packages) - that meet a full range of customer support requirements.

## Options

### Program Features – Principal Server

**HP Support Plus**

- 13 x 5 HW/SW support
- 4-hour response on-site hardware support
- 2-hour response for software support
- License Subscription for HP O/S software and embedded L/P (i.e., EIS for OpenVMS, unlimited users, and server extensions for Tru64 UNIX)
- Consolidated Software Media Update Distribution for OpenVMS or Tru64 UNIX and their layered products. (Some layered products on Consolidated Media Update Distribution can be ordered separately.)

**HP Support Plus 24**

- 24 x 7 HW/SW support
- Named HW engineer
- 4-hour response on-site hardware support
- 2-hour response for software support
- License Subscription for HP O/S software and embedded L/P (i.e., EIS for OpenVMS, unlimited users, and server extensions for Tru64 UNIX)
- Consolidated Software Media Update Distribution for OpenVMS or Tru64 UNIX and their layered products. (Some layered products on Consolidated Media Update Distribution can be ordered separately.)

**SSPs**
(Subsequent System Packages)

- For HP Care Pack Support Plus and Support Plus 24
- HW Support at same level as corresponding package for Principal server
- License Subscription: HP O/S (where applicable)
- Telephone support through Principal server covered by full support package

**Installation**

- Preinstallation review
- Unpacking of equipment
- Assemble and test
- Basic product usage info
- No software installation added

**Installation & Startup HP O/S**

- Preinstallation review
- Unpacking of equipment
- Assemble and test
- Basic product usage info
- Install operating systems
- Product configuration
- Print and network access
- Orientation

### Program Features – Additional Services

## Options

| Model/HP Care Pack Services | Principal Server 1 year | Principal Server 3 years | Subsequent Systems 1 year | Subsequent Systems 3 years |
|---|---|---|---|---|
| AlphaServer GS80 Model 4 | | | | |
| HP Support Plus | FP-W0101-12 | FP-W0101-36 | FP-W2101-12 | FP-W2101-36 |
| HP Support Plus 24 | FP-W0201-12 | FP-W0201-36 | FP-W2201-12 | FP-W2201-36 |
| Installation | FP-WINST-80 | FP-WINST-80 | FP-WINST-80 | FP-WINST-80 |
| Installation & Startup | FP-WSTAR-80 | FP-WSTAR-80 | FP-WSTAR-80 | FP-WSTAR-80 |
| AlphaServer GS80 Model 8 | | | | |
| HP Support Plus | FP-W0102-12 | FP-W0102-36 | FP-W2102-12 | FP-W2102-36 |
| HP Support Plus 24 | FP-W0202-12 | FP-W0202-36 | FP-W2202-12 | FP-W2202-36 |
| Installation | FP-WINST-80 | FP-WINST-80 | FP-WINST-80 | FP-WINST-80 |
| Installation & Startup | FP-WSTAR-80 | FP-WSTAR-80 | FP-WSTAR-80 | FP-WSTAR-80 |

NOTES:

- AlphaServer GS80 systems include one-year hardware warranty with 5x9, on-site Next Business Day response.
- HP Care Pack Services include support for new HP branded hardware options internal to the AlphaServer enclosure plus a monitor (17-inch or less excluding flat panel models).
- External storage devices/cabinets carry their own level of warranty and should be quoted separately for uplifted warranty services.
- In addition to the HP Care Pack Services shown above, other service packages are available for separate hardware and software support.
- For more information on Hardware and Software Upfront Services and other service options available for AlphaServers, consult your Sales Account Manager, HP Services Principal, or visit http://www.hp.com/services/ NOTE: This web site is available in English only.

**Software - Americas and Asia Pacific Only**

- Systems include 90-day Conformance to SPD; select optional Software Support Services if required.
- Software service for Tru64 UNIX include advisory and remedial software support with new version license rights for Tru64 UNIX Base, unlimited users, and Server Extensions
- Software service for OpenVMS include advisory and remedial software support with new version license rights for OpenVMS Base and Enterprise Integration Package

**Recommended Factory Integration Services**

Value-added Implementation Services (VIS) provide systems integration and delivery services. VIS services, including system integration, extended burn-in, custom documentation, and on-site services can be custom-quoted for the full range of AlphaServer configurations.
These pre-packaged services are offered for systems shipped to North America and Japan. For similar services in Europe, e-mail specific requirements to: customsystems.europe@hp.com

- Pre-packaged VIS services are recommended for popular AlphaServer GS80 system configurations that include one storage array:
- Basic Integration Service (YT-CSSIT-V1) System integration, testing, extended burn-in, custom documentation, and installation of a single operating system instance
- Partioning Service (YT-CSSIT-P1) Configuration of additional instances of an operating system
- System integration, testing, extended burn-in, and custom documentation of hardware-partitioned systems

## Options

| | | |
|---|---|---|
| Basic Integration Service | Systems integration and delivery services related to the configuration of the first and/or only instance of an operating system on a single AlphaServer GS80 platform. Includes the following:<br>• Staging and Integration of the AlphaServer GS80<br>• Software load of a single instance of an operating system and current revisions of firmware<br>• Hardware configuration, custom placement, and integration of internal options of the server per customer specifications<br>• Installation of a single instance of either Tru64 UNIX or OpenVMS Operating System<br>• Configuration, exercise, and test of up to one intelligent RAID array controller and associated disks per customer requirements<br>• Testing of the system and its components for a full 100 hour burn-in<br>• Mini-CCD (Custom Configuration Documentation) containing equipment listing, system environmental information, and software version levels | YT-CSSIT-V1 |
| Partitioning Service | Configuration of multiple, non-clustered instances of a second or subsequent operating system on a single AlphaServer GS80 platform. This service is ordered along with the required YT-CSSIT-V1. Order one (1) YT-CSSIT-P1 option for the second hardware partition and for each additional hardware partition on an AlphaServer GS80 system. Includes the following:<br>• Technical edit of order to guide component selection and option placement<br>• Software load of an instance of an operating system on a hardware/software partition<br>• Configuration and hardware integration (as described above) of the server partition per specifications<br>• Partition testing with the system and its components during the 100 hour burn-in | YT-CSSIT-P1 |
| Extra RAID Pair Service | Configuration of additional Intelligent RAID controller pairs beyond the internal and external RAID controller pairs included within the scope of the prerequisite YT-CSSIT-V1 and/or optional YT-CSSIT-P1 services on the same single AlphaServer GS80 platform. The following services are included in the optional YT-CSSIT-R1 Extra RAID Pair Service per each additional pair of Intelligent RAID controllers configured:<br>• Technical edit of order to guide component selection and option placement<br>• Configuration of the disks of the additional controller pair per customer specifications<br>• Hardware configuration verification<br>• Custom disk placement and verification<br>• Installation of current revisions of firmware<br>• Configuration, exercise and testing of up to one pair of additional intelligent array controller pair and associated disk drives for each YT-CSSIT-R1<br>• Controller and disk testing with the system and its components during the 100 hour burn-in | YT-CSSIT-R1 |
| Clustering Service | Configuration of a single cluster instance for AlphaServer GS80 platforms. This is a per-cluster service and is ordered along with the prerequisite YT-CSSIT-V1 services.<br>• Technical edit of order to guide component selection and option placement<br>• Configuration of a cluster per specifications<br>• Hardware and software configuration verification<br>• Installation of either Tru64 UNIX TruCluster software or OpenVMS cluster software and configuration of node functions<br>• Installation of current revisions of firmware<br>• Cluster failover testing with the system and its components during the full 100 hour burn-in | YT-CSSIT-R1 |

## Options

**Full Custom Configurations**

The Integration Service Packages address the most-common customer requirements. For a wider range of configurations, customers can also choose additional customized services based upon a Statement of Work agreement. This includes: cluster add-on nodes, larger storage configurations, custom option support, custom system packaging, mixed operating system partitions, and configured multi-system clusters. Contact your Custom Solutions provider or Sales Representative for these services.

## *Upgrades*

### AlphaServer GS80 System Hardware Expansion

AlphaServer GS80 systems are field upgradeable to support up to eight CPUs.

- AlphaServer GS80 Model 4 can be internally upgraded to an AlphaServer GS80 Model 8 by adding an additional quad building block
- Additional upgrades to the AlphaServer GS160 are available. Contact HP for details.

| | | |
|---|---|---|
| System Capacity Upgrades | System expansion hardware to upgrade an AlphaServer GS80 Model 4 to an AlphaServer GS80 Model 8. Includes one quad building block and associated power supplies and cabling. For use in North America with DA/DY-A80xG-AC | DH-A80BH-AC |
| | System expansion hardware to upgrade an AlphaServer GS80 Model 4 to an AlphaServer GS80 Model 8. Includes one quad building block and associated power supplies and cabling. For use in Japan and Europe with DA/DY-A80xG-AD/AE | DH-A80BH-AD |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 8. For use in North America with DA/DY-A80xG-AC, Tru64 UNIX | DA-160BH-AA |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 8. For use in North America with DA/DY-A80xG-AC, OpenVMS | DY-160BH-AA |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 8. For use in Japan and Europe with DA/DY-A80xG-AD/AE, Tru64 UNIX | DA-160BH-AB |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 8. For use in Japan and Europe with DA/DY-A80xG-AD/AE, OpenVMS | DY-160BH-AB |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 \Model 16. For use in North America with DA/DY-A80xG-AC, Tru64 UNIX | DA-160CH-AA |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 16. For use in North America with DA/DY-A80xG-AC, OpenVMS | DY-160CH-AA |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 16. For use in Japan and Europe with DA/DY-A80xG-AD/AE, Tru64 UNIX | DA-160CH-AB |
| | System expansion hardware to upgrade an AlphaServer GS80 to an AlphaServer GS160 Model 16. For use in Japan and Europe with DA/DY-A80xG-AD/AE, OpenVMS | DY-160CH-AB |

### System Hardware Upgrades - AlphaServer GS80 731/1001-MHz to AlphaServer 1224-MHz

AlphaServer GS80 731-MHz and 1001-MHz systems are field upgradeable to 1224-MHz systems.

| | | |
|---|---|---|
| System Speed Upgrades | • Upgrades require return of the replaced System Box and SMP Modules | |
| | System upgrade hardware - upgrades a 731-MHz or 1001-MHz AlphaServer GS80 running Tru64 UNIX to a 1224-MHz system. Includes a drawer's QBB upgrade to 16 MB of cache, four 1224-MHz CPU modules, and Tru64 UNIX Licenses. | DH-A80CA-AU |
| | System upgrade hardware - upgrades a 731-MHz or 1001-MHz AlphaServer GS80 running OpenVMS to a 1224-MHz system. Includes a drawer's QBB upgrade to 16 MB of cache, four 1224-MHz CPU modules, and OpenVMS Licenses. | DH-A80CA-BU |
| FRU Level Upgrade | • Contact HP Services for detailed information | |
| | System Drawer Level Upgrade to upgrade existing 4-MB or 8-MB cache capable System Drawer to 16-MB cache capable System Drawer | 3X-WF4PD-GA |
| | GS80 SMP upgrade CPU, 68/12241224-MHz with 16-MB on-board cache, Tru64 UNIX | 3X-KN8AC-AB |
| | GS80 SMP upgrade CPU, 68/12241224-MHz with 16-MB on-board cache, OpenVMS | 3X-KN8AC-AC |

## Upgrades

| | | |
|---|---|---|
| Global Clock Module Upgrade | AlphaServer GS80 2-port 9.0ns global clock module upgrade - required for 731-MHz GS80 M4 and M8 system upgrades<br>NOTE: When ordering an upgrade, top gun blue cabinet users with 731-MHz EV67 CPUs, who plan on discontinuing use of the 731-MHz CPUs, (not mixing them with higher speed CPUs) must order this clock option. | 3X-WFCLK-AA |

### AlphaServer 731-MHz GS80 System Hardware Appearance Upgrades

AlphaServer trim panel can be ordered to change external top gun blue skins to carbon black.

| | | |
|---|---|---|
| Appearance Upgrades | AlphaServer GS80 top gun blue to carbon black conversion skin kit | CK-GSBCK-AA |
| | H9A20-AA/AB/AC Expansion Cabinet GS80 top gun blue to carbon black conversion skin kit | CK-GSBCK-AD |

### HP Capacity on Demand (CoD) Program

AlphaServer GS80 customers can add additional CPU capacity on demand without waiting to purchase the resource when it is required and without re-booting their system. The HP Capacity on Demand Program, outlined below, is a two-part process.

- Requires 3X-DWWPA-AA /BA PCI shelf mount box
- Each adapter/controller uses one PCI slot
- A maximum of eight network adapters - 3X-DE602-AA, DEGPA-SA, 3X-DEFPA-xx - are supported per system or hardware partition.

**Part 1**

- Customer purchases a system with Tru64 UNIX or OpenVMS CoD SMP CPU(s) (3X-KN8CA-AD or 3X-KN8CA-AE), or customer purchases Tru64 UNIX or OpenVMS CoD SMP CPU(s) for field installation within an installed AlphaServer GS80 system.
- When purchasing the CoD CPU(s), the customer signs a CoD program agreement to purchase the CPU module(s) within 18 months or upon "first use" of the module(s).
- A blank copy of the agreement is available through your local HP representative or call 1-800-282-6672.
  Full program terms are outlined in this agreement.

**Part 2**

- The customer will be invoiced for the CPU module(s) upon notification by the customer of "first use" or expiration of the 18-month period.

NOTE: CoD CPUs are field installed. Field installation is not included in the CPU option price.

| | |
|---|---|
| GS80 CoD SMP CPU, includes one 6/1224-MHz CPU module with 16-MB on-board cache and Tru64 UNIX SMP license for use under the CoD program terms | 3X-KN8CC-AB |
| GS80 CoD SMP CPU, includes one 6/1224-MHz CPU module with 16-MB on-board cache and OpenVMS SMP license for use under the CoD program terms | 3X-KN8CC-AC |

*TechSpecs*

| | | GS80 Model 4 | GS80 Model 8 |
|---|---|---|---|
| | Dimensions (H x W x D) | 67 x 24 x 39.4 in (170 x 60 x 100 cm) | 67 x 24 x 39.4 in (170 x 60 x 100 cm) |
| | Shipping Dimensions | 76.5 x 36 x 48 in (195 x 79.2 x 122 cm) | 76.5 x 36 x 48 in (195 x 79.2 x 122 cm) |
| | Weight Maximum Configuration | 575 lb (260 kg) | 575 lb (260 kg) |
| | Maximum Shipping Weight | 705 lb (320 kg) | 705 lb (320 kg) |
| Heat dissipation | Minimally configured system | 1,150 W/3,800 Btu/hr | 1,900 W/6,400 Btu/hr |
| | NOTE: Depending on Model 4 or 8, a minimally configured system contains two or four power supplies, single CPU module, single memory module, single system I/O module, minimally configured PCI shelf, and one disk drive. | | |
| | Fully configured system | 2,100 W/7,150 Btu/hr | 3,450 W/11,650 Btu/hr |
| | NOTE: Depending on Model 4 or 8, a fully configured system contains three or six power supplies, four or eight CPU modules, four or eight memory modules, two or four system I/O modules, one PCI shelf, and a single storage shelf with six disk drives. | | |
| | Fully configured system (system cabinet with one I/O expansion cabinet) | 4,450 W/15,100 Btu/hr | 5,750 W/19,600 Btu/hr |
| | NOTE: Fully configured system and one expansion cabinet consist of the above ² fully configured system² and one expansion cabinet that includes three PCI shelves, four storage shelves with a total of 24 disk drives. | | |
| Clearances | | Operating | Service |
| | Front | 29.5 in (75 cm) | 29.5 in (75 cm) |
| | Rear | 29.5 in (75 cm) | 29.5 in (75 cm) |
| | Left Side | None | None |
| | Right Side | None | None |
| Environmental | | Operating | Non-Operating |
| | Temperature | 41° to 95° F (5° to 35° C) | –40° to 151° F (–40° to 66° C) |
| | Humidity | 10% to 90% | 10% to 95% |
| | Altitude | 0 to 10,000 ft (0 to 3 km) | 40,000 ft (12.2 km) |
| | Vibration | 5 to 500 Hz @ .1G maximum | |
| Regulatory | Agency approvals | UL Listed to UL1950 | |
| | | cUL Listed to CAN/C22.2 No. 950-M89FCC Part 15 (Class A) | |
| | | CE Declaration | |
| | Reviewed to | EN 60950 1922/A4:1997, European Norm | |
| | | AS/NZS 3260:1993, Australian/New Zealand Standard | |
| | | 73/23/EEC, Low Voltage Directive | |
| | | IEC950, 2nd Ed., 4th Amend. | |

*TechSpecs*

Power Requirements

NOTE: Power system provides near unity power factor that allows full utilization of the input line current (Watts = VA).

NOTE: The US/Canada model supports nominal input voltages of 115-117V. The Japan and Europe models support nominal input voltages of 200-240V.

NOTE: Fully configured system and one expansion cabinet consist of the above "fully configured system" and one expansion cabinet that includes three PCI shelves, four storage shelves with a total of 24 disk drives.

| | GS80 Model 4 | | |
|---|---|---|---|
| | U.S./Canada | Japan | Europe |
| Nominal voltage(s) | 120V | 200 to 240V | 220 to 240V |
| Frequency range | 50 to 60 Hz | 50 to 60 Hz | 50 to 60 Hz |
| Phases | 2 circuits | 1 circuit | 1 circuit |
| | 1-phase star | 1-phase | 1-phase |
| | 2-wire+ GND | 2-wire+ GND | 2-wire+ GND |
| Maximum input current/circuit | 16A | 13A | 12A |
| Rating | 30A | 30A | 32A |
| Surge current | 60A peak | 160A peak | 190A peak |
| Total Volt-Amps | 2600VA | 2600VA | 2600VA |
| Power cord length | 15 ft (4.5 m) | 15 ft (4.5 m) | 15 ft (4.5 m) |
| Power cap (system) | 2 DEC 12-11193-00 | 1 DEC 12-16886-00 | 1 DEC 12-14379-07 |
| Receptacle (site) | 2 DEC 12-11194-00 | 1 DEC 12-19658-01 | 1 Hubbell 332R6W |
| (industry equivalent) | 2 NEMA L5-30R | 1 NEMA L6-30R | 1 IEC 309 (32A) |
| | | | |
| | GS80 Model 8 | | |
| | U.S./Canada | Japan | Europe |
| Nominal voltage(s) | 120V | 200 to 240V | 220 to 240V |
| Frequency range | 50 to 60 Hz | 50 to 60 Hz | 50 to 60 Hz |
| Phases | 2 circuits | 1 circuit | 1 circuit |
| | 1-phase star | 1-phase | 1-phase |
| | 2-wire+ GND | 2-wire+ GND | 2-wire+ GND |
| Maximum input current/circuit | 17A | 20A | 18A |
| Rating | 30A | 30A | 32A |
| Surge current | 60A peak | 200A peak | 240A peak |
| Total Volt-Amps | 3900VA | 3900VA | 3900VA |
| Power cord length | 15 ft (4.5 m) | 15 ft (4.5 m) | 15 ft (4.5 m) |
| Power cap (system) | 2 DEC 12-11193-00 | 1 DEC 12-16886-00 | 1 DEC 12-14379-07 |
| Receptacle (site) | 2 DEC 12-11194-00 | 1 DEC 12-19658-01 | 1 Hubbell 332R6W |
| (industry equivalent) | 2 NEMA L5-30R | 1 NEMA L6-30R | 1 IEC 309 (32A) |

H9A20 I/O Expander Cabinet

| | | |
|---|---|---|
| Physical Characteristics | Dimensions (H x W x D) | 67 x 24 x 39.4 in (170 x 60 x 100 cm) |
| | Shipping Dimensions | 76.5 x 44 x 48 in (195 x 92 x 122 cm) |
| | Weight Maximum Configuration | 1,349 lb (613 kg) |
| | Shipping Weight Maximum Configuration | 1,635 lb (743 kg) |

## TechSpecs

| Clearances | | Operating | Service |
|---|---|---|---|
| | Front | 29.5 in (75 cm) | 29.5 in (75 cm) |
| | Rear | 6.0 in (15 cm) | 29.5 in (75 cm) |
| | Left Side | None | None |
| | Right Side | None | None |

| Environmental | | Operating | Non-Operating |
|---|---|---|---|
| | Temperature | 41° to 95° F (5° to 35° C) | –40° to 151° F (–40° to 66° C) |
| | Humidity | 10% to 90% | 10% to 95% |
| | Altitude | 0 to 10,000 ft (0 to 3 km) | 40,000 ft (12.2 km) |
| | Vibration | 5 to 500 Hz @ .1G maximum | |

| Heat dissipation | | |
|---|---|---|
| | Minimally configured cabinet | 250 W/850 Btu/hr |
| | NOTE: Minimally configured expander cab contains a minimally configured PCI shelf and one disk drive | |
| | Fully configured cabinet | 2,400 W/8,200 Btu/hr |
| | NOTE: Fully configured expander cab contains three PCI shelves and 24 disk drives | |

Power Requirements

NOTE: The U.S./Canada model supports nominal input voltages of 115-117V. The Japan and Europe models support nominal input voltages of 200-240V.

| | U.S./Canada | Japan | Europe |
|---|---|---|---|
| | 3X-H9A20-AD | 3X-H9A20-AF | 3X-H9A20-AE |
| Nominal voltage(s) | 120V | 200 to 240V | 220 to 240V |
| Frequency range | 50 to 60 Hz | 50 to 60 Hz | 50 to 60 Hz |
| Phases | 2 circuits | 2 circuits | 2 circuits |
| | 1-phase | 1-phase | 1-phase |
| | 2-wire+ GND | 2-wire+ GND | 2-wire+ GND |
| Maximum input current/circuit | 22A | 12A | 11A |
| Rating | 30A | 30A | 32A |
| Surge current | 150A peak | 150A peak | 170A peak |
| Total Volt-Amps | 2600VA | 2600VA | 2600VA |
| Power cord length | 15 ft (4.5 m) | 15 ft (4.5 m) | 15 ft (4.5 m) |
| Power cap (system) | 2 DEC 12-11193-00 | 2 DEC 12-16886-00 | 2 DEC 12-14379-07 |
| Receptacle (site) | 2 DEC 12-11194-00 | 2 DEC 12-19658-01 | 2 Hubbell 332R6W |
| (industry equivalent) | 2 NEMA L5-30R | 2 NEMA L6-30R | 2 IEC 309 (32A) |

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