

August 1999
ECG0145-0899-A

Prepared by ECG Technology
Communications Group

Compaq Computer Corporation

Contents

Product Overview.....3
 9000 Rack Models3
Key Features and Benefits of Ownership4
 Airflow Advantage5
Simplified Management.....5
 Universal Design.....5
 Shipping5
 Expandability Options6
 7000 Series Rack Cabinets8
Quality Assurance8
Tips for Better Reliability.....8
 Component Placement.....8
 Rack Builder Pro Software9
Installation Service.....9
Questions and Answers 10

Compaq 9000 Series Universal Racks

Compaq sets the standard for performance and value in the enterprise with the Compaq Rack 9000 series family of racks and rack options. Compaq Rack 9000 series racks are ideal for rack-mounting Compaq ProLiant, Alpha and Tandem servers, workstations, networking and StorageWorks products. This enterprise-class rack system combines next-generation structural integrity and ease of use capabilities to deliver industry-leading performance.

The Compaq Rack 9000 series of rack cabinets provide everything customers need in a rack cabinet. Compaq delivers innovative racks that make it easy to centralize, protect, organize, and access your hardware for servicing and upgrading. The 9000 Series Rack offers a complete solution to a rack configuration; including simplified management, low total cost of ownership, investment protection, industry standard support, and industry leading breakthroughs.

Help us improve our technical communication. Let us know what you think about the technical information in this document. Your feedback is valuable and will help us structure future communications. Please send your comments to: bob.moore@compaq.com

Notice

The information in this publication is subject to change without notice and is provided "AS IS" WITHOUT WARRANTY OF ANY KIND. THE ENTIRE RISK ARISING OUT OF THE USE OF THIS INFORMATION REMAINS WITH RECIPIENT. IN NO EVENT SHALL COMPAQ BE LIABLE FOR ANY DIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER DAMAGES WHATSOEVER (INCLUDING WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION OR LOSS OF BUSINESS INFORMATION), EVEN IF COMPAQ HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

The limited warranties for Compaq products are exclusively set forth in the documentation accompanying such products. Nothing herein should be construed as constituting a further or additional warranty.

This publication does not constitute an endorsement of the product or products that were tested. The configuration or configurations tested or described may or may not be the only available solution. This test is not a determination of product quality or correctness, nor does it ensure compliance with any federal state or local requirements.

Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

Compaq, Contura, Deskpro, Fastart, Compaq Insight Manager, LTE, PageMarq, Systempro, Systempro/LT, ProLiant, TwinTray, ROMPaq, LicensePaq, QVision, SLT, ProLinea, SmartStart, NetFlex, DirectPlus, QuickFind, RemotePaq, BackPaq, TechPaq, SpeedPaq, QuickBack, PaqFax, Presario, SilentCool, CompaqCare (design), Aero, SmartStation, MiniStation, and PaqRap, registered United States Patent and Trademark Office.

Netelligent, Armada, Cruiser, Concerto, QuickChoice, ProSignia, Systempro/XL, Net1, LTE Elite, Vocalyst, PageMate, SoftPaq, FirstPaq, SolutionPaq, EasyPoint, EZ Help, MaxLight, MultiLock, QuickBlank, QuickLock, UltraView, Innovate logo, Wonder Tools logo in black/white and color, and Compaq PC Card Solution logo are trademarks and/or service marks of Compaq Computer Corporation.

Microsoft, Windows, Windows NT, Windows NT Server and Workstation, Microsoft SQL Server for Windows NT are trademarks and/or registered trademarks of Microsoft Corporation.

NetWare and Novell are registered trademarks and intraNetWare, NDS, and Novell Directory Services are trademarks of Novell, Inc.

Pentium is a registered trademark of Intel Corporation.

Copyright ©1999 Compaq Computer Corporation. All rights reserved. Printed in the U.S.A.

Compaq 9000 Series Universal Racks
White Paper prepared by ECG Technology Communications Group

First Edition (August 1999)
Document Number ECG0145-0899-A

Product Overview

This enterprise-class rack system combines next-generation structural integrity and ease of use capabilities to deliver industry leading performance. Compaq 9000 Series Racks provide customers with the power to sensibly maximize space utility while protecting and simplifying network management.

Ideal for onsite assembly of rack-mounted Compaq ProLiant, Alpha, and Tandem servers, workstations, networking and StorageWorks products, the Compaq Rack 9000 series of universal rack cabinets complement and protect your technological investments. Compaq Rack 9000 is specifically designed to ensure outstanding performance and seamless integration throughout the entire enterprise to organize, protect and to centralize your equipment.

All Compaq rack-mountable products are designed to fit the industry standard 19-inch racks and will even support most third party equipment. The Compaq 9000 Series Rack Cabinets offer the only 42U rack cabinet on the market that is less than two meters high! The 9000 Series Rack Cabinets support full configurations and actually meet standard door height requirements. The 9000 Series racks are even stationed on four wheels to facilitate component relocation.

Compaq's 9000 Series Rack Cabinets are intelligent in design and provide one of the most advanced cooling environments available today. With the new perforated convex front door panel, thermal protection efficiency has greatly advanced. The revolutionary design of the front door practically simulates having no door at all!

9000 Rack Models

All Compaq rack-mountable products are designed to fit our industry standard 19-inch rack cabinets. Compaq offers several racks to meet your system needs, the Rack 9142, 9136, and 9122.

Table 1. Compaq 9000 Series Rack Cabinets

Model Number	Available U* Space	Color	Metric Capacity	Part Number
9142	42 U	Opal	2.0 Meters	120663
9136	36 U	Opal	1.7 Meters	120664
9122	22 U	Opal	1.1 Meters	120665

* One U is equal to 1.75 inches and is the standard measuring unit for racks and rack-mount components.

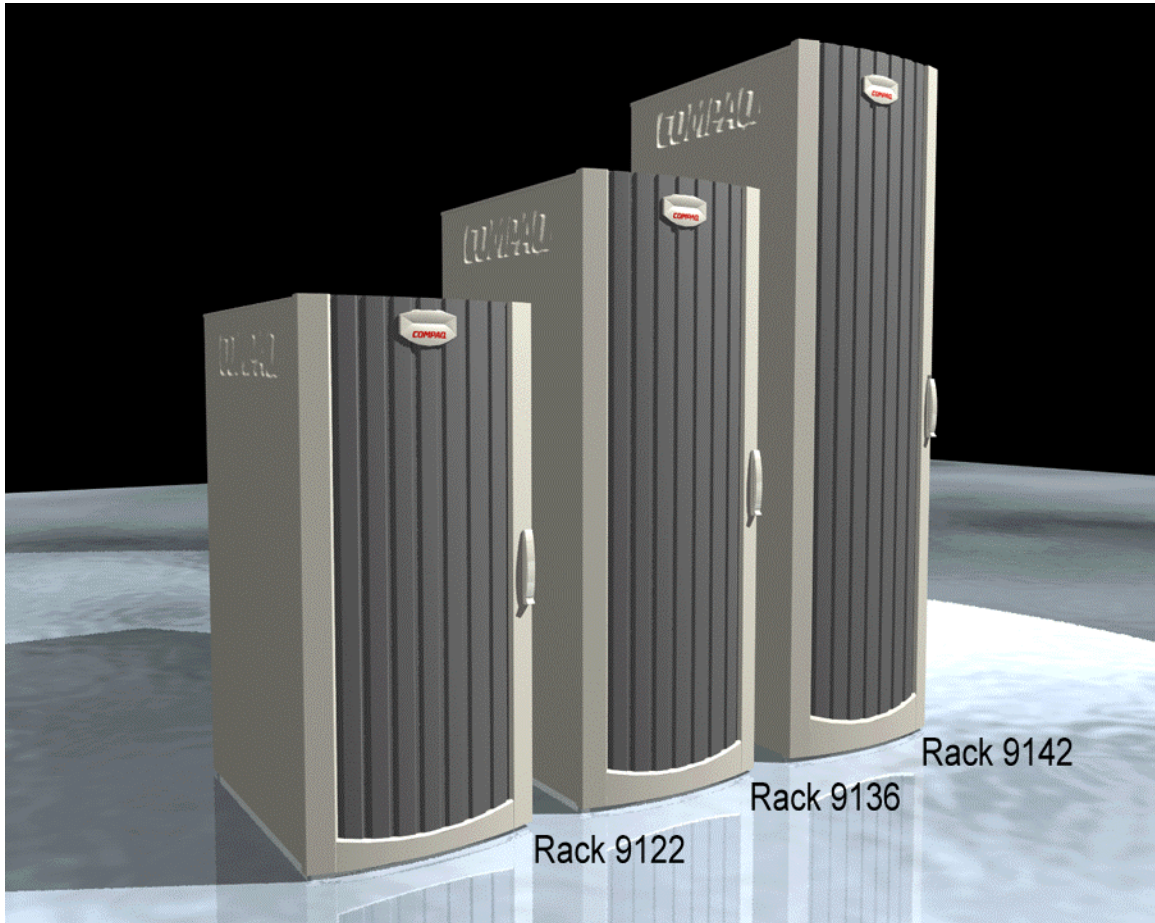


Figure 1. Compaq 9000 Series Rack Cabinets

Key Features and Benefits of Ownership

The Compaq Rack 9000 series offers protection, price, performance, and quality. Compaq delivers premium racks that make it easy to centralize, protect, organize, and access your hardware for servicing and upgrading. Following are some key features that are standard equipped on the 9000 Series Rack Cabinets:

Sturdy Steel Construction – A fully welded steel frame and heavier weight deliver ultimate rigidity and stability. These sturdy, industrial-strength rack models assure that you can not only rack-mount today’s heaviest components, but also heavier components of tomorrow.

Unique Frame and Rail Design – Equipment installation effort is dramatically reduced due to the vertical mounting platform. The 9000 Series racks are specifically designed to minimize the time required to install all system components. This enables fast assembly, easy mounting, and outstanding structural integrity.

Thermal Integrity – Front to back natural convection cooling is greatly enhanced by the innovative multi-angled, perforated design of the front door. For additional heat removal, an optional roof-mount fan kit can be easily installed.

Security Provisions – Both front and rear doors can be locked to provide the security of preventing unauthorized entry.

Flexibility and Functionality – The front and rear doors are reversible, and can to be mounted for left or right access to support strategic or personal preference. This features also enables full back door accessibility. Outstanding cable management features also simplify the development of effective and easy to maintain configurations.

Maximum Performance in Coupled Environments – The Rack 9000 series has a sophisticated mechanism that uses rails and bolts to maximize stability in coupled configurations and dust striping to keep your equipment clean.

Custom Expandability – Several options kits are available to allow for quick and easy expansion of the Compaq Rack 9000 series to create a custom solution.

Airflow Advantage

Compaq rack-mountable products typically draw in cool air through the front and exhaust warm air out the back. The front door of the Compaq 9000 Series Rack Cabinet is designed with a perforated, convex shaped front panel that increases air circulation. This mesh styling provides excellent cooling performance and optimizes ventilation to deliver thermal protection.

Blanking Panels

Blanking panels are panels that cover the front of empty racks to maintain maximum airflow capability. If the front of the rack is not completely filled with components, the remaining openings between components can cause changes in airflow that adversely affect cooling within the rack cabinet. It is recommended to use blanking panels whenever applicable.

Ventilation Fan

A roof-mounted extractor fan kit is also available to enhance natural convection cooling by increasing the airflow in the rack. This option actually increases circulation within the rack by stimulating the release of warm air out of the rack cabinet.

Simplified Management

Universal Design

Unique column and rail design minimizes the time necessary to install products into the Compaq 9000 Series Rack Cabinet. Compaq ProLiant, Alpha and Tandem servers, workstations, networking, and StorageWorks products are easily managed with our seamless enterprise integration process into the 9000 Series rack cabinets. Compaq 9000 Series racks can also be used with many other non-Compaq products.

Note: Customers interested in placing AlphaServer ES/DS systems into the Compaq Rack 9000 Series, for factory-direct on-site configuration, should consult Compaq's CustomSystems group.

Shipping

The Compaq 9000 Series of rack cabinets are also designed to handle full configuration shipping¹. Qualified equipment can be loaded into the racks and, when packaged properly, can be moved without damaging the racks or equipment inside. As specific equipment is qualified for full configuration shipping, information will be updated at www.compaq.com/storageworks.

¹Customers interested in AlphaServer ES/DS systems in the Compaq Rack 9000 Series, for factory-direct or on-site configuration, should consult Compaq's CustomSystems group

Expandability Options

Compaq offers numerous industry standard product options and accessories that assist in the optimization of the Compaq 9000 Series rack space utilization to maintain a more cost efficient rack system. This extensive product offering allows you to choose product solutions that are right for you. Following are several key products that can be used to upgrade your 9000 Series Rack Cabinet.

- **Sidewall mounting kits** – Optional Sidewalls can be added to the rack cabinet to further optimize airflow and release of hot air and to increase rack security options.
- **1U ergonomic Keyboard drawer** – This option can be added to provide a simple, space saving alternative for easy keyboard access.
- Cost and space saving **Compaq Server Console Switches (KVM)** with multiple mounting options – KVM Console Switches can allow multiple server components to be controlled by a minimum number of keyboards, monitors, and mice at user specified configurations.

The KVM Server Console switches can be mounted either behind the keyboard or within a sidewall to provide a zero-U space solution.

Refer to Table 2 for more detailed information regarding options available with the Compaq 9000 Rack Series.

Table 2. Compaq options available for the 9000 Series Rack cabinets

Option Kit	Product Description	Part Number
BAYING KIT	The baying kit is used to join two or more racks together in minutes to create a multi-bay configuration (supports 24" and 600mm floor tile spacing)	120669-B21
SIDE PANEL 42U	Side panels for 42U bare racks	120670-B21
SIDE PANEL 36U	Side panels for 36U bare racks	120671-B21
STABILIZER KIT	A retractable anti-tip stabilizer to provide stability and support when equipment is installed, removed, or accessed within the rack.	120673-B21
BALLAST KIT	Ballast is designed to provide additional stability and support when used with the Stabilizer Kit. Typically used when very heavy equipment is routinely installed, removed or accessed within the rack.	120672-B21
RACK RAIL ADAPTER KIT	Adapters for mounting equipment at the 25" depth level within the rack cabinet (traditional equipment depth is 29" for ProLiant and 25" for AlphaServers).	120675-B21
FAN KIT 110VAC (available in August)	Roof-mounted extractor fan kit enhances natural convection cooling by increasing the airflow in the rack.	120677-B21
FAN KIT 220VAC (available in August)	Roof-mounted extractor fan kit enhances natural convection cooling by increasing the airflow in the rack.	120678-B21
BUSTLE KIT (available in September)	Door extension kit that provides additional space (3.5") for cable management or for extended equipment.	120679-B21
GROUND BONDING KIT	The grounding kit makes it possible to completely integrate grounding in Compaq racks.	120682-B21

Increasing Rack Depth

If additional depth requirements arise, up to seven inches of depth capacity can be added. A 3.5-inch door extension kit is available for both the front and back sections of the rack cabinet that can be used for extended equipment or for additional cable management.

If the capacity of the 9000 Series rack 4 inch extenders are available for both the front and back of the cabinet to add up to an extra 8 inches of depth for the rack cabinet.

7000 Series Rack Cabinets

The Compaq 9000 Series Rack Cabinets are successors to the Compaq 7000 Series of rack cabinets. Even though the 9000 Series is functionally and aesthetically advanced compared to any other family of rack cabinets, the price for each 9000 model rack cabinet will cost approximately twenty-percent less than the current 7000 Series.

An option similar to the innovative design of the 9000 Series Rack Cabinet's ventilated front door pane is available for existing 7000 Series models. Simply remove the Lexan door panel from the 7000 Series model and replace it with the vented door upgrade insert. The Rack 7142 High Air Flow Door Insert is available in both a single pack or a pack of six.

Table 3. Rack 7142 High Air Flow Door Insert

Option	Quantity	Part Number
Rack 7142 High Air Flow Door Insert	Single Pack	327281-B21
Rack 7142 High Air Flow Door Insert	Six Pack	327281-B22

Quality Assurance

The Compaq 9000 Series Rack Cabinets are well designed and have crafted options that provide unlimited flexibility in growing or adapting the 9000 series to specific requirements and custom needs. Customers can depend on investment security across all mainstream Compaq server and storage products because of advanced product integration and high product quality to deliver high system reliability.

All 9000 Series rack cabinets are accompanied by an exclusive three-year onsite warranty and have undergone extensive evaluation and testing conventions across all critical platforms.

Compaq's reputation for providing the highest quality products throughout the entire enterprise is based on our strategic partnerships, extensive product research, product development, and product testing processes.

Tips for Better Reliability

Component Placement

The following rules apply to the physical placement of components in the rack:

- **Weight** - Sort all components by weight, placing the heaviest components at the bottom of the rack.

Keyboard/Video/Mouse (KVM) Switch Box - The switch box can be mounted either behind the keyboard or within a sidewall to provide a zero-U space solution.

- **Keyboard** - When using a 22U rack, place the keyboard in the topmost position, below the switch box, if applicable. When using either a 42U or a 36U rack, place the keyboard at a nominal height of 18U.
- **Monitor** - When using a 42U or 36U rack, position the monitor topmost within the rack. If using a 22U rack, place the monitor on top of the rack.
- **Rack and Components** - Always make sure to provide adequate ventilation space for both front and back doors to allow ambient room air to enter the rack and to allow the warm air to escape the rack. Be careful not block the ventilation apertures.

Rack Builder Pro Software

To help you plan your rack configuration more efficiently, Compaq provides a software utility called Rack Builder Pro. This program is provided on the Rack Builder Pro CD, or you can download the latest version from the Compaq website: <http://www.compaq.com>.

Installation Service

In the United States, Compaq can make arrangements to have your rack system installed by qualified Guaranteed Service Providers. This installation service covers the entire hardware installation sequence, from unpacking the components to routing cabling and running a test of the system.

An order form with pricing is available via PaqFax, Compaq's fax retrieval service. Dial 1-800-345-1518, select PaqFax, and request Document No. 4552.

Installation can also be provided directly by Authorized Compaq Service Providers. See "Getting Help" in the preface of this guide for more information on Compaq support.

Questions and Answers

Q Where can customers find more information about these Rack cabinets?

A More information can be found at our web site: www.compaq.com/storageworks.

Q How will the Compaq Rack 9000 series be priced relative to the Compaq Rack 7000 Series?

A Although the Compaq Rack 9000 series is functionally and aesthetically better than any other family of rack cabinets, including our own 7000 series, the price for each rack cabinet model in the 9000 series will be about twenty-percent less than the current 7000 series.

Q What products should be mounted in the Compaq Rack 9000 series?

A Compaq Rack 9000 series racks are ideal for rack mounting Compaq ProLiant, Alpha and Tandem servers, workstations, networking and StorageWorks products; however, many third party products may also be used.

Q What sort of features does the Compaq Rack 9000 series offer for thermal management for a fully configured rack cabinet?

A The 9000 Series of rack cabinets offer front to back natural convection cooling that is greatly enhanced by the innovative multi-angled, perforated design of the front door. Additional heat removal is available by adding one of several options kits .

Q How can I improve thermal circulation in my 9000 Series Rack Cabinet?

A There are several options kits that can complement the thermal integrity of the Compaq 9000 Rack Cabinets. Add a roof-mounted fan kit, install both sidewalls and also blanking panels to optimize airflow through the rack.

Q How is air circulated through the 9000 Series Rack Cabinet?

A Compaq rack-mountable products typically draw in cool air through the front and exhaust warm air out the back. When an optional fan kit is added, hot air is exhausted pulled out the top of the rack cabinet.

Q Are there any security measures that can be taken to protect equipment in the rack cabinet?

A Yes. Both front and rear doors are equipped with locks to provide added system security.

Q What opening access, left or right, are provided by the doors on the Compaq Rack 9000?

A The front and rear door design allows the doors to be mounted for left or right access to support strategic or personal preference.

Q Is it possible to move the 9000 Series Rack Cabinet after it has been fully configured?

A Yes. The rack cabinet can be moved after components have been placed inside. The largest cabinet of the series still measuring at less than two meters high allows it to fit through any standard doorway. The cabinet also resides on four wheels to simplify relocation.

Q I have several network components that are too large for the 9000 Rack Cabinet, is there a solution?

A Yes. Up to seven inches of depth can be added to the 9000 Rack Cabinet by adding both a 3.5-inch front and a 3.5-inch rear extender.

Q I have a Compaq 7000 Series Rack Cabinet, is there a way to improve air circulation without completely replacing the system?

A Yes. An option similar to the innovative design of the 9000 Series Rack Cabinet's ventilated front door pane is available for existing 7000 Series models. Simply remove the Lexan door panel from the 7000 Series model and renovate it with the vented door upgrade insert.

Q I am unsure of how to plan the configuration of my 9000 Series Rack. Where can I get help?

A Compaq provides a software utility called Rack Builder Pro to aide in creating optimal rack configurations. This program is provided on the Rack Builder Pro CD, or you can download the latest version from the Compaq website: <http://www.compaq.com> .

Q Can the Compaq Rack 9000 series be shipped fully configured?

A The 9000 Series is designed to handle full configuration shipping. Qualified equipment can be loaded into the racks and, when packaged properly, can be moved without damaging the racks or the equipment inside. As specific equipment is qualified for full configuration shipping, information will be updated at www.compaq.com/storageworks.

¹Customers interested in AlphaServer ES/DS systems in the Compaq Rack 9000 Series, for factory-direct or on-site configuration, should consult Compaq's CustomSystems group.

Q Do the 9000 Series rack cabinets have purchase protection?

A Yes. All Compaq rack cabinets are accompanied by an exclusive three-year onsite warranty and have undergone extensive evaluation and testing conventions across all critical platforms.

Q Where can I get help with rack installation?

A In the United States, Compaq can make arrangements to have your rack system installed by qualified Guaranteed Service Providers. This installation service covers the entire hardware installation sequence, from unpacking the components to routing cabling and running a test of the system.

Q Can I install an AlphaServer in a Compaq Rack 9000?

A Yes. Customers interested in placing AlphaServer ES/DS systems into the Compaq Rack 9000 Series, for factory-direct on-site configuration, should consult Compaq's CustomSystems group.