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Contents

Compaq Server Console Switch (KVM) Information Guide

A Compaq Server Console Switch is a device that provides a direct connection to multiple computer servers and allows the user to logically "switch" a single keyboard, monitor and mouse among those systems. Up to 64 computers running different operating systems can be manipulated from a single video screen.

Compaq Server Console Switches play an essential role in rack-mounted server configurations, as the space constraints in a server rack usually allow for only one console. Occupying only 1 "U" (1.75 inches) in height, a Compaq Server Console Switch has very tangible and quantifiable benefits of immediate cost savings and organized control over multiple servers in a rack-mount configuration.

The general benefits associated with a Compaq Server Console Switch are cost savings, physical space savings, reduced energy requirements, as well as the equipment and personnel efficiencies provided through non-intrusive, "out-of-band", server management.

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Overview

Figure 1.　Compaq Server Console Switch

A Compaq Server Console Switch emulates the presence of a keyboard, mouse, and video signal to each computer that it is connected to and provides a direct connection to multiple computer servers allowing the user to logically "switch" the keyboard, monitor and mouse among those systems. The keyboard, video, and mouse (KVM) together comprise the "console" and are available with 2-, 4-, or 8-port connections. The console switch can also be connected to eight other switches to allow control of up to 64 servers. Depending on the design, Compaq Server Console Switch devices utilize On-Screen Displays (OSDs), and/or keyboard "hot keys" to access each CPU connected to the console through the switch. With the On-Screen Display interface, connected computers can be identified by name or number, enabling the user to view and select user-specified server names.

Features

Compaq Server Console Switch devices are equipped with the following features:

- **On-Screen Display (OSD)** – The On Screen Display function presents system related information on the monitor, such as power-up test data and configuration menus, in a functional, user friendly manner. The OSD menus can be used to switch between connected computers. Switching entails selecting which computer to be allocated to receive commands from the console and to display output. Current information is maintained for each computer in the system.

- **Programmable Scanning –** System performance can be evaluated easily by scanning connected computers sequentially or by designating a custom scan pattern for specified computers and time spans.

- **Configuration NVRAM** – NVRAM (non-volatile random access memory) simplifies configuring information with user-friendly commands entered from the keyboard. As a result, configuration information is saved until updated, even in case of power loss.

- **Multiple Space Saving Zero U Installation Methods –** Both side-mount and rear-mount models are available for installation customization. Side-mount models are equipped with rails to simplify installation onto the side of the rack cabinet. Rear-mount units can be used in conjunction with a Compaq 1 U Keyboard Drawer (part number 338056-B21) and are equipped with slide rails to simplify mounting the unit behind the keyboard drawer.

- **Hardware Reset Switch** – In case keyboard and/or mouse communication is broken, the Hardware Reset Switch can be used to reset the console without interrupting power to the system.

- **Unattended Reboot –** When power is restored after a power outage, each server connected to the switch box automatically reboots as configured, without operator intervention. The switch generates responses to ensure that the reboot is successful and that it is ready to switch between connected computers.

- **Password Protection** – To protect the system against unauthorized users, the Compaq Server Console Switch provides a password protection option to lock the keyboard and monitor that activates when the screen saver is displayed. This security feature enables the user to specify a predetermined time delay before the system is locked by entering the number of seconds of delay before the screen saver appears.

- **Switch Firmware Update** – Compaq Server Console Switch firmware can easily be updated via Firmware Flash. Port communications settings are automatically configured to allow direct downloading from the connected computer.

- **Alternate Language Selection –** Several alternate languages are available on the Compaq Server Console Switch Software Utility CD. (Not available for use with the 2-Port switch)

- **Support for Optional Switch Box Connector Kit –** This option provides frontal access to the 4- or 8-port switches for a keyboard, monitor, mouse, and power cord

- **Locking Cables/Color Coded Connectors –** The Locking Cables feature ensures solid connections with external devices and the Color Coded Connectors ensure easy installation.

- **Three-year Warranty –** Compaq offers a limited three-year warranty to enforce quality control.
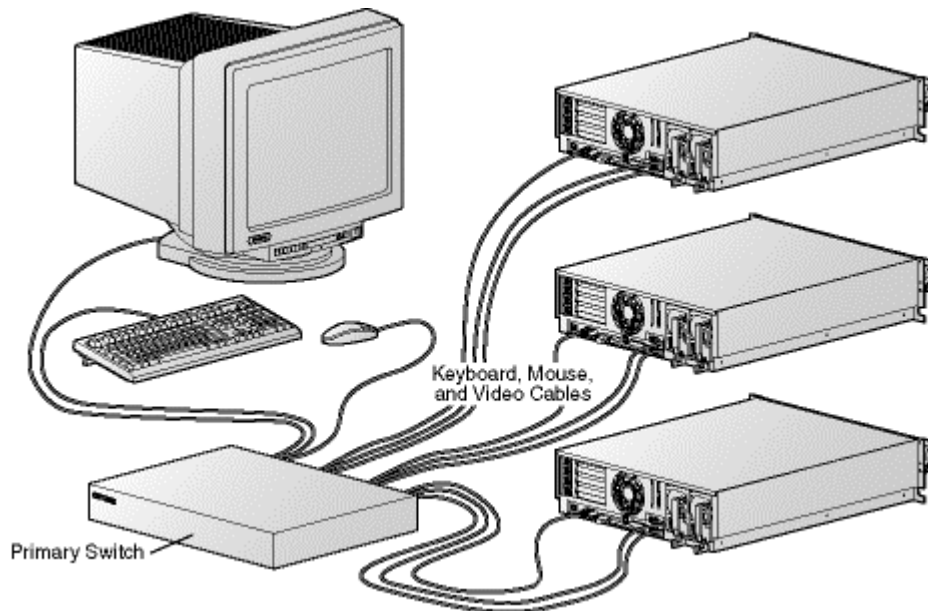
How a Compaq Server Console Switch Works

Compaq Server Console Switch devices do not physically connect to the backbone of the computer network, and thus are termed "out-of-band" devices. An out-of-band device functions as a non-intrusive device that passes signals that do not interfere with network traffic and has no effect on the hardware or software of the other devices attached to it. Out-of-band devices also run completely independent of the utilized operation system running on connected devices, allowing the console switch to work on any operating system. Compaq Server Console Switches are typically referred to as pass-through products, as they pose no interaction with software being run on the individual computers.

The Compaq Console Switch constantly sends an emulation signal to attached CPUs introducing no danger of hung systems due to keyboard errors, disconnected mice, or monitor problems. Since the Compaq Server Console Switch does not reside within the logical network path, server control is available even when the network is down. A Compaq Server Console Switch actually aides in bringing servers back up, as it can view the boot-up of the server and help diagnose multiple server problems without being affected by those problems.

Compaq Console Switch Configurations

Single User

A single user can control multiple computers with a single Compaq Server Console Switch. The console switch has one input (or user) port for a single user console and multiple output (or system) ports to connect multiple systems to the switch. A single switch box is used to connect four to eight servers. In this configuration, the KVM console is connected directly to the unit, and the Server Console Switch can connect to perspective servers in either the same or adjoining racks. Refer to Figure 2 for configuration illustration.

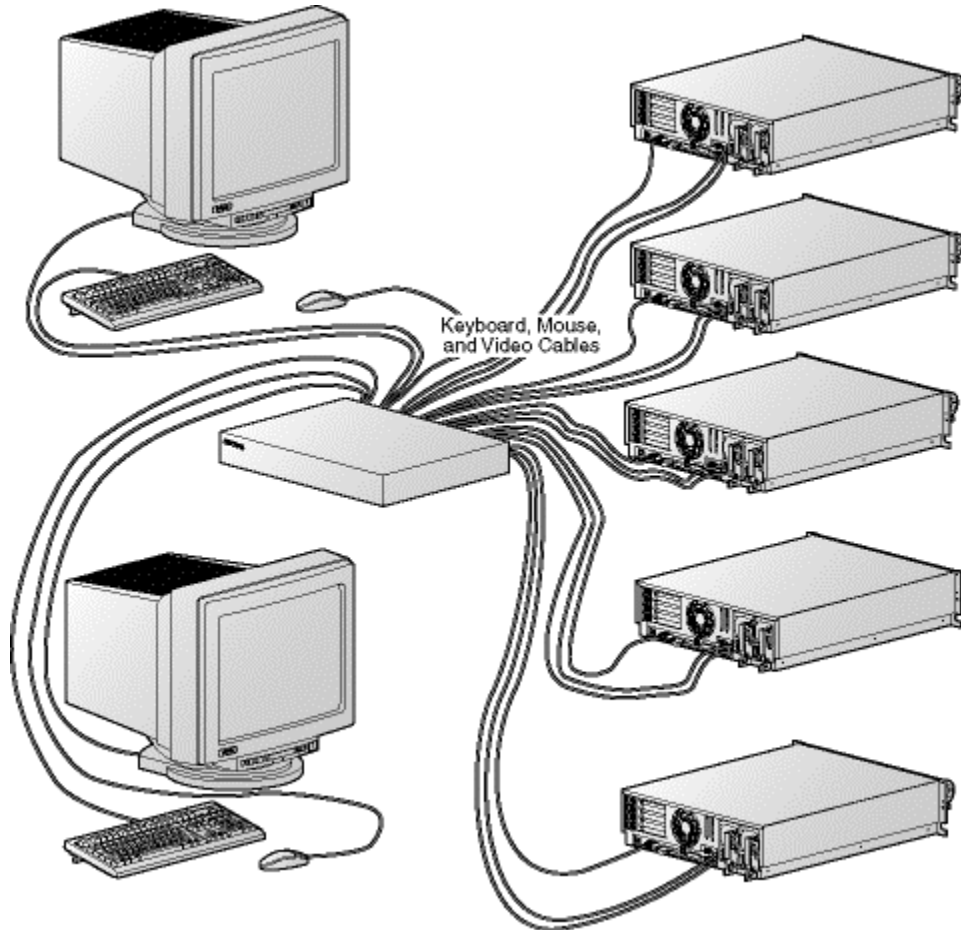**Figure 2.　　Single 4-Port Compaq Server Console Switch Configuration**

Note:　A "2x8" switch provides one additional user port for use with a second user or console position. This configuration is useful when a secondary, remote console position is desired.

Multi-user

A multi-user Compaq Server Console Switch has 8 ports that supports two KVM consoles that enables the system to be controlled by two separate users in different locations. Multiple console positions offer expanded flexibility, such as the following scenarios:

- Allow simultaneous control of servers in both the data center and in other remote locations
- Enables network administrators to display status, or scan, of all their machines on one console while still being able to perform system tasks from another console (which also has access to all computers).
- If the network fails, a network administrator could get multiple servers back online from four consoles in less time (instead of going from server to server on one console or from server to server physically without a console switch).
- If there are multiple network administrators, a multiple console switch allows each of them to access all of the servers in their data center to diagnose problems, all from separate locations.

Figure 3.   Multi-User Configuration of the 2x8 Compaq Server Console Switch

Scanning

The following are two examples of potential scan behavior where a multi-user switch in the primary position and any single user switch in the secondary position can create situations that change the scan pattern.

Example 1

User A is accessing computers 2 through 4 that are attached to the secondary switch on Port 2 of the primary switch, while user B scans computers attached to the secondary switch at Port 1 of the primary switch.

- Behavior – Switch at port 1 is available to scan system devices with no user accessing it. Any key pressed at the keyboard or a mouse click will stop the scanning and pass the keystrokes or the mouse movements to the currently selected computer.

Example 2

User A is accessing computers 2 through 4 while user B scans computers 2 through 4.

- Behavior – User B can only watch the monitor activities of User A cannot use the keyboard or the mouse to pass the keystrokes or mouse movements to the currently selected computer.

Tiering

Two Compaq Server Console Switch devices can be tiered, or connected serially to each other, to expand the number of systems controlled by one user. One of the output system device ports of an 8-port switch (the primary switch) can be used to serially connect to another 8-port switch (the secondary switch), yielding a total of 15 computers being controlled by only one user. Up to nine server console switches can be tiered, yielding a total of 64 connected computers. Figure 4 depicts two KVM consoles operating multiple computer systems through one Server Console Switch.
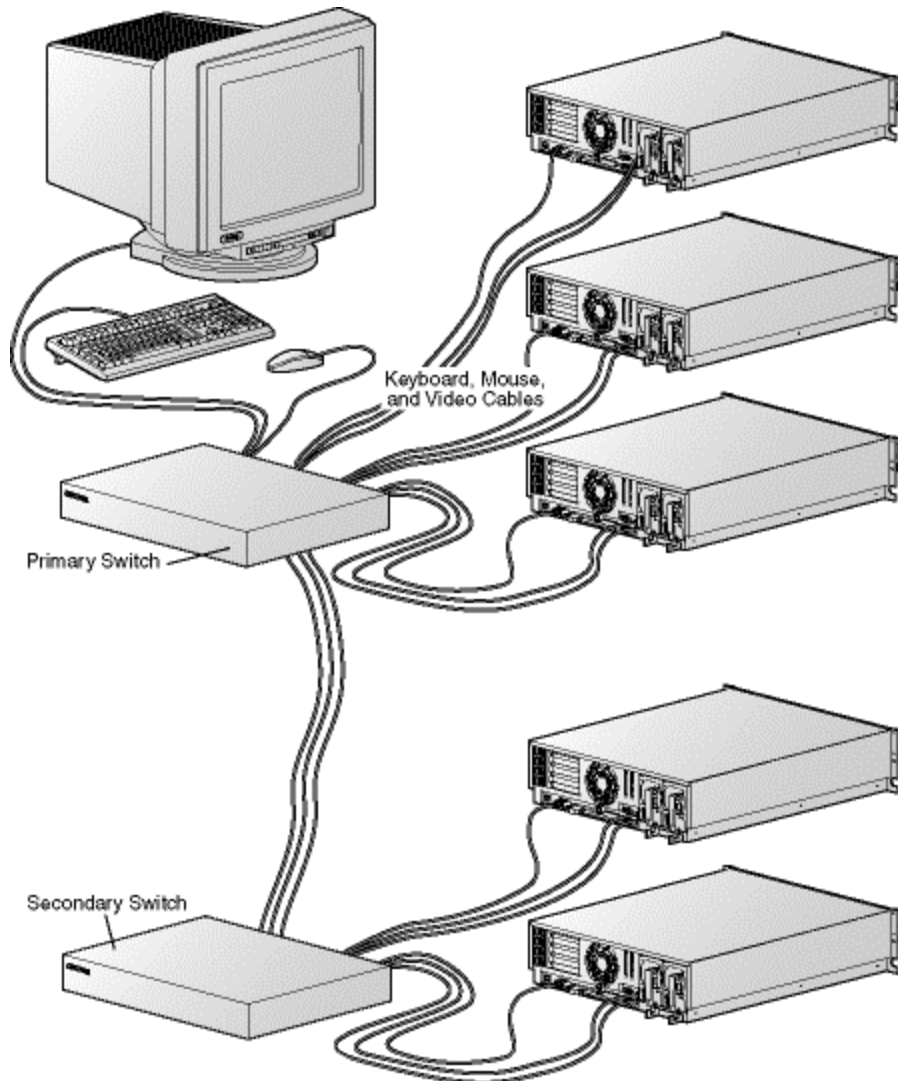

Keyboard, Mouse, and Video Cables

Primary Switch

Secondary Switch

Figure 4.   Tiered Compaq Server Console Switch Configuration

Advanced Features

Compaq Server Console Switch devices often have functions that go beyond simple switching between systems. Many models have the ability to be put in "scan" mode, where the switch automatically cycles through the video signals of the attached systems to monitor activity at pre-programmed time intervals to alternate focus to each system. Compaq Console switches can also

operate in "broadcast" mode, allowing the switch to transmit identical keyboard and/or mouse signals to more than one system synchronizing data input. Compaq Server Console Switches have onscreen menus that enable individual servers to be labeled in a personalized fashion and identified as such on the network. Through on-screen menus, user-specified passwords can be set to protect the system from unauthorized use.

Benefits of the Compaq Console Switch

General Scenarios

- When **space and cost considerations** are essential, a Compaq Console Switch manages multiple computers by a single keyboard, video monitor, and mouse.

- In a **rack-mount environment**, a Compaq Console Switch is ideal to manage rack-mount servers by only one console, and can be rack-mounted as well.

- When a **rapid or unplanned growth** of network servers occurs, console switches are virtually essential to control physical space requirements and to simplify the physical layout of the administrative work area.

- If **multiple servers** need to be used by one or more administrators, the Compaq Console Switch creates an ergonomic method to "switch" between multiple systems and administrators.

- **Growth and budget pressures** on Information Technology (IT) can necessitate the implementation of console switches to maximize usage area of existing data centers or to increase available space for new data centers.

- A **shortage of system administrators** managing servers in an IT department can be resolved with a Compaq Console Switch to minimize IT staff requirements to efficiently manage numerous servers.

- To **maximize IT budget expenditure**, Compaq Console Switches may be added. The budget can then be put toward better server management in rack-mount configurations, rather than spending on redundant consoles.

Overall Company Benefits

Network Operating Centers

Console switches are very beneficial in a Network Operating Center (NOC) and are essential in Lights-Out NOCs. A Network Operating Center is a location in which all servers are housed, usually in organized, cost-effective rack-mount configurations, for high ease-of-use in managing network environments. Lights-Out NOCs offer greater security, as all rack-mounted servers and switches are controlled externally from one or more consoles. The server room in a Lights-Out Network Operating Center can be locked from outside intrusion, but still be logically accessible by the network administrator through a console switch and a long-line driver or remote server management product.

Facilities Managers

- Typically, a minimum of fifty-percent savings in floor space can be expected when using console switches in rack-mount configurations versus non rack-mounted server

configurations. In one typical lab, console switches were implemented within rack-mount configurations reducing required floor space by sixty-seven percent.
- With fewer monitors, power consumption is reduced considerably. With the addition of one Compaq Server Console Switch, the total count of computer monitors can be reduced by 87%, in that a single monitor controls eight computers.
- Air conditioning costs are reduced due to the reduction in heat produced by the eliminated monitors when a console switch is implemented and uses only one monitor.

LAN (Network) Administrators

- Compaq Server Console switches allow network administrators to view server status from a single point, and to diagnose and fix problems from that location. There are very significant time and effort savings in implementing Server Console Switches in rack-mount configurations. When servers go down, the time it takes to bring them back up will be reduced if the administrator doesn't have to physically go from server to server and can access all servers from one console.
- Single console switches can often be used to control multiple combinations of mixed platforms, reducing the need for overpriced proprietary monitors and keyboards. Maintenance is reduced when extra monitors, keyboards, and mice are eliminated, which previously may have needed maintenance annually or even replacement.
- Compaq Server Console Switches can easily coexist with other out-of-band management tools connected to the same system.

Software/Hardware Developers

By adding a remote Compaq server Console Switch to congested computer lab, a more comfortable office environment can be achieved. Productivity levels increase due to the more comfortable work environment with less crowded labs and cubicles.

Specific Case Benefits

- A network administrator redesigning a data center could use Compaq Server Console Switches with rack-mounted servers to save on space and cost of redundant consoles within or among racks.
- An MIS director designing a Lights-Out Network Operating Center can access the server racks from a location outside the data center with a Compaq Server Console Switch.
- An individual software developer or engineer who routinely uses 2-4 computers to design, test, and simulate ideas can access all peripheral systems through a single Server Console Switch.
- A mid-sized company with 6 servers and an overworked system administrator in a very cluttered data center would greatly benefit from a rack-mounted switch configuration. All six servers could be mounted in one rack, and only one console would be needed with the implementation of an eight port console switch.
- Companies that have several "in-band" network management tools, but wish to compliment those items with non-intrusive server management tools that do not "live on the network" or become expensive overhead can add a Server Console Switch.

- Companies with a mix of legacy and new systems that need more effective space management solutions can use switches with racks to consolidate their servers into a manageable space and have the ability to access and control the mixed servers in a common manner.

- Companies that need increased security, density, manageability, and daily 24-hour confidence of solving problems even if the network is "down" could use the Compaq Server Console Switch to address these issues from any designated location.

IT Cost Reduction Analysis and Return

Adding a Compaq Console Switch to an IT department can result in an enormous reduction in annual personnel and equipment costs. Table 1 demonstrates true customer cost savings and investment return associated with a Compaq Server Console Switch attached to a rack-mount configuration running 100 servers in an urban east-coast data center.

Table 1. Estimated Savings and Cost Assumptions for 100 Servers

Benefit	Estimated Annual Savings	Cost Assumptions
Space Savings	$96,000	$20/sq.ft. x 400 sq. ft. x 12 months
Equipment Savings	$26,100	87 KVMs* x $300 per KVM set
Energy Savings	$57,159	87 monitors x 14.4kWh/day x $0.125 x 365 days
People/Time Savings	$70,000	salary of 1 Network Administrator
Console Switch Cost	-$15,080	$1,160 per server console switch x 13 server console switches
Total Savings	**$234,179**	
* KVM = Keyboards, Monitors (Video), and Mice		

The following diagram charts the actual annual Savings and Cost Assumptions of the above mentioned east coast data center. The total annual savings includes the cost of the Compaq Server Console Switch.
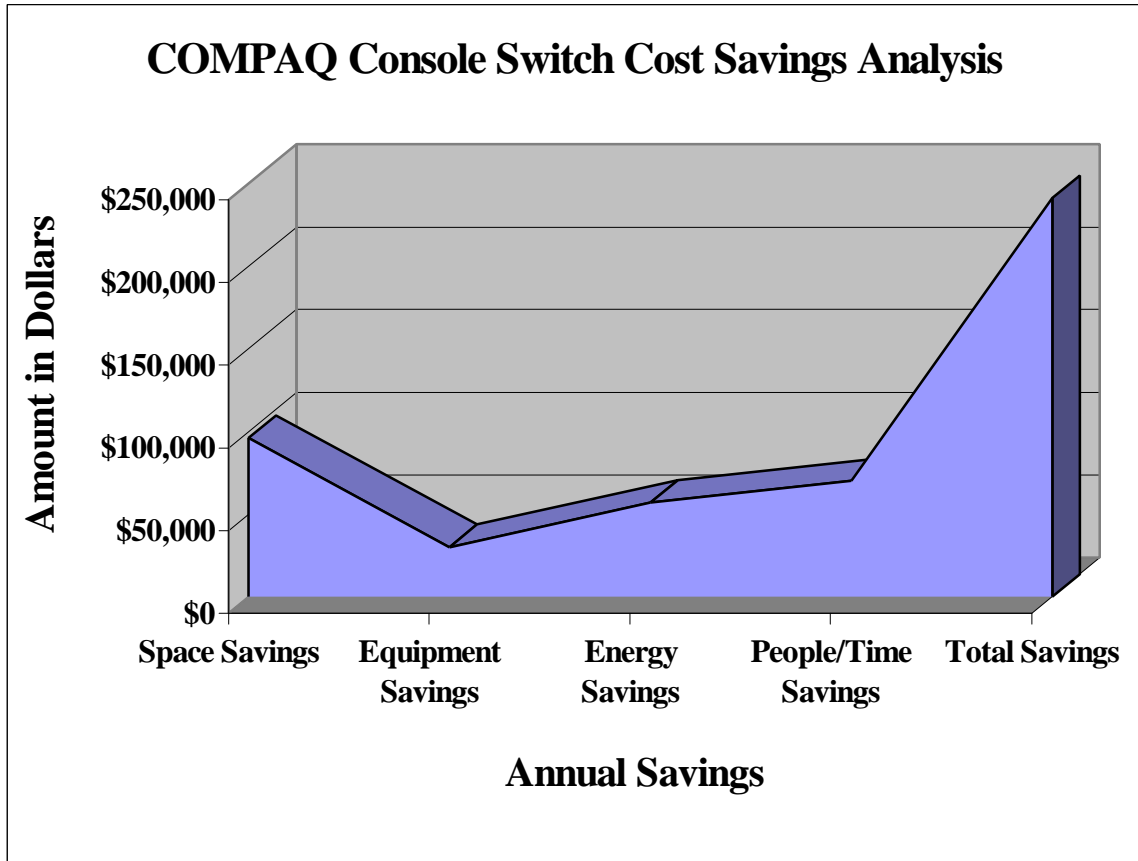
COMPAQ Console Switch Cost Savings Analysis

Figure 5. True annual savings provided by adding a Compaq Server Console Switch

Competitive Analysis Matrix

Table 2. Console Switch Competitive Comparison Chart

	Compaq Console Switches	Cybex Autoview	Rose Ultraview	Raritan Compuswitch
Hardware Specs				
Designed for rack-mount environment	**Yes**	No	No	Yes
Integration into server cabinet	**Yes**	No	No	No
2, 4, and 8 port models	**Yes**	Yes	Yes	Yes
Tiering option to other switches for expansion	**Yes**	yes	Yes	Yes
Standard On Screen Display	**Yes**	Yes	Yes	No
Standard server cables	**Yes**	No – proprietary	No – proprietary	No – proprietary
Compatible with other industry standard server mfg. Switches	**Yes**	No	No	No
3 year warranty	**Yes**	No	No	No
Single Vendor support with servers	**Yes**	No	No	No
2-User Models	**Yes**	Yes	No	No

Questions and Answers

Q   How can I reduce the required number of keyboards, monitors, and mice needed to communicate with multiple computer servers?

A   Add a Compaq Server Console Switch to your network system to allow users to logically "switch" a single keyboard, monitor and mouse among those systems.

Q   How many systems can be controlled by one console with the addition of Compaq Server Console Switch devices?

A   Up to 64 systems running different operating systems can be controlled through a single console when tiering Compaq console switches.

Q   I have a rack-mount system configuration, is there enough space to add a Compaq Server Console Switch?

A   Yes. The Compaq Server Console Switch when mounted to the sidewall will occupy zero-U of rack space.

Q   How can I recognize separate servers when using only one monitor?

A   The Compaq Server Console Switch is equipped with digital On-Screen Displays that allows the user to individually label connected computers.

Q   With only one console controlling my network, how can I protect my system from unauthorized users?

A   The Compaq Server Console Switch comes equipped with password protection options to protect the system from unauthorized users.

Q   What is an "out-of-band" device?

A   "Out-of-band" devices function non-intrusively and pass signals that do not interfere with network traffic and have no effect on the hardware or software of the other devices attached to it.

Q **Is it possible to control connected servers through a Compaq Server Console Switch when the network is down?**

A Yes. Because Compaq Server Console Switch devices are considered "out-of-band", server control is still available even when the network is down, and actually aides in bringing servers back up.

Q **Can unique names be assigned to each computer in a system?**

A Yes. It may be easier to identify the computers in a system by name, rather than by port number. For example, in a network environment, the same names can be assigned as those designated by the network for each computer.

Q **Is it possible to have more than one console connected to a Compaq Server Console Switch?**

A Yes. A multi-user Compaq Server Console Switch is available that has 8-ports and supports two KVM consoles enabling the systems to be controlled by two separate users in different locations.

Q **Is it possible to use more than one Compaq Server Console Switch concurrently to control additional systems by one user?**

A Yes. Two single user Compaq Server Console Switch devices can be tiered, or connected serially to one another, to expand the number of systems controlled by one user to 15 computers.