

MARCH 2001

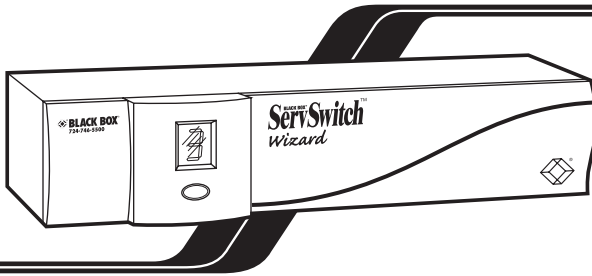
BLACK BOX[®] *ServSwitch*[™] *Wizard*



SW651A
SW652A

 **BLACK BOX**[®]
NETWORK SERVICES

Addendum for ServSwitch™ Wizard Kits



The ServSwitch™ Wizard Kits were accidentally left out of your ServSwitch Wizard manual dated March 2001. They include the matching Wizard chassis plus two (SW651A-K) or four (SW652A-K) of each of these accessories:

- Premium KVM CPU Cables. These are identical to the cables identified in your manual as “ServSwitch Duo CPU-Extension Cables” (product code EHN409). You can use these Premium KVM CPU Cables to attach your CPUs to the Wizard, or for any other purpose your manual specifies for the ServSwitch Duo CPU-Extension Cables.
- 6-pin mini-DIN female to 5-pin DIN male PC/AT® keyboard-port adapters (available separately as product code FA212) for connecting CPUs with PC/AT type keyboard ports.
- 6-pin mini-DIN female to DB9 female RS-232 serial mouse-port adapters (available separately as product code FA314) for connecting CPUs with serial mouse ports.

We apologize for the omission.

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Welcome to the ServSwitch™ Family!

Thank you for purchasing a BLACK BOX® ServSwitch™ Brand KVM switch! We appreciate your business, and we think you'll appreciate the many ways that your new ServSwitch keyboard/video/mouse switch will save you money, time, and effort.

That's because our ServSwitch family is all about breaking away from the traditional, expensive model of computer management. You know, the one-size-fits-all-even-if-it-doesn't model that says, "One computer gets one user station, no more, no less." Why not a single user station (monitor, keyboard, and mouse) for multiple computers—even computers of different platforms? Why not a pair of user stations, each of which can control multiple computers? Why not multiple user stations for the same computer?

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The ServSwitch™ family from Black Box—the one-stop answer for all your KVM-switching needs!

*

This manual will tell you all about your new ServSwitch™ Wizard, including how to install, operate, and troubleshoot it. For an introduction to the ServSwitch Wizard, see **Chapter 2**. The ServSwitch Wizard product codes covered in this manual are:

SW651A
SW652A

This manual also includes information about the Remote-Control Module accessory, whose product codes are:

KV6REM
KV6REM-25
KV6REM-50
KV6REM-75

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- (a) Reorient or relocate the receiving antenna.
- (b) Increase the separation between the equipment and the receiver.
- (c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- (d) Consult the supplier or an experienced radio/TV technician for help.

Shielded cables must be used with this equipment to maintain compliance with radio-frequency energy-emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.



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INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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1. Specifications

Compliance —	CE (EN55022 Class B); FCC Part 15 Subpart J Class A, IC Class/classe A
Standards —	VGA, SVGA, XGA, XGA-2, SXGA, or UXGA video; supports VESA DDC, DDC1, and DDC2 signaling
Interfaces —	Video: VGA; Keyboard and mouse: IBM PS/2 compatible; Expansion port: Proprietary variant of EIA/TIA RS-232
Resolution —	Up to 1600 x 1280 noninterlaced at up to 100 Hz
Protocol —	RS-232: Asynchronous
Data Format —	RS-232: 8 data bits, no parity, 1 stop bit
Data Rate —	RS-232: 1200 bps
Flow Control —	RS-232: None
Maximum Distance —	2 m (6 ft.) if interface-powered or 10 m (30 ft.) if AC-powered to any attached keyboard, monitor, and mouse; 5 m (15 ft.) if interface-powered or 30 m (100 ft.) if AC-powered to any attached CPU or cascaded Wizard
User Controls —	Keyboard commands; Mouse-click functions; (1) Front-mounted pushbutton for channel change and configuration mode; (1) Bottom-mounted 8-position DIP switch for reset and firmware upgrade
Indicator —	(1) Front-mounted 7-segment status display

Connectors —	All rear-mounted: User port: (1) HD15 female for monitor attachment, (2) 6-pin mini-DIN female for keyboard and mouse attachment; CPU ports ([2] on SW651A, [4] on SW652A): (1) HD15 female for video-port attachment, (2) 6-pin mini-DIN female for keyboard- and mouse-port attachment; (1) Multipurpose DB15 female (see Section A.3 of the Appendix); (1) Barrel jack for power
MTBF —	500,000 hours (based on the historical reliability of similarly designed and manufactured products)
Maximum Altitude —	10,000 ft. (3048 m)
Temperature Tolerance —	32 to 104°F (0 to 40°C)
Humidity Tolerance —	5 to 60% noncondensing
Enclosure —	Steel, aluminum, and plastic
Power —	Either: <ul style="list-style-type: none">• 5 VDC at up to 500 mA from the keyboard interfaces of the attached computers, or• From the optional power supply PS649 (not included): Input: 100 to 240 VAC at 50 to 60 Hz from utility-power outlet, through detachable power cord and IEC 320 male inlet, to external transformer; Output: 5 VDC at up to 1 A; Consumption: 5 watts maximum
Size —	1.8"H (1U) x 10.3"W x 5.9"D (4.6 x 26.2 x 15 cm)
Weight —	2.2 lb. (1 kg)

2. Introduction

The ServSwitch™ Wizard is a high-performance keyboard-, monitor-, and mouse-sharing device that supports a wide range of IBM® PC compatible hardware and software platforms, including some high-end IBM PS/2® compatible computers (IBM RS/6000®, Compaq® Alpha®, and SGI™).

2.1 Features and Benefits

Here are some of the useful features of the ServSwitch Wizard and some of the ways those features benefit you:

- Control multiple computer CPUs from a single keyboard, monitor, and mouse.
- Continuous keyboard and mouse emulation on all ports ensures problem-free computer bootup. And because all ports are simultaneously active, all attached CPUs can be booted at the same time.
- Can usually draw all the power it needs from the attached CPUs. For demanding applications with cascading and/or high-end video, an optional power supply (product code PS649) is available.
- Intelligent switching: You can scan/switch between all ports or just the active ones.
- Flash-upgradable for easy on-site firmware upgrades.
- Supports high-bandwidth monitors, at resolutions up to 1600 x 1280 pixels and refresh rates up to 100 Hz, with low distortion.
- Video channels support Display Data Channel (DDC/DDC1/DDC2) signaling.
- Can be cascaded to control a large number of CPUs.
- Can be paired to control CPUs with dual video outputs.
- Password security prevents unauthorized use.
- Local channel switching using its front-panel pushbutton, a keyboard hotkey sequence, or a 3-button mouse.
- Remote channel switching through its RS-232 serial port, using its convenient optional Remote-Control Module or some other device.
- Automatically restores keyboard and mouse states when channel is changed.

- Mixed PC/AT® and PS/2 keyboards and PS/2 and RS-232 mice supported as standard.
- Supports keyboard modes 1, 2, and 3, as well as both “prompt” and “stream” mouse modes, for maximum compatibility.
- Support for Microsoft® IntelliMouse™ and many other “wheel mice.”
- Mouse-restoration functions that make it possible to hot-plug certain systems.
- Supports IBM ThinkPad® notebooks and their “Y” cables.
- Also supports IBM RS/6000®, Compaq® Alpha®, and SGI™ computers.
- Compatible with all popular operating systems for the IBM PC.
- Includes screen-blank, autoscan, and variable-hotkey options.
- Metal enclosure for good shielding and video quality.
- Front-panel Power and Activity LEDs.
- Can be soft-reset if problems occur.

2.2 The Complete Package

The only other thing that comes with the ServSwitch Wizard (product codes SW651A for the 2-port model and SW652A for the 4-port model) is this manual. (We don't include a power supply because most applications don't require one. If you need a power supply for the Wizard, it can be purchased separately as product code PS649.)

The only other things that come with the Wizard's optional Remote-Control Module (the KV6REM series of product codes—see **Section 5.2**) are Velcro® mounting strips.

2.3 The ServSwitch Wizard Illustrated

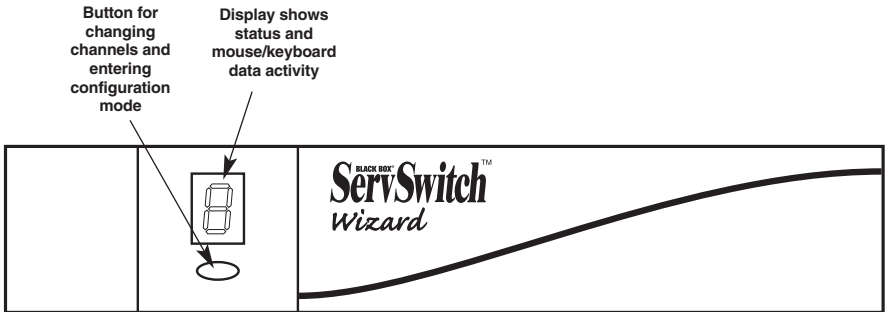


Figure 2-1. The ServSwitch Wizard's front panel.

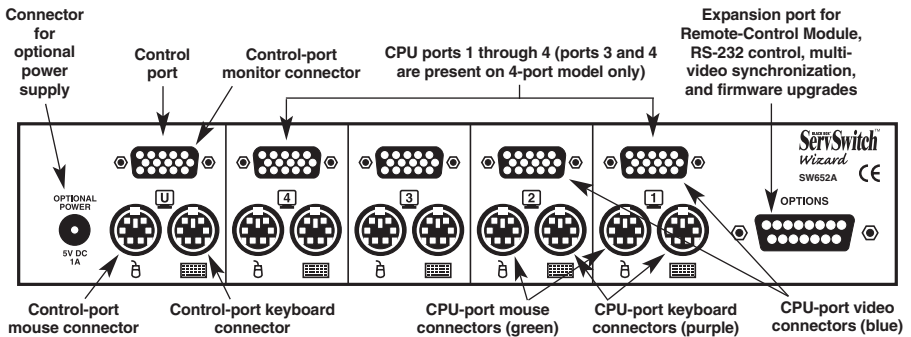


Fig. 2-2. The ServSwitch Wizard's rear panel (SW652A shown).

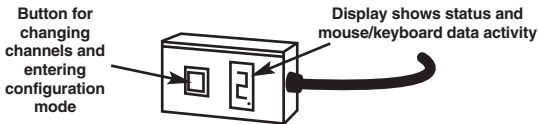


Figure 2-3. The Remote-Control Module (KV6REM), an optional accessory.

The bottom panel of the ServSwitch Wizard isn't shown here, but there's an 8-position DIP switch mounted on it. You'll use this switch if you ever do a "warm reset" of the Wizard (see **Section 5.12**) or upgrade the Wizard's firmware (see **Section 5.13**).

2.4 Safety Concerns

As you prepare to install the ServSwitch Wizard, please keep these things in mind:

- The Wizard is for use in dry, oil-free indoor environments only.
- Do *not* attempt to fix the Wizard yourself.
- Follow all warnings and instructions marked on the Wizard, its optional power supply, and any other accessories.
- If you are using the Wizard's optional power supply:
 - **Warning:** The Wizard's power-supply transformer contains *no* user-serviceable parts, but it *does* contain “live” parts capable of delivering hazardous electric shocks—do *not* attempt to dismantle it!
 - Make sure that the total current rating of the devices plugged into the AC outlet that's supplying the Wizard is not greater than the outlet's rated current capacity.
 - If you use an extension cord with the power supply, make sure that the total current rating of the devices plugged into the extension cord is not greater than the cord's rated current capacity.
 - Do *not* continue to use the Wizard's power supply if its transformer case becomes damaged, cracked, or broken, or if you suspect that the power supply isn't operating properly.
 - If the Wizard's power supply stops working, replace it only with a manufacturer-approved power supply of the same type.

3. Installation

3.1 What You Will Need

You'll need these things to be in place before you can install your ServSwitch Wizard:

- Cables to connect the ServSwitch Wizard to the keyboard, video, and mouse ports of each of your computers. If you'll be installing synchronized or cascaded Wizards, you'll also need cables to attach the Wizards to each other. Cable specifications are given in the **Appendix**. (You don't need to connect a mouse cable if you are not using the mouse.)
- A monitor with a standard VGA (HD15) connector that will work when connected directly to each of your computers. The ServSwitch Wizard supports low- and high-resolution monitors.
- A standard PC/AT or PS/2 style keyboard. (If you're using an AT keyboard with a 5-pin DIN connector, you'll need a standard AT to PS/2 keyboard adapter—product code FA212—to connect it to the ServSwitch Wizard.)
- A PS/2 style two- or three-button Microsoft® or Logitech™ compatible mouse or a Microsoft IntelliMouse® or IntelliMouse Explorer compatible mouse. If you want to use the mouse to switch channels on the ServSwitch Wizard, you'll need a three-button mouse or an IntelliMouse. (The Wizard supports other IntelliMouse compatible “Internet mice”—fitted with a wheel or other scrolling control, and sometimes additional buttons—including several models by Logitech and Genius™.)

All of the mouse connections from ServSwitch Wizard to the attached computers support either PS/2 mouse ports or RS-232 serial mouse ports. The Wizard automatically converts PS/2 mouse data and commands to serial-mouse data and commands, but you'll still need the appropriate adapter—product code FA314—to connect the Wizard to a PC with a serial mouse port. See **Section A.2** in the **Appendix**.

The Wizard will operate without a mouse connected if you don't want to use one.

- A suitable mouse driver for your PCs. Supported types are:
 - PS/2 or RS-232 two-button mouse driver by any manufacturer.
 - Microsoft mouse drivers, including those for the IntelliMouse.
 - Logitech mouse drivers, including those for two-button, three-button, and wheel mice.

3.2 Placement

The ServSwitch Wizard should be placed on a desktop or shelf near your monitor and peripherals. You can use the optional Remote-Control Module if you want to put a Wizard farther from your monitor and peripherals.

3.3 Connecting Your Equipment

NOTES

When you connect devices to Wizards' "control ports" and "CPU ports," refer to Figure 2-2 in Section 2.3 to see where these ports are.

Any unused CPU-port or control-port connectors on a ServSwitch Wizard can be left vacant.

Most ServSwitch Wizard applications will involve a keyboard, monitor, mouse, and two to four computer CPUs attached to a *single* Wizard. If that describes what you want to do, follow the procedure in **Section 3.3.1**.

If you want to switch between more than four CPUs, you'll need multiple *cascaded* Wizards to connect them together. Follow the procedure in **Section 3.3.2**.

If your CPUs have multiple video outputs, you will need multiple *synchronized* Wizards to switch between the CPUs. Follow the procedure in **Section 3.3.3**.

NOTE

It is theoretically possible to install a synchronized cascade, but we don't recommend doing this. If you need to switch between large numbers of computers with multiple video outputs, we strongly suggest that you consider a KVM-switching system designed to handle such applications, such as our ServSwitch™ Multi.

As described in **Sections 3.3.1** through **3.3.3**, you might want to use ServSwitch Duo User-Extension Cables or CPU-Extension Cables to connect your equipment, or even ServSwitch Brand KVM extenders if the distances involved are long enough. And to connect PC/AT style equipment, you'll need adapters. These cables, extenders, and adapters are described in **Section 3.3.4**.

3.3.1 SYSTEMS WITH A SINGLE WIZARD

Make sure that the Wizard is unplugged and powered down. If possible, turn off and unplug all of the devices that you want to attach to it. (If you have to “hot-plug” any powered computers into the Wizard, see **Section 5.8**.)

Connect your user equipment (keyboard, PS/2 mouse, and monitor) to the appropriate “control port” connectors on the Wizard’s rear panel. If you have had to place the Wizard farther from the user equipment than the equipment’s native cables will reach—up to an additional distance of 30 ft. (9.1 m)—you can plug the native cables into ServSwitch Duo User-Extension Cable. If you need to place your user equipment farther away than that, you’ll need to use one of our ServSwitch brand KVM extenders.

Next, connect each computer CPU to the Wizard by running cabling from the CPU’s keyboard, mouse, and video ports to the matching connectors in one of the Wizard’s “CPU ports.” This cabling can be either separate male-to-male keyboard-, mouse-, and video-extension cables, or our three-in-one ServSwitch Duo CPU-Extension Cable. If you need to run farther than 100 ft. (30.5 m) to a CPU, you’ll need to use one of our ServSwitch brand KVM extenders.

A complete system using a single Wizard is shown in Figure 3-1.

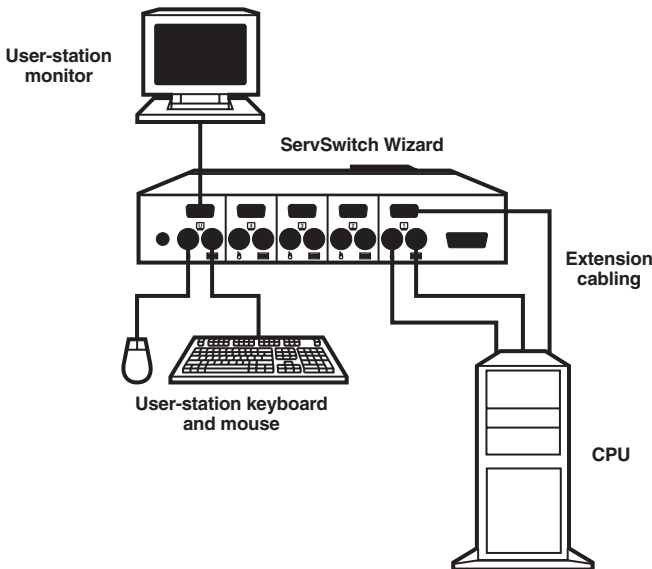


Figure 3-1. System using a single ServSwitch Wizard (SW652A shown).

3.3.2 CASCADED WIZARD SYSTEMS FOR MORE THAN FOUR CPUs

Multiple ServSwitch Wizards can be cascaded (connected together in a one-to-many scheme) in order to increase the maximum number of available CPU ports in your KVM-switching system. (Note that *each* Wizard in a cascade *must* be powered through a power supply and *not* from the keyboard interface.) This can be particularly useful where clusters of computers are located some distance from each other, because each Wizard acts as a kind of signal booster or repeater and can be long distances away from the other Wizards in the system.

You can include ServSwitch Wizard LPs, ServSwitch Wizard Pros, and ServSwitch Duos in ServSwitch Wizard cascades. We don't recommend including Duos, however, unless a single ServSwitch Duo is the master switch for your cascade. This is because users attached to two or more Duos in the same cascade might see the same CPUs as having different CPU numbers, and might have to use different commands to access them.

Make sure that your “master” ServSwitch Wizard—the chassis that your monitor, keyboard, and mouse will be attached to—is unplugged and powered down. If possible, turn off and unplug all of the devices that you want to attach to this Wizard. (If you have to “hot-plug” any powered computers into your Wizard system, see **Section 5.8**.)

Connect your user equipment (keyboard, PS/2 mouse, and monitor) to the appropriate “control port” connectors on the master Wizard's rear panel. If you have had to place the Wizard farther from the user equipment than the equipment's native cables will reach—up to an additional distance of 30 ft. (9.1 m)—you can plug the native cables into ServSwitch Duo User-Extension Cable. If you need to place your user equipment farther away than that, you'll need to use one of our ServSwitch brand KVM extenders.

Now connect a layer of as many as four “subsidiary” Wizards to your master Wizard by running cabling from the subsidiary Wizards' control ports to the master Wizard's “CPU ports.” This cabling can be either separate male-to-male keyboard-, mouse-, and video-extension cables, or our three-in-one ServSwitch Duo CPU-Extension Cable. If you need to run farther than 100 ft. (30.5 m) between master and subsidiary Wizards, you'll need to use one of our ServSwitch brand KVM extenders.

You can extend your cascade to a third layer by repeating the process and attaching additional subsidiary Wizards to the subsidiary Wizards already attached to your master Wizard chassis. Though it's theoretically possible to cascade Wizards to four, five, or more layers, we recommend that you limit your setup to three, because the addresses you need to enter to switch CPU channels become ridiculously long. If you need to connect that many computers, use a more powerful KVM switch such as our ServSwitch™ Affinity or ServSwitch Multi.

Finally, connect each computer CPU to the Wizard system by running cabling from the CPU's keyboard, mouse, and video ports to the matching connectors in one of the CPU ports on one of the subsidiary Wizards. As with the master-to-subsidary Wizard connections, this cabling can be either separate keyboard-, mouse-, and video-extension cables or ServSwitch Duo CPU-Extension Cable. If you need to run farther than 100 ft. (30.5 m) to a CPU, you'll need to use one of our ServSwitch brand KVM extenders.

A complete cascaded Wizard system is shown in Figure 3-2.

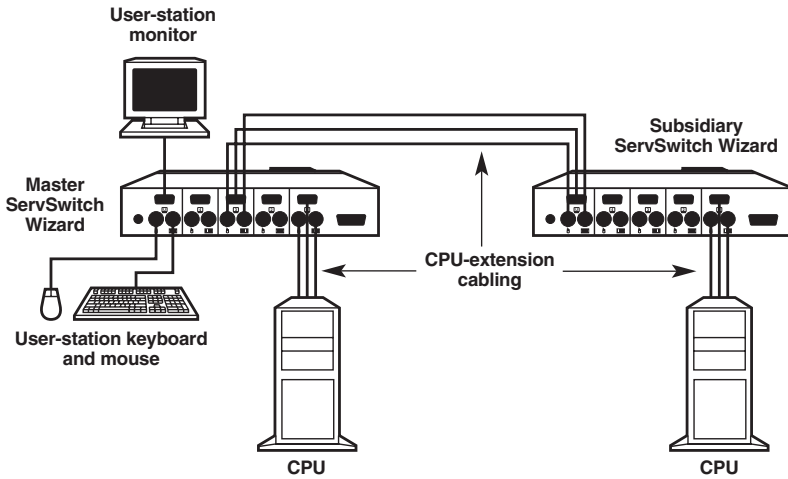


Figure 3-2. A simple cascaded system with two ServSwitch Wizards.

3.3.3 SYNCHRONIZED WIZARD SYSTEMS FOR CPUs WITH MULTIPLE VIDEO OUTPUTS

Some business environments, such as engineering and financial services, often make use of CPUs with multiple video outputs (as in, multiple video cards and/or video cards with multiple video heads). This is because these environments frequently require more “video real estate” than a single monitor can provide.

It can be hard to integrate such CPUs into a KVM-switched system, because most KVM switches make no provision for the extra video output. But the ServSwitch Wizard supports these CPUs, and here’s how: When you switch to a different CPU channel, the Wizard transmits the same switching command out of its RS-232 port. Any other Wizard receiving this command will make the same channel change. So you can connect a CPU’s additional video outputs to additional Wizards, then interconnect your Wizards’ RS-232 ports to create a synchronized switching system that switches all video feeds coming from each CPU at the same time.

(Note that *each* Wizard in a synchronized system *must* be powered through a power supply and *not* from the keyboard interface.)

Make sure that your “master” ServSwitch Wizard—the chassis that your keyboard and mouse will be attached to—is unplugged and powered down. If possible, turn off and unplug all of the devices that you want to attach to this Wizard. (If you have to “hot-plug” any powered computers into your Wizard system, see **Section 5.8**.)

Connect your primary user equipment (your keyboard, your PS/2 mouse, and the first of your monitors) to the appropriate “control port” connectors on the master Wizard’s rear panel. If you have had to place the Wizard farther from the user equipment than the equipment’s native cables will reach—up to an additional distance of 30 ft. (9.1 m)—you can plug the native cables into ServSwitch Duo User-Extension Cable. If you need to place your user equipment farther away than that, you’ll need to use one of our ServSwitch brand KVM extenders.

Attach all other monitors you’ll be using to the control-port video connector on the rear panel of another Wizard. As with your primary user equipment, use video-extension cable or ServSwitch Duo User-Extension Cable to cross gaps up to 30 ft. (9.1 m), or one of our ServSwitch brand KVM extenders for longer distances.

Connect the additional Wizards to your master Wizard with DB15 cable. If your CPUs output only two video feeds, so that you only need to synchronize two Wizards, connect the second Wizard to the first with a special male-to-male DB15 synchronization cable (available on a quote basis; see **Section A.3** of the **Appendix** for a pinout). But if your CPUs output more than two video feeds, you’ll need to use pass-through, multi-drop, or preferably one-to-many DB15 cabling; call Black Box Tech Support to discuss your application.

Connect each computer CPU to the synchronized Wizard system. First run cabling from the CPU's keyboard port, mouse port, and primary video output to the matching connectors in one of the master Wizard's "CPU ports." This cabling can be either separate male-to-male keyboard-, mouse-, and video-extension cables, or our three-in-one ServSwitch Duo CPU-Extension Cable. If you need to run farther than 100 ft. (30.5 m) to a CPU, you'll need to use one of our ServSwitch brand KVM extenders.

Finally, connect the additional video outputs from each CPU to the video connectors in the CPU ports of the additional Wizards. For correct switching, *make sure* to connect all of the video outputs from the same CPU to same-numbered ports on your synchronized Wizards. As with your first CPU-video connection, these connections can be made with video-extension cable or ServSwitch Duo CPU-Extension Cable for distances up to 100 ft. (30.5 m), or one of our ServSwitch brand KVM extenders for longer distances.

Feel free to mix computers with multiple video outputs and computers with single outputs in your synchronized system. When you switch to a CPU with a single output, that output will be displayed on the first monitor and the additional monitors will be blank.

A complete synchronized Wizard system is shown in Figure 3-3.

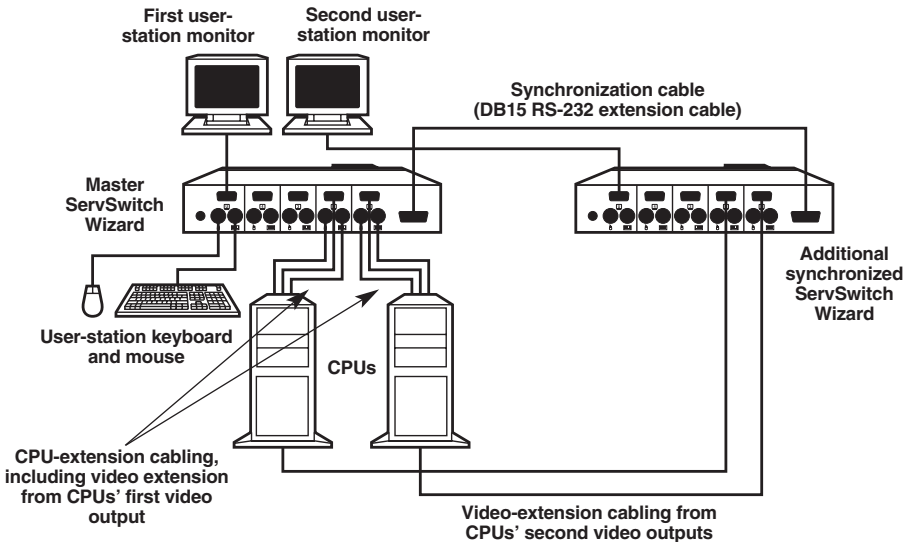


Figure 3-3. A simple synchronized system with two ServSwitch Wizards.

3.3.4 SERVSWITCH DUO CABLES, SERVSWITCH EXTENDERS, AND PC/AT ADAPTERS

The ServSwitch Duo Cables—so called because they were first offered for use with the ServSwitch Duo—come in two types: User-Extension Cables, designed to extend the distance between a switch and a set of user equipment (keyboard, monitor, and mouse); and CPU-Extension Cables, designed to extend the distance between a switch and a CPU or another switch. ServSwitch Duo User-Extension Cables (product code EHN409) come in 10-ft. (3-m), 20-ft. (6.1-m), and 30-ft. (9.1-m) lengths. ServSwitch Duo CPU-Extension Cables (EHN408) come in 5-ft. (1.5-m), 10-ft. (3-m), 20-ft. (6.1-m), 30-ft. (9.1-m), 50-ft. (15.2-m), and 100-ft. (30.5-m) lengths.

Both types of cable are built to the special three-in-one design shown in Figure 3-4 on the next page. The central coaxial video strand of each cable is molded to the keyboard and mouse strands on either side, and the ends of its video strand are one inch (2.5 cm) longer than the ends of the other strands, so that the weight of the composite cable can be borne by the video connector's screwlocks. To help you tell the otherwise identical keyboard and mouse strands apart, the keyboard strand is labeled "K" and colored orange, while the mouse strand is labeled "M" and colored green.

We offer several types of ServSwitch Brand CAT5 KVM Extenders. At the time of this writing, there are three models that you might want to use to extend switch-to-user, switch-to-CPU, or switch-to-switch distances in a ServSwitch Wizard system:

- The ServSwitch Brand CAT5 KVM Micro Extender (product code ACU3001A) is suitable for runs up to 50 m (160 ft.).
- Depending on your video resolution, the regular ServSwitch Brand CAT5 KVM Extender (ACU1001A) can be suitable for runs up to 300 m (1000 ft.).
- The ServSwitch Brand Fiber KVM Extender (ACS235A) is suitable for runs up to 1000 m (3300 ft.).

With the regular Extender and Micro Extender, you'll need CAT5 cable to run between the Extender's Local and Remote Units, plus special cable to connect the Extender to the CPU or Wizard. For Wizard-to-CPU runs, you might want the Dual-Access regular Extender (ACU1009A) or Micro Extender (ACU3009A), which supports a local user station at the CPU that contends with the Wizard's user station for access. With the Fiber Extender, you'll need a multimode fiberoptic cable with at least five fiber strands to run between the Extender's Local and Remote Units. Call Black Box Technical Support for help planning an Extender-assisted ServSwitch Wizard system.

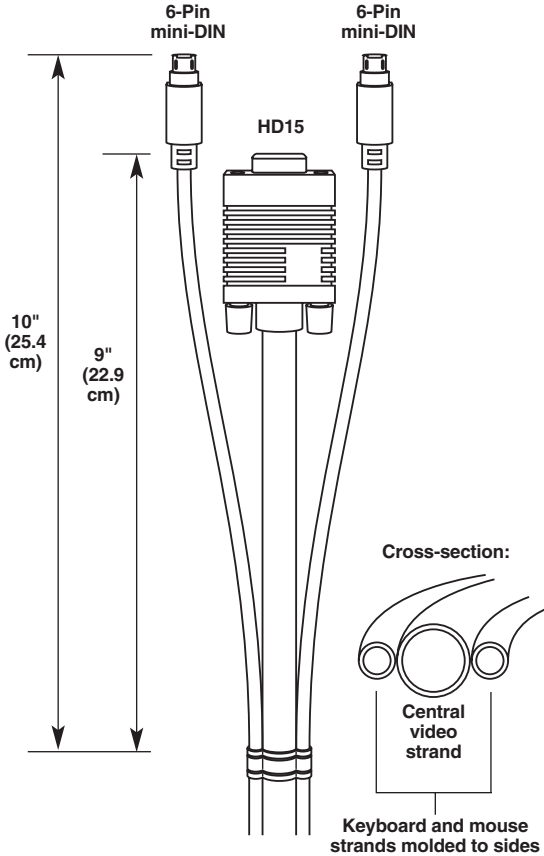


Figure 3-4. The ServSwitch Duo cables.

To connect computers with serial mouse ports and/or PC/AT style keyboard ports, you'll need adapters like those shown in Figure 3-5. Refer to the **Appendix**.

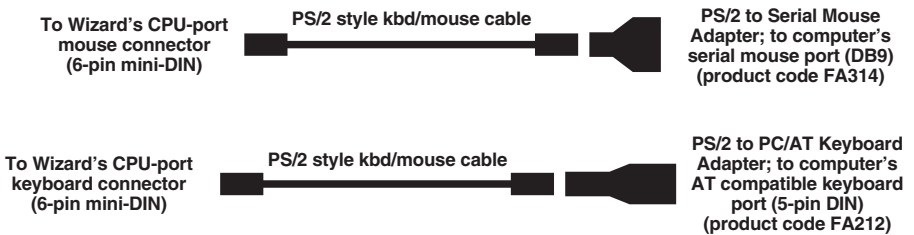


Figure 3-5. Using serial-mouse-port PC/AT keyboard-port adapters.

3.4 Powering the Wizard

Once you've installed your ServSwitch Wizard system and attached your equipment to it, you need to apply power to each Wizard. You can do this in either of two ways:

*If you are **not** using the optional power supply:* Power up the attached CPUs. The ServSwitch Wizard (which has no ON/OFF switch) might be able to start operating automatically; it can draw power from the attached CPUs' keyboard interfaces, and a single cable connection to a CPU's keyboard port is usually sufficient to power the Wizard if the cable isn't more than 3 meters (10 feet) long. (If more than one computer is connected to the Wizard, you'll probably be able to use longer cables; the Wizard will draw power intelligently from all attached computers.) As you power up your CPUs, watch the Wizard's 7-segment display as discussed in **Section 5.1**: If it shows the number "1" or the letter "P," the Wizard will be able to operate using the power it's receiving from the CPUs, but if it's blank or shows an "o" shape, the Wizard is not getting enough power from the CPUs and you'll have to either use the power supply or swap in shorter CPU cables.

*If you **are** using the power supply:* Plug the power supply's output cord into the power jack on the back of the ServSwitch Wizard, then attach the input cord to the power-supply transformer's IEC 320 inlet, then plug the input cord into utility (mains) power. (In this situation, always apply power to the ServSwitch Wizard *first*, then power on the monitor and each of the computers; if you power up the computers before the Wizard, the computers might not recognize the presence of the mouse or keyboard.) The Wizard should start operating immediately; it has no ON/OFF switch.

4. Configuration

To configure your ServSwitch Wizard system, you'll need to configure first the attached PCs, as directed in **Section 4.1**, then the Wizard itself, as directed in the rest of this chapter.

IMPORTANT NOTE

Throughout the rest of this manual, the [Enter] designation refers to the main “enter” or “carriage-return” key (often labeled “↵”) on the main section of the keyboard. Do not use the “Enter” key on the numeric keypad or the extra “Enter” key found on the main section of some specialized keyboards.

4.1 Configuring Your PCs

Configure your PCs in the same way that you would if your keyboard, mouse, and monitor were all connected directly to your PCs. Keep in mind that the ServSwitch Wizard emulates Microsoft compatible serial, IntelliMouse, and PS/2 mice; so you'll need to make sure that your PC software is configured for a Microsoft mouse of the correct type. Refer to the list of supported drivers in **Section 3.1**.

4.2 Configuring the ServSwitch Wizard

The ServSwitch Wizard comes from the factory preset to default configuration settings which are suitable for most applications. If you need to set the Wizard differently, you can access its “configuration mode” to do so; once you do, the new settings are stored in the ServSwitch Wizard’s EEPROM memory and are retained when the Wizard is powered OFF.

4.2.1 ENTERING CONFIGURATION MODE

You can access the ServSwitch Wizard’s configuration mode in either of two different ways: Use one method when you power up the Wizard; use the other while the Wizard is operating.

- To enter configuration mode at power-up, make sure that the ServSwitch Wizard and all attached computers are turned OFF and unplugged. Hold down the front-panel pushbutton while you plug in the ServSwitch Wizard (if you’re using the optional power supply) or power up one or more of the attached CPUs (if you’re *not* using the Wizard’s power supply); do *not* release the button until the ServSwitch Wizard displays “C” to show that it is in configuration mode.
- To enter configure mode while the ServSwitch Wizard is running, hold down its front-panel pushbutton for 5 seconds until the front-panel display shows “C”.

In configuration mode, you can change settings by typing a single-letter command (for a given feature), followed by a single-digit numeric argument (for how you want that feature to behave), followed by the [Enter] key. Press the [Esc] (escape) key to abort a setting change before you fully enter it. The ServSwitch Wizard will remain in configuration mode until you type the letter “E” followed by [Enter] key.

For example: To set the hotkey sequence to option #2 ([Ctrl] + [Shift] + command key), type [H][2][Enter] while the ServSwitch Wizard is displaying “C”, then type [E][Enter] to exit configuration mode.

The remaining sections of this chapter describe the Wizard’s user-configurable settings.

4.2.2 SETTING THE SCREEN-SAVER TIMEOUT

The ServSwitch Wizard has a programmable screen-saver function which will blank the display on the shared monitor after a certain time elapses with no activity on the shared keyboard or mouse.

The Wizard's front-panel display will flash while the Wizard is in screen-saver mode. To restore the blanked monitor display, just type at the keyboard or move the mouse. Use the "B" command (type [B] [*digit*] [Enter]) to set how long the ServSwitch Wizard waits for keyboard or mouse activity before activating the screen saver:

- B1** Screen saver disabled (default)
- B2** Screen saver is activated after 1 minute of inactivity
- B3** 2 minutes
- B4** 4 minutes
- B5** 8 minutes
- B6** 12 minutes
- B7** 16 minutes
- B8** 20 minutes

4.2.3 AUTOSCANNING: SETTING THE SCAN MODE AND PAUSE TIME

The ServSwitch Wizard begins autoscanning its CPU channels (that is, briefly displaying each channel's video in turn) when you type in the hotkey sequence followed by the letter "A" (see **Section 5.5**). By default, the Wizard only scans those channels that have a powered-up computer or cascaded switch connected to them. But if you need the Wizard to scan all of its channels, you can send it the [L][2] or [L][4] command. (In these settings, when the Wizard scans a channel that has no computer or cascaded switch attached, or a channel whose attached computer or switch is off or just not outputting video, the shared monitor will display a blank screen.) Also, if you want the Wizard to start autoscanning as soon as it powers up, instead of waiting for the "A" command, you can send it the [L][3] or [L][4] command.

Please keep in mind that in cascaded systems, it isn't possible to perform a single autoscan of the whole cascade; you must separately scan each Wizard that has CPUs attached to it. During a scan, when a Wizard switches to a port with a cascaded switch attached to it, the system will display the video from whatever channel is currently selected at the *cascaded* switch. Refer to **Section 5.10**.

- L1 ServSwitch Wizard only scans active ports during autoscanning (default)
- L2 ServSwitch Wizard scans every one of its ports during autoscanning
- L3 ServSwitch Wizard powers on in autoscan mode and scans active ports only
- L4 ServSwitch Wizard powers on in autoscan mode and scans all ports

CAUTION!

Many modern monitors are fitted with automatic power-saver relays and will automatically blank their displays after a short time if the computer they're communicating with becomes idle. If you are using such a monitor, you should not use the Wizard's L2 or L4 setting unless you can set the monitor's power-saver timeout to an interval longer than the Wizard's autoscan pause time (see the next page), because if the monitor keeps going in and out of power-saver mode during autoscanning, the constant switching ON and OFF of your monitor's relay will eventually damage your monitor.

While autoscanning, the Wizard will pause at each channel to display that channel's video signal for the duration of the currently selected autoscan-pause time:

- T1** During autoscan, the Wizard pauses at each channel for 2 seconds (default)
- T2 5 seconds
- T3 7 seconds
- T4 10 seconds
- T5 15 seconds
- T6 20 seconds
- T7 30 seconds
- T8 60 seconds

To get out of autoscan mode, simply select a fixed channel using the on-screen menu, the Wizard's front-panel pushbutton, the keyboard hotkeys, or the mouse.

4.2.4 ENFORCING MOUSE SPEED

In its factory-default state, the ServSwitch Wizard allows each CPU to handle mouse communication any way the CPU wants to. However, some CPUs with particular rare combinations of operating systems, mice, and mouse drivers can be abnormally sensitive to small timing changes in mouse communication. These CPUs can react badly to the presence of the Wizard, making persistent timing errors that cause the mouse to seem slow or sluggish. This has especially been noted to occur while using Logitech mice with some HP® Vectra® machines running later versions of Windows NT® and Logitech mouse drivers.

One way to fix this problem is to change the mouse driver. But if this isn't an option, at least in the short term, you can send the Wizard the [L][6] command. This causes the Wizard to take a more active role in mouse communication, ensuring that the CPU won't have timing problems and keeping the mouse up to speed.

- L5 ServSwitch Wizard allows CPU to react to the mouse at any speed (default)
- L6 ServSwitch Wizard forces normal mouse speed

4.2.5 SETTING THE CASCADE-QUERY CODE

Each ServSwitch Wizard uses a special “query code” to detect whether or not it is connected in a cascade to another ServSwitch Wizard (or to a ServSwitch Wizard LP, ServSwitch Wizard Pro, or ServSwitch Duo). By default, your Wizard uses query code “AD” hex; this code should be fine for most applications. However, older ServSwitch Duos with firmware versions earlier than 1.09 always use query code “EF” hex, and because it is essential that all of the switches in a ServSwitch Wizard/Duo cascade use the same query code, you'll need to change the Wizard's query code to “EF” if any of those older Duos are hooked up to your cascade.

- L7 Cascade-query code = “AD” (default)
- L8 Cascade-query code = “EF”

4.2.6 SETTING MOUSE-MODE REPORTING AND ENABLING/DISABLING MOUSE SWITCHING

In the ServSwitch Wizard's factory-default state, you can use a three-button PS/2 mouse or an IntelliMouse to cycle through the Wizard's CPU channels. To switch to the next channel, simply hold down the center or "wheel" button on the mouse, then press its left button. If you don't want to use this feature—particularly if it's going to conflict with mouse-controlled application functions—you can disable it by sending the [U][2], [U][3], or [U][5] command. If the third button on a three-button mouse is being used to switch the Wizard, it won't be available for use with PC software, although the wheel on an IntelliMouse can be used for both switching and software with no problems. For this reason, we've included the [U][1], [U][2], and [U][4] command options, which cause the Wizard to report to the attached PCs that they are attached to a 2-button mouse. If you want to use all the functions of a 3-button mouse or IntelliMouse for your PC software, you should send the Wizard the [U][3] or [U][5] command.

The ServSwitch Wizard supports "Internet mice" that are compatible with the Microsoft IntelliMouse. These are fitted with a wheel or other type of scrolling control and sometimes have additional buttons. Many such mice are available from several different manufacturers.

You can connect either a standard PS/2 mouse or an IntelliMouse compatible mouse to the Wizard's control port. You can configure your CPUs using Microsoft PS/2 or IntelliMouse drivers in any combination as required.

IntelliMouse features are supported on both PS/2 and RS-232 CPU connections. When you use PS/2 CPU connections, the Wizard will automatically configure itself to the type of mouse requested by the driver. If you are using RS-232 CPU connections, you will need to send the [U][4] or [U][5] command to enable the IntelliMouse features.

- U1 Channels are mouse-switchable; the Wizard reports "2-button mouse" to the attached PCs (default)
- U2 Channels are not mouse-switchable; the Wizard reports "2-button mouse" to the attached PCs
- U3 Channels are not mouse-switchable; the Wizard reports "3-button mouse" to the attached PCs
- U4 Channels are mouse-switchable; the Wizard reports "IntelliMouse" to the attached PCs
- U5 Channels are not mouse-switchable; the Wizard reports "IntelliMouse" to the attached PCs

4.2.7 CHOOSING ACTIVE PORTS OR ALL PORTS FOR KEYBOARD-TAB AND MOUSE SWITCHING

In the ServSwitch Wizard's factory-default state, when you "cycle through" the CPU ports on the Wizard by pressing {Hotkeys} + [Tab] or when you switch to the next or previous channel with your mouse, the Wizard stops at *every* channel. It does this even if the device attached to a particular channel is off or not outputting video, or even if there *isn't* any device attached to that channel. (The Wizard will display a blank screen for such channels.) But if you'd rather have the Wizard "skip over" any ports that don't have a powered-up computer or cascaded switch connected to them, you can send it the [U][8] command.

- U7 Switch to all ports when switching with {Hotkeys} + [Tab] or with the mouse (default)
- U8 Switch only to active ports when switching with {Hotkeys} + [Tab] or with the mouse

The U7/U8 setting has no effect on autoscanning (see **Section 4.2.3**) or on switching with {Hotkeys} + [*digit*], with the front-panel pushbutton, or through the RS-232 serial interface.

4.2.8 SETTING THE HOTKEY SEQUENCE

You can access many of the ServSwitch Wizard's main functions (such as CPU-channel selection, autoscanning, and locking) by sending commands from the shared keyboard. Each command must start with a "hotkey sequence" (series of keystrokes) that alerts the Wizard to interpret the keyboard data that follows it as a command. The default hotkey sequence is [Ctrl] and [Alt] pressed simultaneously. If any of the applications on computers attached to the Wizard require this sequence to trigger important application-specific functions, you will have to change the Wizard's hotkey sequence with the "H" command (type [H][*digit*][Enter]).

Alternative hotkey sequence #5 is particularly suitable for extended keyboards where additional keys can be programmed to act as combinations of other keys. Such keyboards are supplied with many Gateway™ computers. If you program one of these "spare" keys to produce both hotkey keystrokes, or if you program a set of these keys to produce the hotkey *and* channel-number keystrokes, you'll be able to select channels, lock the Wizard, etc., with as few as one or two keypresses.

- H1 Either of the left and right [Ctrl] keys and either of the left and right [Alt] keys together (default)
- H2 Either of the left and right [Ctrl] keys and either of the left and right [Shift] keys together
- H3 Either of the left and right [Alt] keys and either of the left and right [Shift] keys together
- H4 Right [Alt] key only
- H5 Both the left and right [Alt] keys together
- H6 The left [Ctrl] key and the left [Alt] key together
- H7 The right [Ctrl] and the right [Alt] key together
- H8 No hotkey enabled; the hotkey-dependent functions can't be accessed from the keyboard

4.2.9 VIEWING THE FIRMWARE REVISION, RESTORING MOUSE FUNCTION, OR RESETTING TO FACTORY DEFAULTS

For technical-support purposes, it might be necessary to find out the firmware-release version of the control software in your ServSwitch Wizard. Before calling Black Box Tech Support about a problem, you can use the [F][1], [F][2], and [F][3] commands to retrieve this; each of these commands causes the Wizard to briefly show one of the digits of the firmware's version number on its front-panel display. For example, if the Wizard responds to [F][1][Enter] with the digit "1", to [F][2][Enter] with the digit "0", and to [F][3][Enter] with the digit "2", your Wizard is using firmware version 1.02.

You can also restore the function of previously disconnected PS/2 type CPU mouse ports with the [F][5] and [F][6] commands (see **Section 5.8**) and you can reset all of the Wizard's configuration options to their factory-default states with [F][8].

- F1 Display first digit of firmware-version number
- F2 Display second digit of firmware-version number
- F3 Display third digit of firmware-version number
- F4 (Reserved for future use)
- F5 Restore PS/2 mouse function to the currently selected CPU's mouse port
- F6 Restore IntelliMouse function to the currently selected CPU's mouse port
- F7 (Reserved for future use)
- F8 Reset all configuration options to their factory-default settings (the Wizard will briefly show the letter "r" on its front-panel display to indicate that this has been completed)

4.2.10 SETTING THE PASSWORD

There are many situations where access to corporate file servers or sensitive information needs to be controlled. In such circumstances, the ServSwitch Wizard can be locked away in a room or secure cabinet and controlled remotely. In this mode, you can type the hotkey sequence followed by the number “0” (zero) at the shared keyboard of the active control port in order to “lock” the Wizard. When you do so, the Wizard blanks the screen, disconnects the keyboard and mouse from all of the computers, and displays the letter “P” on its front-panel display. Control can only be regained by typing the correct password on the keyboard.

To set this password, get into configuration mode, then type the letter “P” and press the [Enter] key. The ServSwitch Wizard will light the middle and bottom segments of its front-panel display, so that it resembles a wide equals sign, and you can then type your password. The password is not case-sensitive and can be any combination of keystrokes, including function keys but excluding [Ctrl], [Alt], [Shift], and [Enter]. (For example, the password [F4] [F] [R] [E] [D] [Home] would be valid.) When you’ve finished typing in your password, press [Enter] to save it to the Wizard’s EEPROM. (This type of memory does not depend on active power or even a battery backup, so it can persist indefinitely.) Don’t worry if you type the password incorrectly; you can always re-enter it, even if you’ve exited and re-entered configuration mode. (The exception to this is if somebody locks the Wizard, and you discover only then that you messed up entering the password or can’t remember what the password is. At that point, you’ll have to power down the Wizard and hold down its front-panel pushbutton while powering it back on to get back into configure mode—as described in **Section 4.2.1**—in order to change the password.)

If you want to remove the password after setting one, get into configuration mode, type the letter “P”, and press the [Enter] key as before, but then press [Enter] again without typing in any other characters. (If you try to lock the Wizard before you’ve set a password, or after you’ve removed the password, the Wizard will still blank the video, but it won’t prevent someone from selecting another channel.)

4.2.11 EXITING CONFIGURATION MODE

When you’ve finished configuring the ServSwitch Wizard, simply type the letter “E” and press [Enter]. The Wizard will exit the configuration mode and return to normal operation. The attached computers can now be switched on.

5. Operation

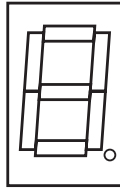
This chapter explains how to operate the ServSwitch Wizard. Please read this chapter carefully before starting to use the Wizard; also make sure you have read the important note at the start of **Chapter 4**.

5.1 Power Status

At power-up, the ServSwitch Wizard will try to select CPU channel #1 unless (a) a password has been set or (b) the Wizard isn't getting enough power to operate properly. Watch the Wizard's front-panel 7-segment display, as described in Figure 5-1: If the Wizard is not receiving enough power, the display will be blank; if the Wizard can select CPU 1, the display will show "1"; or if a password has been set, the Wizard will display "P" and remain locked until a valid password is entered. (For the meaning of this display after power-up, see **Section 5.3**.)

DISPLAY SHOWS:

Blank



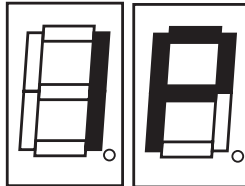
MEANING:

Switch is not receiving nearly enough power to operate

The number "1"

—

The letter "P"



Switch has powered up normally and has selected channel 1

Switch has powered up normally but is locked and is waiting for the password to be entered

Figure 5-1. The front-panel status display at power-up.

5.2 The Front-Panel Pushbutton and the Remote-Control Module

You can use the ServSwitch Wizard's front-panel pushbutton to select which CPU channel (CPU port) is currently controlled by the active control port. Press the key once during normal operation to select the next CPU channel in sequence (for example, to select channel 4 if channel 3 is currently selected); press the key repeatedly to manually cycle through the channels.

You can also use this button to access the ServSwitch Wizard's configuration mode (see **Section 4.2.1**). To access configuration mode while the Wizard is operating, press the button and hold it down for 5 seconds until "C" appears on the Wizard's front-panel display.

An optional Remote-Control Module ("RCM") is also available for the ServSwitch Wizard. It's a small hand-held component—with a SELECT key that mimics the Wizard's pushbutton and an identical copy of the Wizard's front-panel display—whose cord you can plug into the Wizard's RS-232 port. This is particularly useful in applications where the ServSwitch Wizard is located some distance from the shared keyboard, mouse, and monitor. The RCM can be conveniently attached to your keyboard with the included Velcro strips so you can have channel information and channel-selection control at your fingertips.

At the time of this writing, four different models of the Remote-Control Module are available, each with a different cord length: 10 ft. (3 m, product code KV6REM), 25 ft. (7.6 m, KV6REM-25), 50 ft. (15.2 m, KV6REM-50), and 75 ft. (22.9 m, KV6REM-75).

5.3 The Status Display

The ServSwitch Wizard's front-panel 7-segment status display usually shows the number of the currently selected computer channel, while the dot LED alongside it flashes in response to data from the shared keyboard or mouse (see the top illustration in Figure 5-2). If you select autoscan mode, however, the display will alternately (a) display the current channel number and (b) light each of its outer six LED segments, one after the other, in a clockwise sequence, as shown in the second illustration. If the Wizard is in configuration mode, it will display "C". If the Wizard has been locked, it will display "P" until a valid password has been typed to unlock the Wizard. Finally, if the screen-saver mode has been activated, the channel number will flash.

DISPLAY SHOWS:

- Channel number 1 through 8, steadily lit
- As above, with flashing dot in lower right-hand corner
- Zero



MEANING:

- That channel is selected
- Switch is receiving keyboard or mouse data to be transmitted to the selected computer
- Display is disabled, but not controls

- Alternately, channel number and clockwise progression of lit segments



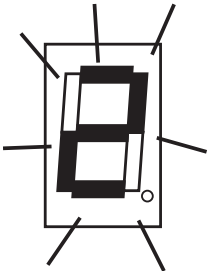
- Switch is in autoscan mode, scanning from channel to channel at user-selected rate

- The letter "P"
- The letter "C"



- Switch is locked and is waiting for the password to be entered
- Switch is in configuration mode

- Channel number, flashing



- Switch is in screen-saver mode and is waiting for keyboard or mouse activity to restore video

Figure 5-2. The front-panel status display during regular operation.

5.4 Things to Keep in Mind About the Keyboards and Mice

CPU bootup sequence: When your computer CPUs are powered on, they communicate with any attached keyboards and mice and load the setup parameters required by their particular operating systems. It is necessary for the ServSwitch Wizard to be attached and powered on during this sequence so that it can give the CPUs the required responses and keep track of all the modes and settings requested by each of the connected CPUs.

Mouse characteristics: Do not unplug a PS/2 mouse connection from a computer CPU while the CPU is on. Because of the way PS/2 mice communicate, the CPU will lose mouse function and you will have to reboot the CPU to regain normal operation. Unplugging a shared PS/2 mouse from the ServSwitch Wizard will have no immediate effect, but the CPU will lose mouse function as soon as you plug the mouse back in. (RS-232 mouse-port connections can usually be freely unplugged and replugged, provided that a mouse was connected when the operating system initially booted.) The ServSwitch Wizard has a PS/2 mouse-recovery system which allows you to disconnect and reconnect the shared mouse without powering down the system, but we recommend using this only when absolutely necessary. See **Section 5.8** for details.

Keyboard- and mouse-mode handling during channel switching: The ServSwitch Wizard keeps a log of the keyboard and mouse modes and resolution settings requested by each of the connected computer CPUs, including the keyboard Num Lock, Caps Lock, and Scroll Lock states. These settings are automatically restored to the shared keyboard and mouse when the ServSwitch Wizard channel is switched, ensuring maximum software compatibility.

5.5 Keyboard Control: Hotkey Commands

You can control many functions on the ServSwitch Wizard—such as CPU-channel selection, autoscanning, or locking—from the keyboard, using commands triggered with the Wizard’s currently selected hotkey combination. All of the hotkey-control commands are invoked by holding down the one or two hotkeys and then pressing a command key. By default, the two hotkeys are [Ctrl] and [Alt], although other keystroke combinations can be selected (see **Section 4.2.8**).

Normally, when you send a hotkey command, you have to release the hotkeys and the command key before you can send another one. The one exception to this rule is {Hotkeys} + [Tab], the “switch to next CPU channel” command; you can “tab through” the channels by holding down the hotkeys and repeatedly pressing [Tab].

The hotkey commands are summarized below and on the next page. Note that to generate the numeric digits in the commands that contain them, you need to press the number keys on the top row of the main section of the keyboard, *not* the number keys on the keypad; the Wizard will not recognize keypad numbers.

- Use {Hotkeys} + [*x*], where *x* is a number from one to two (on the 2-port model) or one to four (on the 4-port model), to switch to the corresponding CPU channel. If you try to select a channel with a higher number than the Wizard has ports, the Wizard will ignore the command and pass it through to the currently selected computer.
- Use {Hotkeys} + [Tab] to switch to the next channel in numeric sequence.
- Use {Hotkeys} + [M] to get the Wizard to display its on-screen menu for selecting computers by name.
- Use {Hotkeys} + [A] to have the Wizard start autoscanning (briefly displaying the video from each CPU channel in turn). You can control whether or not it scans empty channels, and for how long it pauses at each channel, with the “L1” through “L4” and “Tx” configuration commands respectively (see **Section 4.2.3**). To stop autoscanning, simply select a fixed channel using the Wizard’s front-panel pushbutton, the keyboard hotkeys, or the mouse.

Please note that, in cascaded systems, it is not possible to scan through all of the channels on every Wizard in the same scan. Each Wizard must be scanned separately.

- Use {Hotkeys} + [0] to select nonexistent “channel zero” in order to shut off the video output from the Wizard to the shared monitors. The Wizard’s front-panel display will show “0”. You can re-enable video by selecting another channel through the keyboard, front-panel pushbutton, on-screen menu, or mouse.
- Use {Hotkeys} + [L] to lock the Wizard (disable its shared keyboard and mouse and select nonexistent “channel zero” in order to shut off the video output from the Wizard to the shared monitors). If a password has not been set (see **Section 4.2.10**), the Wizard behaves exactly as if you had entered {Hotkeys} + [0] (see above). If a password has been set, the Wizard displays “P” to indicate that a valid password must be entered to unlock the switch; simply type in the password followed by the [Enter] key to do so. Note that if anyone has tried to type something at the shared keyboard while the Wizard is locked, you will have to press [Enter] to clear those characters so that they won’t invalidate the password when you proceed to type it in.
- Use {Hotkeys} + {Channel Address} to select a CPU channel in a cascaded system (see **Section 5.10**). The {Channel Address} is a series of one- or two-digit channel numbers that specify the “path” to follow to get from the master ServSwitch Wizard (or ServSwitch Wizard LP, ServSwitch Wizard Pro, or ServSwitch Duo) to the desired CPU channel on the subsidiary Wizard. The numbers in the {Channel Address} can be single digits if *all* of the switches in the cascade are 2-, 4-, or 8-port switches; if *any* are 12- or 16-port switches, you’ll have to add a leading zero before the single-digit numbers. For example, if you want to access
 - CPU channel 16 on a “second-layer” subsidiary Duo connected to
 - CPU port 2 (“02”) on a “first-layer” subsidiary Wizard connected to
 - CPU port 1 (“01”) on the master Wizard, you would enter:
 {Hotkeys} + [0][1][0][2][1][6].

To make sure that the Wizard doesn’t switch prematurely to the wrong channel, hold down the hotkeys until you enter the last digit, *then* release them.

Examples of common hotkey commands (assuming the hotkeys are [Ctrl] and [Alt]):

- *To select channel 2:*
Press and hold [Ctrl] and [Alt], press and release [2], release [Ctrl] and [Alt].
- *To “tab through” channels:*
Press and hold [Ctrl] and [Alt], press and release [Tab] (repeat as many times as necessary), release [Ctrl] and [Alt].
- *To select channel 7 on an 8-port subsidiary Wizard Pro connected to port 4 on a 4-port master Wizard:*
Press and hold [Ctrl] and [Alt], press and release [4], press and release [7], release [Ctrl] and [Alt].
- *To select channel 13 on a subsidiary Duo connected to port 3 on a 4-port master Wizard:*
Press and hold [Ctrl] and [Alt], press and release [0], press and release [3], press and release [1], press and release [3], release [Ctrl] and [Alt].

5.6 Mouse Control

Yet another convenient way to select CPU channels on the ServSwitch Wizard is through a three-button mouse, if this feature is enabled (see **Section 4.2.6**). As shown in Figure 5-3 (button to hold down is black, button to click is gray):

- To switch to the *next* channel, hold down the central mouse button or “wheel” button, then click on the *left-hand* mouse button.
- To switch to the *previous* channel, hold down the central mouse button or wheel button, then click on the *right-hand* mouse button.

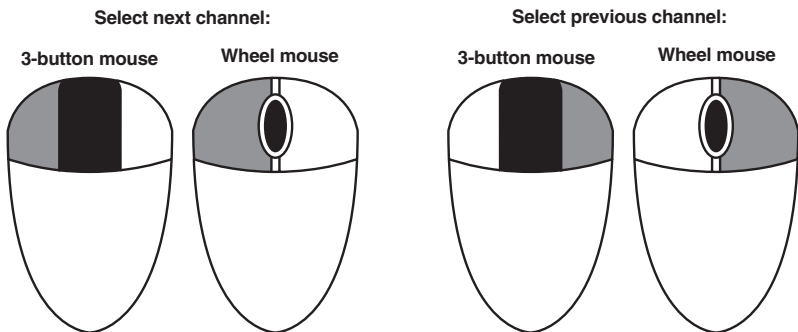


Figure 5-3. Using the mouse buttons for switching.

5.7 Re-Enabling a Disconnected PS/2 Mouse

If you accidentally disconnect the shared PS/2 mouse from the ServSwitch Wizard while the Wizard is operating, the mouse will not work correctly when you plug it back in. To avoid having to reboot the entire system in this situation, the Wizard has an automatic mouse-recovery system.

With the PS/2 mouse disconnected, change the channel using the Wizard's front-panel pushbutton or the keyboard hotkeys. The ServSwitch Wizard detects that the mouse has been disconnected and triggers the automatic recovery system. Plug in the PS/2 mouse and the ServSwitch Wizard will re-initialize it.

Alternatively, you can reset the keyboard and mouse by holding the Wizard's front-panel pushbutton down for five seconds to enter configuration mode, then releasing the button, then pressing the button again while the display shows "C". When you do, the Wizard will perform a complete power-off reset of the connected keyboard and mouse. This function only resets the shared keyboard and mouse that are plugged into the control port; it does not affect the status of any of the other ports on the Wizard or of the CPU connections.

5.8 Hot-Plugging Devices Into the ServSwitch Wizard and Re-Enabling Disconnected CPU PS/2 Mouse Ports

It is advisable to switch off the computer systems that are going to be connected to the ServSwitch Wizard before installation. However, even if this is not possible, most systems can be "hot-plugged" (connected to the Wizard while they are powered and operating); the PS/2 mouse-port malfunctions this usually causes can often be overcome by using the ServSwitch Wizard's mouse-restoration functions. (The keyboard connection will normally restore itself automatically.)

Let's take this from the top: On many computer CPUs, mouse movement will be lost if the PS/2 mouse is unplugged and plugged back in while the CPU is running. Mouse movement can then only be restored by rebooting the CPU. This is because the mouse drivers only set up and enable the mouse when the CPU is initially booted.

If you have powered down your ServSwitch Wizard, or if you are attempting to hot-plug a system into it, you may be able to restore lost mouse movement using the ServSwitch Wizard's mouse-restoration functions.

Important: Mouse-restoration functions should be used with caution, because unpredictable results may occur if the wrong mouse type is selected. If in doubt, restore the mouse by rebooting the CPU normally.

Standard PS/2 mouse data uses a different data format than IntelliMouse data, so two reset functions are provided on the ServSwitch Wizard. The type of data format expected by the CPU depends upon the driver and the type of mouse that was connected when the driver was booted. The following table may be used as a guide; note that the mouse-reset functions predict the likely mouse *resolution* settings but may not restore the *speed* or *sensitivity* of the mouse exactly as they were when the CPU originally booted:

Type of mouse/ system connected at bootup:	Driver type:	Probable expected data format:	Suggested restoration command:
PS/2	PS/2 only	PS/2	F5
PS/2	IntelliMouse	PS/2	F5
IntelliMouse	PS/2 only	PS/2	F5
IntelliMouse	IntelliMouse	IntelliMouse	F6

To restore lost mouse movement on a CPU connected to the ServSwitch Wizard:

1. Select the CPU that has lost its mouse movement.
2. Press and hold the pushbutton on the front of the ServSwitch Wizard for five seconds until “C” appears in the front-panel display. The Wizard is now in configuration mode.
3. To restore a PS/2 mouse connection, type the letter “F”, then the number “5”, then [Enter]. Or, to restore an IntelliMouse connection, type the letter “F”, then the number “6”, then [Enter].
4. Exit from configure mode by typing the letter “E” followed by [Enter].
5. Test the mouse movement by moving the mouse a short distance.

5.9 RS-232 Control

There is yet one more way to select channels on the ServSwitch Wizard: through its RS-232 serial port. (This is a proprietarily pinned DB15 connector; see **Section A.3** of the **Appendix** for more information.) This connector serves more often as the attachment point for the Wizard's optional Remote-Control Module, but by using an adapter you can connect a different RS-232 device to it. To select a channel through this port, the data rate and format of the sending device must be set to 1200 bps, 8 data bits, no parity, and 1 stop bit. No handshaking (flow control) is used by the ServSwitch Wizard.

Simply send the ASCII character for the channel which needs to be selected: ASCII "1" (31 hex, 49 decimal) will select channel 1, ASCII "2" (32 hex, 50 decimal) will select channel 2, and so on. The Wizard will echo this character back to the sending device when the channel has been changed. At the time of this writing, this method is best used to switch channels on single Wizards; switching synchronized Wizards would require carefully pinned special cabling, and switching cascaded Wizards isn't possible.

5.10 Operating Cascaded ServSwitch Wizards

As described in **Section 3.3.2**, multiple ServSwitch Wizards can be cascaded together. To select channels in cascaded systems, you will need to send hotkey commands from the master Wizard's attached keyboard (see the "{Hotkeys} + {Channel Address}" paragraph in **Section 5.5**).

For an example of hotkey switching, consider a situation in which two ServSwitch Wizards are connected together as shown in Figure 5-4 on the next page. To select the computer attached to port 1 on the subsidiary ServSwitch Wizard, you would press and hold down the hotkeys, then press and release "3," press and release "1," and finally release the hotkeys. This causes the master Wizard to switch to its port 3, to which the subsidiary Wizard is attached, and send the subsidiary Wizard the command to switch to port 1, to which your desired computer is attached. (If there were any 12- or 16-port ServSwitch Duos in the system, you would have to use two digits to designate each port, inserting a leading zero when necessary.)

Two more examples, assuming that the hotkeys are the default combination of [Ctrl] + [Alt]:

- *To switch to channel 4 of a 4-port subsidiary Wizard attached to channel 1 of your 4-port master Wizard:*
Press and hold [Ctrl] + [Alt], press and release [1], press and release [4], release [Ctrl] + [Alt].

- To switch to channel 13 of a 16-port subsidiary Duo attached to channel 2 of your 4-port master Wizard:
Press and hold [Ctrl] + [Alt], press and release [0], press and release [2], press and release [1], press and release [3], release [Ctrl] + [Alt].

Please note that it is not possible to autoscan every channel in a cascaded system with a single scan. Cascaded Wizards must be scanned individually using their front-panel pushbuttons or {Their Hotkeys} + [A]. When you switch or scan to a port on a Wizard to which a subsidiary Wizard is attached, the Wizard system will display the video from the currently selected port on the *subsidiary* Wizard.

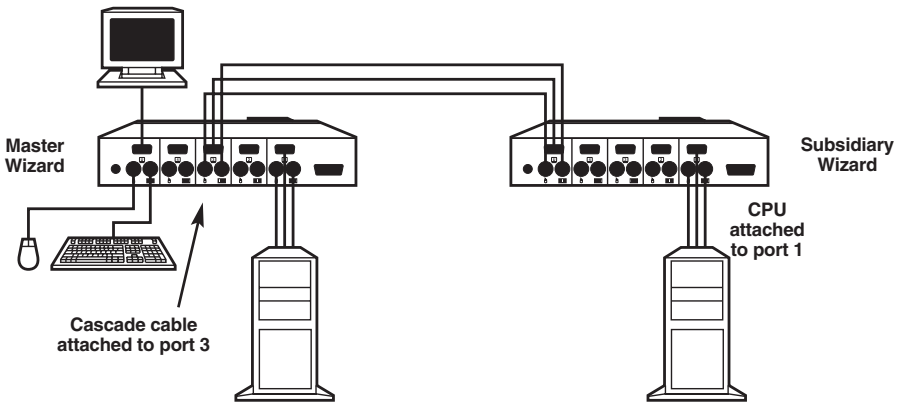


Figure 5-4. Cascade layout.

5.11 Operating Synchronized ServSwitch Wizards

As described in **Section 3.3.3**, multiple ServSwitch Wizards can be interconnected with serial cable and synchronized to support CPUs with multiple video outputs. To select channels in synchronized systems, just send a hotkey command from the master Wizard's attached keyboard, press the master Wizard's front-panel pushbutton, or—if this is enabled—send a switching command from the master Wizard's attached mouse. This command will be echoed out of the master Wizard's OPTION port and received by the other synchronized Wizard(s), which will switch to the same port. If you have your system cabled correctly, all of the video outputs from the CPU you've selected will now be displayed.

5.12 Performing a Warm Reset

Sometimes, when problems occur in a ServSwitch Wizard system, powering the Wizard off and back on again can fix the problem. If a Wizard is getting power from its optional power supply, you can do this by unplugging and replugging the power supply. But if the Wizard is getting power from the attached computers, the only way to shut it down is to disconnect it from those computers or turn the computers off, which might not be desirable or possible.

Instead of powering the Wizard off and back on to completely reinitialize it, you can accomplish the same results by having the Wizard do a “warm reset” (hardware reset) while it's still operating. You'll see an 8-position DIP switch on the bottom of the Wizard. Move position 8 of this switch (the rightmost one if you hold the Wizard with its front panel facing the ceiling) to the ON (up) position to make the Wizard halt; move position 8 back to OFF (down) to reset the Wizard and return it to normal operation.

Even though the Wizard doesn't have any CPU startup communication to work with after a warm reset, it should still be able to autodetect the correct keyboard mode and mouse type under most circumstances. Occasionally, however, you'll also need to do a mouse reset and/or recovery (see **Sections 5.7** and **5.8**) to get the mouse working properly.

Note: Aside from position 8 and position 7 (used for firmware upgrades, as described in the next section), all of the positions of the Wizard's DIP switch are reserved for future use. Do *not* change their settings.

5.13 Upgrading the Wizard's Firmware

Because the ServSwitch Wizard stores most of its firmware (its “operating system,” if you will) in flash memory, the firmware is upgradable. To fix bugs in existing firmware, or to add features to your Wizard, Black Box Technical Support might sometimes recommend that you upgrade the Wizard's firmware if a newer revision is available. (Follow the procedure described in **Section 4.2.9** to find out which firmware version your Wizard is currently running.)

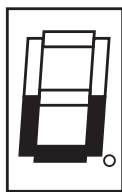
To upgrade the Wizard's firmware, you'll need a “host PC,” which must be an IBM PC compatible computer with an RS-232 serial port. This computer must be running an operating system that can execute DOS programs, such as MS-DOS® or Windows® 3.x, 95, 98, or 2000. You'll also need a DB9 female to DB15 male firmware-upgrade cable (product code KV6SER) to transfer the firmware files to the Wizard. (Refer to the **Appendix** for the pinning of this cable.)

Take these steps:

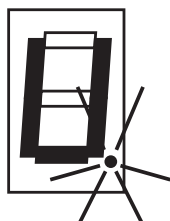
1. Download the firmware-installation/verification program (probably named “SSW_{xyz}.EXE”) and the firmware binary itself (probably “SSW_{xyz}.HEX”) from our Web site at www.blackbox.com onto the host PC. If you can't find these files on our Web site, Tech Support can help. (In these filenames, *xyz* = the *x.yz* firmware-revision level; for example, “SSW118.EXE” would be the installation program for firmware revision 1.18.)
2. Run the firmware-upgrade cable from the host PC to the OPTIONS port on the ServSwitch Wizard.
3. There is an 8-position DIP switch on the bottom of the Wizard. Move position 7 of this switch (the next-to-the-rightmost one if you hold the Wizard with its front panel facing the ceiling) to the ON (up) position to set the Wizard to “upgrade mode.”
4. Do a full reset of the Wizard: Either power it down and back up again, or move position 8 of its DIP switch to the ON (up) position and back to OFF (down) to do a warm reset (see **Section 5.12**).

At this point, make *very sure* that the Wizard is receiving adequate power. The upgrade program monitors the Wizard's voltage and won't allow an upgrade to proceed if the voltage is insufficient. If you're using the Wizard's optional power supply, it's definitely going to get the power it needs. If it's being powered by the attached computers, it's normally possible to perform an upgrade when the Wizard is powered by a single computer, but it's a good idea to power up all of the computers attached to the switch anyway. This minimizes the possibility that power will fail during an upgrade due to a sudden brownout, cable disconnection, etc.

The ServSwitch Wizard's front-panel 7-segment display should now show a lowercase "u" to indicate that the Wizard is ready to be upgraded:



- Run the SSW_{xyz}.EXE firmware-upgrade program that you downloaded in step 1. Follow the directions that appear on the host PC's screen to transfer the new firmware to the Wizard. The Wizard's 7-segment display will change to show an uppercase "U" and its dot will flash to show that the Wizard's receiving data from the PC:



- When the upgrade's complete, the 7-segment display will change back to the lowercase "u" and the dot will stop flashing. Move position 7 of the Wizard's DIP switch back to OFF (down) to return the Wizard to normal operation.

CAUTION—if the upgrade goes wrong:

The upgrade program rewrites the Wizard's existing firmware code with the code in the SSW_{xyz}.HEX file. If the upgrade process is interrupted, the Wizard will contain invalid code and will not operate properly. A partial, interrupted, or failed upgrade can be fixed, but only if you *immediately* repeat the upgrade process *without* turning OFF position 7 of the Wizard's DIP switch. (The code that the Wizard uses to download new firmware is not itself affected by the upgrade process.) If you move position 7 back to OFF after a failed upgrade attempt, the Wizard will begin running the incomplete code. This could have unpredictable results and might damage your Wizard or the attached equipment!

- Verify that the upgrade has been successful by having the Wizard indicate its new firmware revision as described in **Section 4.2.9**.

6. Troubleshooting

6.1 Things to Try

This section suggests possible answers for a number of problems that people sometimes encounter when trying to operate the ServSwitch Wizard. If the suggested actions don't solve your problem, or if you don't see a listing for the type of trouble you're having, contact Black Box Technical Support as described in **Section 6.2**.

Problem:

Poor video quality with smearing, fuzziness, or rippling.

Possible Solution:

Use shielded or screened coaxial video cables to connect your devices to the ServSwitch Wizard.

Problem:

Your mouse does not move the cursor/pointer.

Possible Solutions:

If you move the mouse and the activity indicator (the dot on the 7-segment display) does not flash, then the ServSwitch Wizard is not receiving data from the mouse. Check the mouse's connection to the Wizard; if it's OK, try resetting the mouse using the reset function (see **Section 5.7**), warm-resetting the Wizard (see **Section 5.12**) or powering the Wizard OFF and then ON again. If you are attempting to connect the Wizard to a CPU with a PS/2 mouse connection that has not been powered down, you will need to use the mouse-restoration function F5 or F6 (see **Section 5.8**).

Make sure that your software is configured to accept a Microsoft compatible PS/2 mouse of the type that you have connected.

Make sure that (a) the mouse and computer were both connected to the ServSwitch Wizard before any part of the system was powered up, and (b) the Wizard was powered ON before the attached computer. If you're not sure whether this was the case, then (if it's possible to do so) power everything down, make sure all cable connections are correct and secure, power up the Wizard, then power up all attached computers.

Problem:

Your keyboard does not function or functions only intermittently. The Num Lock LED does not always light when the Num Lock key is pressed.

Possible Solution:

Some older keyboards were designed for use with specific computers and are not truly PC/AT or PS/2 compatible. These are not common, but if you're having problems like this and you're using an old keyboard, try a newer keyboard.

Problem:

Just using your mouse normally causes the CPU channel to change unexpectedly.

Possible Solutions:

Some cheaper mice are not fully compatible with the ServSwitch Wizard and can lose data, which—if mouse switching is enabled (see **Section 4.2.6**)—sometimes causes the Wizard to interpret a data stream as a channel-change request. Try using a Microsoft, Logitech, IBM, Compaq®, or Hewlett-Packard® mouse instead.

Make sure that you are using a Microsoft compatible mouse driver on your PC. Some drivers by other manufacturers can cause the mouse to use proprietary mouse-data formats that the Wizard doesn't support. If you have unplugged and reconnected a mouse to the ServSwitch Wizard, make sure that you reset it (see **Section 5.7**) or—especially if the mouse is an IntelliMouse—use the mouse-restoration function (see **Section 5.8**).

Problem:

The mouse moves very slowly but otherwise functions correctly.

Possible Solutions:

Change to a Microsoft mouse driver or set the Wizard to the “L6” configuration option. See **Section 4.2.4**.

Problem:

The cursor/pointer jumps around the screen after you disconnect the mouse cable or power down the ServSwitch Wizard.

Possible Solution:

If you have disconnected and reconnected a CPU mouse cable or you have powered down the ServSwitch Wizard, and you're using a PS/2 mouse or IntelliMouse, the mouse might have gotten out of sync with the CPU. Try the mouse-reset function (see **Section 5.7**) or the mouse-restoration function (see **Section 5.8**), or reboot the CPU.

Problem:

Compaq MX11800 model integrated keyboard and mouse only: The mouse consistently fails to boot when the Wizard is connected to PCs running Windows NT 4.0 through their PS/2 style mouse ports.

Possible Solutions:

There are three possible solutions to this problem:

1. Use a different type of mouse.
2. Connect the Wizard to your NT 4.0 PCs through adapters and their serial ports rather than through their PS/2 ports.
3. Select channel 0, or another channel that is not connected to an NT 4.0 PC, while NT is booting. You should be able to use the system normally once the logon screen appears.

6.2 Calling Black Box

If you determine that your ServSwitch Wizard is malfunctioning, *do not attempt to alter or repair it*. It contains no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem;
- when the problem occurs;
- the components involved in the problem—that is, what types of computers, what type of keyboard, brand of mouse, make and model of monitor, etc.;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you've already done.

6.3 Shipping and Packaging

If you need to transport or ship your ServSwitch Wizard:

- Package it carefully. We recommend that you use the original container.
- Before you ship the Wizard back to Black Box for repair or return, contact us to get a Return Authorization (RA) number.

Appendix: Cable Guidelines

IMPORTANT NOTE

The maximum supported cable lengths vary widely between devices and cables. It might be possible to use cables that are longer than those specified in this Appendix with certain computers and peripherals, but this can't be guaranteed. If you have problems, try using shorter cables.

A.1 Cabling from the Keyboard, Monitor, and Mouse to the ServSwitch Wizard

All of the shared devices plug directly into the relevant ports at the rear of the ServSwitch Wizard. If you use a PC/AT style keyboard you'll need a PC/AT (5-pin DIN female) to PS/2 (6-pin mini-DIN male) adapter. (These are readily available from Black Box.)

If you are *not* using the optional power supply, these peripherals' cables should be no longer than 6 ft. (2 m). If you *are* using the power supply, you can use ServSwitch Duo User-Extension Cables to increase the distance from ServSwitch Wizard to your peripherals to as much as 32 ft. (10 m; see **Section 3.3.4**); many keyboards and mice will operate at distances up to 65 ft. (20 m), but don't count on this.

A.2 Cabling from the ServSwitch Wizard to the CPUs

Video: HD15 male to HD15 male, wired as a standard VGA CPU-to-monitor cable. There are two types commonly available. The better type, which will carry video very well, is constructed with a coaxial cable core. The not-so-good type—cheaper cable more suited for data communication—is often used, but can degrade video quality, especially over longer distances. Avoid using “data cables” longer than 6 ft./2 meters unless video quality is not important in your application.

If you are *not* using the optional power supply, the video-extension cable should be no longer than 15 ft. (5 m) in any situation. If you *are* using the power supply, you might be able to run good coaxial video cables as far as 165 ft. (50 m) with little loss of video quality, but the longest we recommend going—unless you use a ServSwitch brand KVM Extender—is 100 ft. (30.5 m) over the video strand of our ServSwitch Duo CPU-Extension Cables (see **Section 3.3.4**).

If you want to make use of the ServSwitch Wizard's ability to pass Display Data Channel (DDC) information between your CPUs and the monitor, you'll need a cable that carries the DDC signaling lines (HD15 pins 12 and 15), which not all video cables do.

Keyboard and PS/2 mouse ports: 6-pin mini-DIN male to 6-pin mini-DIN male with all lines connected straight through (1 to 1, 2 to 2, etc.). If the PC has a 5-pin DIN PC/AT style keyboard connector, you will need a PS/2 to PC/AT keyboard adapter, 6-pin mini-DIN female to 5-pin DIN male (product code FA212.)

If you are *not* using the Wizard's optional power supply, the keyboard- and mouse-extension cables should be no longer than 15 ft. (5 m) in any situation. If you *are* using the power supply, you might be able to run keyboard- and mouse-extension cable, such as the keyboard and mouse strands of our ServSwitch Duo CPU-Extension Cables (see **Section 3.3.4**), as far as 100 ft. (30.5 m).

RS-232 serial mouse ports: You'll need a special adapter with the pinning shown in Figure A-1 on the next page (product code FA314) to connect the ServSwitch Wizard's PS/2 mouse port to the RS-232 port on a PC.

As noted above, PS/2 type mouse cables, such as the mouse strand of our ServSwitch Duo CPU-Extension Cables (see **Section 3.3.4**), should be no longer than 15 ft. (5 m) if you're *not* using the optional power supply or 100 ft. (30.5 m) if you *are*. If you're using an adapter at the Wizard end instead of the PC end and are running regular RS-232 cable, this cable should not be longer than 15 ft. (5 m) if you're *not* using the optional power supply or 50 ft. (15.2 m) if you *are*.

6-pin mini-DIN attaches to Wizard or cable from Wizard

DB9 attaches to PC's serial port or cable to PC's serial port

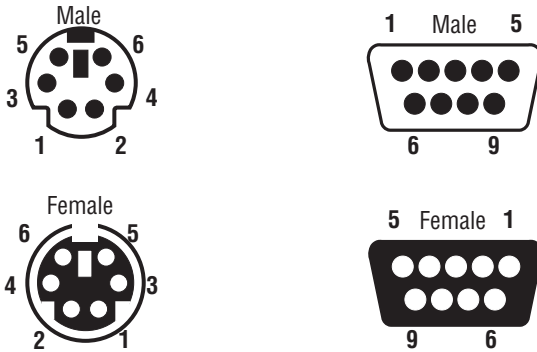
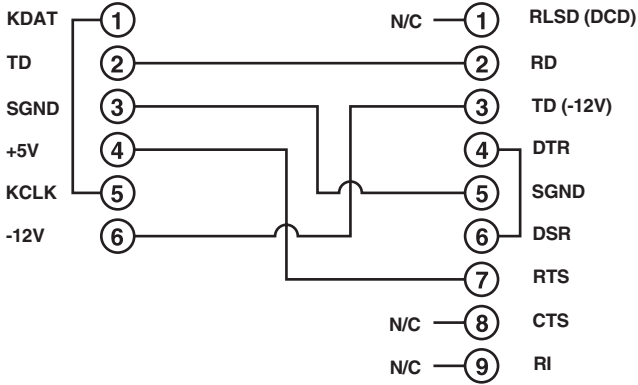


Figure A-1. The RS-232 mouse adapter.

A.3 Cabling Attached to the OPTIONS Port

The DB15 connector labeled “OPTIONS” on the back of the ServSwitch Wizard is a proprietarily pinned port using RS-232-type signaling. You can connect any of these devices to it:

- The Wizard’s optional Remote-Control Module (RCM, see **Section 5.2**);
- An RS-232 device for serially controlled channel switching (see **Section 5.9**);
- Another Wizard, to create a synchronized system for CPUs with multiple video outputs (see **Section 3.3.3**); or
- A PC, in order to upgrade the Wizard’s firmware (see **Section 5.13**).

The pinout of this connector is pretty simple: Pin 9 (Signal Ground, SGND), Pin 10 (Transmit Data, TD), and Pin 11 (Receive Data, RD) are the only pins used for serial communication to PCs, other Wizards, and RS-232 devices. All other pins are intended for RCM communication only and should be left unconnected; attaching them to any other RS-232 equipment could have unpredictable and possibly damaging effects.

The pinout for a synchronization cable is shown in Figure A-2 on the next page. We can offer this cable as a special quote, but it’s not a stock item at the time of this writing. The pinout for a firmware-upgrade cable (product code KV6SER) is shown in Figure A-3.

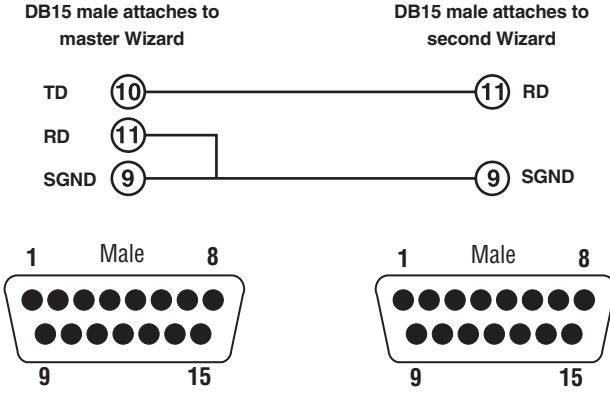


Figure A-2. The synchronization cable.

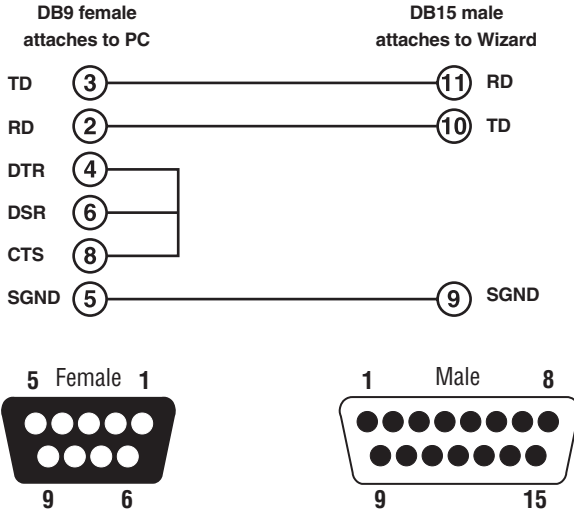


Figure A-3. The firmware-upgrade cable KV6SER.

DISCLAIMERS

While every precaution has been taken in the preparation of this manual, neither the manufacturer nor its authorized agents assume any responsibility for errors or omissions. Nor do they assume any liability for damages resulting from the use of the information contained herein. They reserve the right to change the specifications, functions, or circuitry of the product without notice.

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