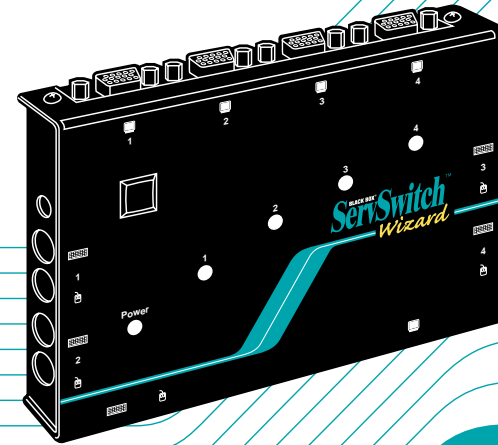


AUGUST 2000

BLACK BOX™
ServSwitch™
Wizard



SW641A
SW641A-K
SW642A
SW642A-K

Customer Support Information:

FREE tech support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746.

Mailing address: **Black Box Corporation**, 1000 Park Dr., Lawrence, PA 15055-1018

World-Wide Web: www.blackbox.com • E-mail: info@blackbox.com

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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?

With our ServSwitch products, there's no reason why not. We carry a broad line of robust solutions for all these applications. Do you have just two PCs, and need an economical alternative to keeping two monitors, keyboards, and mice on your desk? Or do you need to share dozens of computers, including a mix of IBM® PC, RS/6000®, Apple® Macintosh®, Sun Microsystems®, and SGI® compatibles among multiple users with different access levels? Does your switch have to sit solidly on a worktable and use regular everyday cables? Or does it have to be mounted in an equipment rack and use convenient many-to-one cables? No matter how large or small your setup is, no matter how simple or how complex, we're confident we have a ServSwitch system that's just right for you.

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 unit, 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:

SW641A
SW642A

SW641A-K
SW642A-K

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AND
INDUSTRY CANADA
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Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

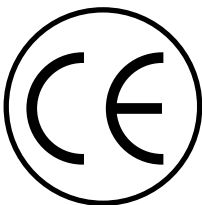
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- (a) Reorient or relocate the receiving antenna.
- (b) Increase the separation between the equipment and the receiver.
- (c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- (d) Consult the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



NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT

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.

Contents

Chapter	Page
1. Specifications	9
2. Introduction	12
2.1 Features and Benefits of the ServSwitch Wizard	12
2.2 The Complete ServSwitch Wizard Package	15
2.3 The ServSwitch Wizard Illustrated	17
2.4 Safety Concerns	18
3. Installation	19
3.1 What You Will Need	19
3.2 Placement	21
3.3 Connecting Your Devices	22
3.4 Connecting to AC Power (Optional)	27
4. Configuration	29
4.1 Configuring Your PCs	29
4.2 Configuring the ServSwitch Wizard	30
5. Operation	34
5.1 The Power LED	34
5.2 The Channel LEDs	35
5.3 The Channel-Change Pushbutton	37
5.4 Things to Keep in Mind About the Keyboards and Mice	38
5.5 Keyboard Control: Hotkey Commands (Including Autoscanning and Screen Blanking) ...	39
5.6 Mouse Control	43
5.7 Re-Enabling a Disconnected PS/2 Mouse	44
5.8 Cascading ServSwitch Wizards	45

Chapter	Page
6. Troubleshooting	48
6.1 Things to Try	48
6.2 The Maintenance-Mode Functions	53
6.2.1 Hot-Plugging Devices Into the ServSwitch Wizard and Re-Enabling Disconnected CPU PS/2 Mouse Ports	55
6.2.2 Querying the Switch for Its Firmware Version	60
6.2.3 Resetting the Keyboard and Mouse	60
6.3 Resetting the ServSwitch Wizard Itself	61
6.4 Calling Black Box	62
6.5 Shipping and Packaging	63
Appendix: Cable and Connector Guidelines	64
A.1 Cabling: Keyboard, Monitor, and Mouse to ServSwitch Wizard	64
A.2 Cabling: ServSwitch Wizard to PCs	65

1. Specifications

Compliance —	CE (EN55022 Class B); FCC Part 15 Subpart J Class A, IC Class/class A
Standards —	VGA, SVGA, XGA, or XGA-2 video
Interfaces —	Video: VGA; Keyboard and mouse: IBM PS/2 compatible; with appropriate adapters, also supports IBM PC/AT keyboard and EIA/TIA RS-232 mouse
Resolution —	Up to 1600 x 1200 noninterlaced at up to 100 Hz
Maximum Distance —	Without optional power supply: 2 m (6 ft.) to any attached keyboard, monitor, and mouse; 10 m (32 ft.) to any attached CPU or cascaded ServSwitch Wizard unit; With optional power supply: 10 m (32 ft.) to any attached keyboard, monitor, and mouse; 20 m (65 ft.) to any attached CPU or cascaded ServSwitch Wizard unit; 40 m (130 ft.) to an attached ServSwitch Duo Extender across Premium Extender Cable

- User Controls** — Keyboard commands;
Mouse-click functions;
(1) Top-mounted pushbutton
- Indicators** — All top-mounted:
(1) Power LED;
SW641A(-K): (2) Port (Channel) LEDs;
SW642A(-K): (4) Port (Channel) LEDs
- Connectors** — All side-mounted:
(1) HD15 female for monitor attachment;
(2) 6-pin mini-DIN female for keyboard
and mouse attachment;
(1) Barrel jack for optional power-supply
connection;
For each computer port, a set of (1) HD15
female (for video attachment) and
(2) 6-pin mini-DIN female (for
keyboard-port and mouse-port
attachment):
SW641A(-K): (2);
SW642A(-K): (4)

Power —	5 VDC at 500 mA from attached CPUs' keyboard interfaces; With optional power supply PS649: Input: 100 to 240 VAC at 50 to 60 Hz from utility-power outlet, through detachable power cord and IEC 320 inlet, to external transformer; Output: 5 VDC at up to 2.5 A from transformer to Switch (Switch draws only 500 mA); Consumption: 2.5 watts
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 and aluminum
Size —	1.1"H x 6.6"W x 4.5"D (2.8 x 16.8 x 22.1 cm)
Weight —	1 lb. (0.5 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.

2.1 Features and Benefits of the ServSwitch Wizard

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

- Control multiple PCs from a single keyboard, monitor, and mouse.
- Draws its power from the attached computers—and draws so little that even laptops can power it.
- Emulates the presence of a keyboard and mouse, and all ports are active simultaneously. This means all connected computers can boot up automatically at the same time.
- Can be cascaded to control hundreds of CPUs.
- Mixed PC/AT® and PS/2® keyboards and PS/2 and RS-232 mice supported as standard.

- High-resolution circuitry ensures the best possible video, even over extended distances (although long distances might require the optional power supply).
- Channel switching with front-panel pushbutton, keyboard hotkey sequence, or 3-button or wheel mouse.
- Automatically restores keyboard and mouse states when channel is changed.
- Supports high-bandwidth monitors at resolutions up to 1600 x 1200 pixels.
- Supports keyboard modes 1, 2, and 3, as well as both “prompt” and “stream” mouse modes, for maximum compatibility.
- Support for Microsoft® IntelliMouse™ and other common “wheel” mice.
- Mouse-restoration functions to enable hot-plugging of certain systems.
- Supports IBM ThinkPad® and its “Y” cables.
- Includes screen-blank, autoscan, and variable-hotkey options.

SERVSWITCH™ WIZARD

- Power and activity LEDs confirm correct operation; standard cable connections make installation easy and inexpensive; robust metal case ensures good shielding and video quality.

2.2 The Complete ServSwitch Wizard Packages

You should have received these components with your regular ServSwitch Wizard (product code SW641A or SW642A):

- The ServSwitch Wizard itself.
- Two Velcro® mounting strips (see **Section 3.2** for information about using these).
- This manual.

If you ordered a ServSwitch Wizard Kit, you should also have received two (product code SW641A-K) or four (SW642A-K) of each of these:

- 10-ft. (3-m) PS/2 style three-in-one CPU-Extension Cables for attaching your PC CPUs to the Switch. As shown in Figure 3-1 in **Section 3.3**, these cables have keyboard and mouse strands with 6-pin mini-DIN connectors bonded to a central video strand with HD15 connectors. (If you ever need to replace them, or if you ordered the ServSwitch Wizard only, these cables are available separately as product code EHN408-0010.)

- 6-pin mini-DIN female to 5-pin DIN male keyboard-port adapters (in case your CPUs have the older PC/AT style keyboard ports).
- 6-pin mini-DIN female to DB9 female mouse-port adapters (in case your CPUs have the older PC/AT style serial mouse ports).

If you didn't receive everything, or if anything arrived damaged, contact Black Box right away. (A power supply is not included because it isn't needed for most applications. You can purchase a power supply separately; order our product code PS649.)

2.3 The ServSwitch Wizard Illustrated

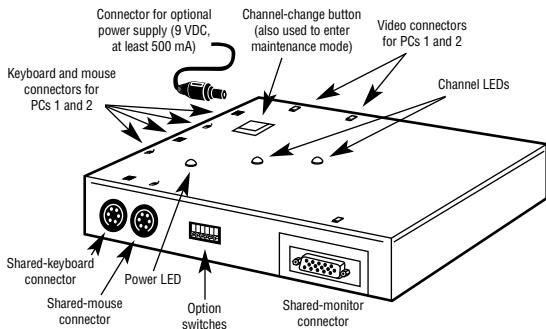


Fig. 2-1. The front and side of the 2-port ServSwitch Wizard (SW641A).

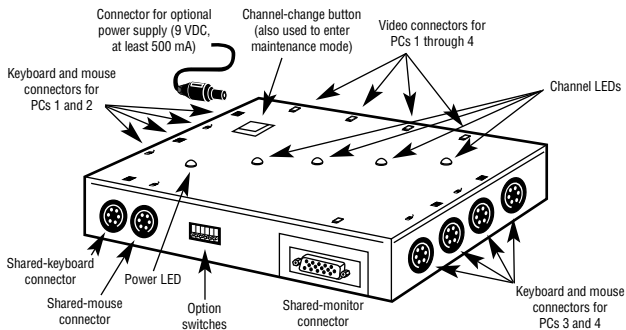


Fig. 2-2. The front and side of the 4-port ServSwitch Wizard (SW642A).

2.4 Safety Concerns

As you prepare to install the ServSwitch Wizard, please keep these things in mind, particularly if you purchase and use its optional power supply:

- The Switch is for use in dry, oil-free indoor environments only.
- Warning: The Switch's power supply contains *no* user-serviceable parts, but it *does* contain parts capable of delivering hazardous electric shocks—do *not* attempt to dismantle it!
- Plug the power supply into a socket outlet close to the Switch.
- Do not use the Switch's power supply if its case becomes damaged, cracked, or broken, or if you suspect that it is not operating properly.
- If the Switch's power supply stops working, replace it with a manufacturer-approved adapter of the same type only.

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 PCs. (If you ordered the SW641A-K or SW642A-K Kit, these cables came with the Switch. See **Sections 2.2 and 3.3**)

Cable specifications are given in the **Appendix**. (You do not need to connect a mouse cable or cable strand to a PC CPU if you won't be using the mouse with that CPU. If you need to connect the Switch to the 5-pin DIN keyboard port of a PC/AT compatible computer, use a standard PS/2 to AT keyboard adapter such as our product code FA212—included with the Kits. To connect the Switch to a CPU's DB9 serial mouse port, use an FA314 adapter; these are also included with the Kits.)

- A monitor with a standard VGA/SVGA (HD15) connector that will work when connected directly to each of your PCs. The ServSwitch Wizard supports low- and high-resolution monitors.

- A standard PC/AT or PS/2 style keyboard. If you are using an AT keyboard with a 5-pin DIN connector, you can connect it to the ServSwitch Wizard using a standard AT to PS/2 keyboard adapter such as our product code FA211.
- A PS/2 style two- or three-button Microsoft or Logitech® compatible mouse or a Microsoft IntelliMouse compatible mouse. If you want to use the mouse to switch channels on the ServSwitch Wizard, you will need a three-button mouse or an IntelliMouse. (The Switch supports other “Internet mice” compatible with the IntelliMouse—fitted with a wheel or other scrolling control, and sometimes additional buttons—including the Logitech Pilot Mouse+™, Logitech MouseMan+®, Genius™ NetMouse™ and Genius NetMouse™ Pro.)

All of the mouse connections from ServSwitch Wizard to the attached PCs support either a PS/2 or an RS-232 mouse. The Switch automatically converts PS/2 mouse commands to RS-232 serial-mouse commands. You can use a serial mouse if you attach it to the Switch through an appropriate adapter, as described in the **Appendix** (our product code FA314). The Switch will operate without a mouse connected if you do not wish 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. (You might be able to use other mouse drivers with Intellimouse-compatible data formats, but these may or may not work—trial-and-error testing might be necessary.)
 - Logitech mouse drivers, including those for two-button, three-button, and wheel mice.

3.2 Placement

The ServSwitch Wizard has been designed to be either set on a desktop or surface-mounted close to the computers that it's serving. To mount the ServSwitch Wizard on a wall or other surface, use the two Velcro strips that came with the unit. Peel the backing away from one side of each of the two strips and press the strips firmly onto the bottom of the unit (the wide flat area where there are no connectors and no LEDs). Then peel the backing away from the other side of the strips and press the bottom of the Switch firmly against the surface you want to mount the Switch on.

3.3 Connecting Your Devices

If you are using an optional power supply with the single or master ServSwitch Wizard, make sure the power supply is unplugged and disconnected from the Switch. Also make sure that (if possible) all of the devices you want to attach to your ServSwitch Wizard system are turned off and unplugged. (If you have to “hot-plug” any powered computers into the Switch, see **Section 6.2.1.**)

Connect a set of shared user equipment (keyboard, PS/2 mouse, and monitor) to the appropriate connectors on the Switch’s front panel (see Figure 2-1 or 2-2 in **Section 2.3**). If you have had to place the Switch farther from the user equipment than the equipment’s native cables will reach, you can extend the Switch’s reach if you use the optional power supply. For starters, you can plug the native cables into User-Extension Cable (our product code EHN409), which comes in 10-foot (3-m) and 32-foot (10-m) lengths. If you need to run even farther, you can use a ServSwitch™ Duo Extender (our product code KV6EXT) with 130-ft. (40-m) Premium Extender Cable (our product code KV6100) to connect the Switch to the keyboard, mouse, and monitor. (For more information about the Extender, see its manual.)

Both the User-Extension Cable and Premium Extender Cable, as well as the CPU-Extension Cable discussed later in this section, are built to the special three-in-one design shown in Figure 3-1 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.

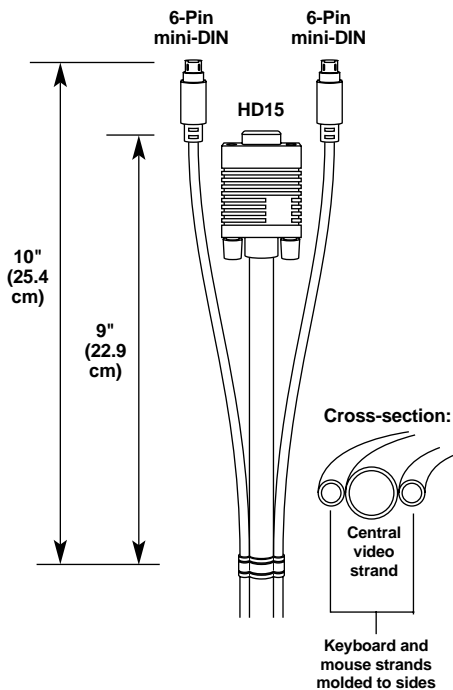


Figure 3-1. The ServSwitch Wizard cables.

Next, connect each computer or (in cascaded systems) subsidiary ServSwitch Wizard to your single/master Switch. If you ordered a ServSwitch Wizard Kit, your Switch will have come with two or four 10-ft. (3-m) CPU-Extension Cables—which also have the three-in-one design shown in Figure 3-1—that you can run from the CPU’s or subsidiary Switch’s video, keyboard, and mouse ports to the matching ports on the single/master Switch.

If you ordered just the Switch rather than the Kit, the CPU-Extension Cables are available separately, as product code EHN408, in 5-foot (1.5-m), 10-foot (3-m), 30-foot (10-m), and 50-ft. (15-m) lengths. (Alternatively, you can run separate male-to-male keyboard-, mouse-, and video-extension cables: EVNPS05 for video, EVNPS03 for keyboard and mouse.)

Any unused CPU-port or control-port connectors on the Switches can be left vacant.

To connect computers with serial mouse ports and PC/AT style keyboard ports, you'll need adapters, as shown in Figure 3-2 below. Two or four of each are included with the Kits; they're available separately if you ordered the Switch only. Refer to the **Appendix** for cable guidelines.

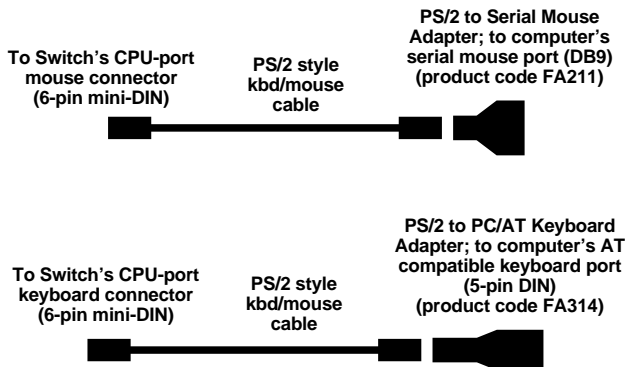


Figure 3-2. Using adapters to connect computers with serial mouse ports or PC/AT keyboard ports.

Once you make these connections, the ServSwitch Wizard is ready for use, unless you need to plug in its optional power supply (see the next section). It should start to operate as soon as one of the connected computers is powered on. Watch the Power LED: If it lights steadily, the Switch is operating; if it flashes or is dark, the Switch either is not receiving power at all (are all of the computer cables attached at both ends?), is not receiving enough power, or is not operating correctly. Depending on the video resolution and cabling distances of your application, you might need to get a power supply for the Switch. If you can't determine where the problem is, call Black Box for technical support.

3.4 Connecting to AC Power (Optional)

You might need an optional power supply (our product code PS649) if you're running long distances to your user equipment or CPUs or if you're using very-high-resolution video. Once you've installed your ServSwitch Wizard and attached your equipment to it, you can:

1. Plug the power supply's output cord into the jack on the side of the Switch.

2. Plug the IEC 320 female end of the power supply's input cord into the IEC 320 male inlet on the power-supply transformer.
3. Plug the other end of the input cord into utility (mains) power.

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 Switch, the computers might not recognize the presence of the mouse or keyboard.

The Switch should start operating as soon as you plug in the power supply. Watch the Power LED: If it lights, the Switch is operating; if it flashes or is dark, the Switch either is not receiving power at all (are the power supply's output and input cords both securely attached? is the AC outlet actually working?), is not receiving enough power, or is not operating correctly. If you can't determine where the problem is, call Black Box for technical support.

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 Switch 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, but keep these things in mind:

- The ServSwitch Wizard emulates Microsoft compatible serial, IntelliMouse, and PS/2 mice, so 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**.

- The ServSwitch Wizard supports VGA, SVGA, XGA, and XGA-2 type monitors, but does not support the automatic detection features available with some Plug-and-Play monitors and video cards. If you have this type of video card or monitor, you should select the video mode manually instead of relying on the automatic detection feature.

4.2 Configuring the ServSwitch Wizard

You can use the 6-position DIP switch on the front of the ServSwitch Wizard (see Figure 2-1 or 2-2 in **Section 2.3** and Figure 4-1 at the end of this section) to configure the Switch. The Switch comes from the factory preset to default configuration settings that are suitable for most applications; for these settings, all DIP-switch positions are OFF. If you need to set the Switch differently, you can move the DIP-switch positions as required. (You can do this even if the Switch is operating, because the Switch scans its DIP switch continuously.)

The DIP switch positions have these functions:

- 1 Determines the hotkey combination that can be used to switch the Switch's channel (see **Section 5.5**).

- 2 Sets the Switch to stop at either *all* the ports or just the *active* ports while it is (a) autoscanning, (b) being switched with {Hotkeys} + [Tab], or (c) being switched with a mouse (see **Sections 5.5** and **5.6**).

CAUTION!

Many modern monitors are fitted with automatic power-saver relays and will automatically blank their displays after a short time if the PC they're communicating with becomes idle. If you are using such a monitor, you should not set the ServSwitch Wizard to autoscanner all ports unless you can set the monitor's power-saver timeout to an interval longer than the Switch's autoscanner pause time (see the entry for position 3 below), 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.

- 3 Sets the time that each channel will be displayed during autoscanner (the "pause" or "dwell" time). Available options are 2 or 5 seconds (see **Section 5.5**).
- 4 Determines whether the mouse can be used to switch the Switch's channel (see **Section 5.6**). If you use the mouse to switch the Switch, the mouse's third or wheel button will not be available to your application software.

- 5 Used to reset the Switch (see **Section 6.3**).
For normal operation, set this switch to OFF.
- 6 Reserved—must be set OFF.

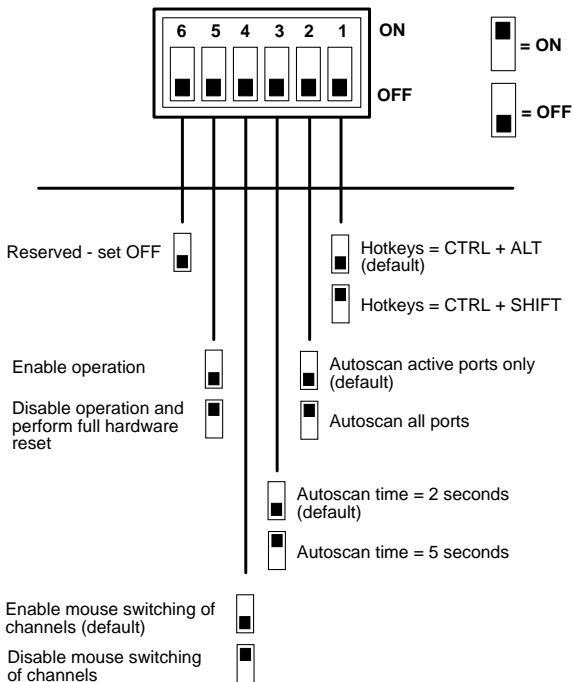


Figure 4-1. The configuration DIP switch.

5. Operation

This chapter explains the general operation of the ServSwitch Wizard. We recommend that you read this chapter carefully before starting to use the Switch; also make sure you have read the important note at the start of **Chapter 4**.

5.1 The Power LED

At power-up—either when you attach the first powered computer to the ServSwitch Wizard, or when you plug the optional power supply into the Switch and into a working AC—the ServSwitch Wizard should steadily light its top-panel Power LED and select CPU channel #1.

If the Power LED is instead dark or flashing, the Switch is either (a) not receiving any power, (b) not receiving enough power, or (c) not working properly. If you're running the Switch from CPU-interface power, this can be caused by (in decreasing order of likelihood) loose/undone cable connections, cables being run farther than 10 m (32 ft.), all CPUs being powered OFF, cables being broken, the Switch's Power LED being defective, or the Switch's main board being defective.

If you're running the Switch from AC power, this can be caused by (in decreasing order of likelihood) loose/undone power-supply connections, AC outlet being turned OFF/not working, power supply being broken, the Switch's Power LED being defective, or the Switch's main board being defective. If you can't determine the cause of this problem, call Black Box for technical support.

5.2 The Channel LEDs

When a particular computer channel on the ServSwitch Wizard is selected, the correspondingly numbered channel LED on the Switch's top panel lights up. This LED will flash when there is keyboard or mouse activity on that channel. While the Switch is in autoscan mode, the Switch alternates between (a) lighting the channel LED of the computer channel that the scan is currently pausing on and (b) flashing all of the channel LEDs. While the Switch is in maintenance mode (see **Section 6.2**), it steadily lights channel LEDs 1 and 2 at the same time. Refer to Figure 5-1 on the next page.

SERVSWITCH™ WIZARD






DISPLAY SHOWS	MEANING (when power indicator is on)
 All channel indicators off.	Channel "0" selected. Video disabled.
 Channel indicator on continuously.	Channel is selected. There is no keyboard or mouse data activity.
 Channel indicator flashes.	Channel is selected. Data is being received from the keyboard or mouse.
 Channel indicators 1 and 2 lit together.	ServSwitch Wizard is in maintenance mode.
 Channel indicators light in sequence before showing the selected channel.	ServSwitch Wizard is in autoscan mode.

Figure 5-1. The channel LEDs.

5.3 The Channel-Change Pushbutton

During normal operation, you can press the pushbutton on the top panel of the ServSwitch Wizard once to change the monitor display and keyboard/mouse control to the next CPU channel in sequence. On the 2-port model of the Switch (SW641A), pressing this button switches from channel 1 to channel 2 or vice versa. On the 4-port model (SW642A), pressing this button once selects the next CPU channel in sequence (channel 3, for example, if channel 2 is currently selected); pressing the key repeatedly manually cycles through all four channels. When you change to a new channel, the Switch will light the corresponding channel's top-panel LED.

5.4 Things To Keep in Mind About the Keyboards and Mice

PC bootup sequence: When your PCs 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 PCs the required responses and keep track of all the modes and settings requested by each of the connected PCs.

Mouse characteristics: Do not unplug a PS/2 mouse connection from a PC while the PC is on. Because of the way PS/2 mice communicate, the PC will lose mouse function and you will have to reboot the PC to regain normal operation. Unplugging a shared PS/2 mouse from the ServSwitch Wizard will have no immediate effect, but the PC will lose mouse function as soon as you plug the mouse back in. (RS-232 mice can usually be freely unplugged and replugged, provided that one 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 6.2.1** 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 PCs, 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 (Including Autoscanning and Screen Blanking)

You can control several functions on the ServSwitch Wizard—such as CPU-channel selection and autoscanning—from the keyboard, using commands triggered with the Switch’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 you can change to [Ctrl] and [Shift] by setting position 1 of the Switch’s configuration DIP switch to ON (see **Section 4.2**).

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. 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 Switch will not recognize keypad numbers.

- Use {Hotkeys} + [1] to select channel 1.
- Use {Hotkeys} + [2] to select channel 2.
- *4-port (SW642A) units only:* Use {Hotkeys} + [3] to select channel 3.
- *4-port (SW642A) units only:* Use {Hotkeys} + [4] to select channel 4.

- Use {Hotkeys} + [Tab] to switch to the next active channel (if DIP switch position 2 is set OFF) or the next channel in numeric sequence (if DIP switch position 2 is set ON). (Refer to **Section 4.2**.)
- Use {Hotkeys} + [A] to have the Switch 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 positions 2 and 3 respectively of the Switch's configuration DIP switch (see **Section 4.2**). To stop autoscanning, simply select a fixed channel using the Switch's top-panel channel-change pushbutton, the keyboard hotkeys, or the mouse (if mouse switching is enabled and the mouse is a 3-button or IntelliMouse type).

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

- Use {Hotkeys} + [0] to select nonexistent "channel zero" in order to shut off the video output from the Switch to the shared monitors. The Switch's front-panel display will show "0". You can re-enable video

by selecting another channel through the Switch's top-panel channel-change pushbutton, the keyboard hotkeys, or the mouse (if mouse switching is enabled and the mouse is a 3-button or IntelliMouse type).

- Use {Hotkeys} + {Channel Address} to select a CPU channel in a cascaded system (see **Section 5.8**). The {Channel Address} is a series of one-digit channel numbers that specify the “path” to follow to get from the master Switch to the desired CPU channel on the subsidiary Switch. For example, if you want to access
 - CPU port **4** on a “second-layer” subsidiary Switch connected to
 - CPU port **2** on a “first-layer” subsidiary Switch connected to
 - CPU port **1** on the master Switch, you would enter:
{Hotkeys} + [1][2][4].

To make sure that the Switch 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 3 on a subsidiary Switch connected to port 4 on a master Switch:* Press and hold [Ctrl] and [Alt], press and release [4], press and release [5], release [Ctrl] and [Alt].

5.6 Mouse Control

Yet another convenient way to select CPU channels on the ServSwitch Wizard—if you leave this feature enabled—is through a three-button mouse. Simply hold down the central mouse button or “wheel” button, then click on the *left-hand* mouse button to switch to the next *higher-numbered* channel, or click on the *right-hand* mouse button to switch to the next *lower-numbered*

channel. The Switch comes from the factory with mouse switching enabled; to disable mouse switching, move position 4 of the Switch's configuration DIP switch to ON (see **Section 4.2**).

The mouse will switch to the next *active* channel if DIP switch position 2 is OFF; it will switch to the next channel *in numeric sequence* if DIP switch position 2 is ON (see **Section 4.2**).

5.7 Re-Enabling a Disconnected PS/2 Mouse

If you disconnect the shared PS/2 mouse from the ServSwitch Wizard by accident during operation, the mouse will not work right when you plug it back in. To avoid having to reboot the entire system in this situation, the Switch has an automatic mouse-recovery system.

With the PS/2 mouse disconnected, change the channel using the Switch's change-channel 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 have the Switch do a power-off reset of the keyboard and mouse (see **Section 6.2.3**).

5.8 Cascading ServSwitch Wizard Units

Multiple ServSwitch Wizard units 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. This can be particularly useful where clusters of computers are located some distance from each other, because each Switch unit acts as a kind of signal booster or repeater and can be as much as 50 feet (15.2 m) away from the other Switches in the system. (To send video these distances, you will *absolutely have to* use the optional power supply for your cascaded Switches.) To select channels in cascaded systems, you will need to send hotkey commands from the master Switch's keyboard (see the “[Hotkeys] + [Channel Address]” paragraph in **Section 5.5**).

For an example of hotkey switching, consider a situation in which two ServSwitch Wizard units, unit “A” and unit “B,” are connected together as shown in Figure 5-2 on the next page. To select the computer attached to port 3 on ServSwitch Wizard “B,” you would press and hold down the hotkeys, then press and release “2,” press and release “3,” and finally release the hotkeys. This causes the master Switch, unit “A,” to switch to its

port 2, to which the subsidiary Switch is attached, and send the subsidiary Switch the command to switch to port 3, to which your desired computer is attached.

Please note that it is not possible to autoscan every channel in a cascaded system with a single scan. Cascaded Switches must be scanned individually by pressing {Their Hotkeys} + [A] at the shared keyboard.

NOTE

It is often possible to include ServSwitch™ Wizard Pro or ServSwitch™ Duo units in the same cascade as ServSwitch Wizard units; in such situations, we strongly recommend that a Wizard Pro or Duo unit be the cascade's master Switch. Before installing such a cascade, please call Black Box Technical Support to discuss your application.

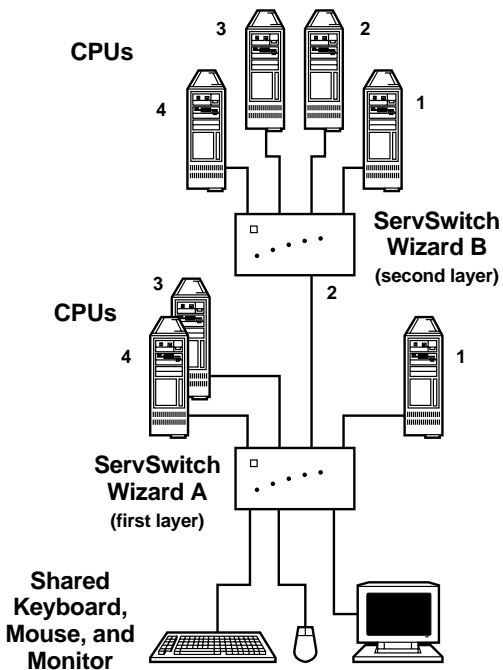


Figure 5-1. A typical cascade of two ServSwitch Wizards.

6. Troubleshooting

If you have difficulty with your ServSwitch Wizard, see if the problem is listed in **Section 6.1** and, if so, try the suggested remedies. You can also, at any time, perform the general remedial functions listed in **Section 6.2** or reset the Switch itself as described in **Section 6.3**. If nothing helps, call Black Box Technical Support as directed in **Section 6.4**. If you need to ship your Switch, see **Section 6.5**.

6.1 Things To Try

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 channel LED on the Switch's top panel does not flash, then the ServSwitch Wizard is not receiving data from the mouse. Check the mouse connection to the Switch; if it's OK, try resetting the mouse using the reset function (see **Section 6.2.3**) or removing and restoring power to the Switch. If you are attempting to connect the Switch to a CPU with a PS/2 mouse connection that has not been powered down, you will need to use the mouse-restoration function (see **Section 6.2.1**).

Make sure that your computer's software is configured to accept a Microsoft compatible mouse of the type that you have connected (PS/2 or RS-232).

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 Switch 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 Switch (if you're using its optional power supply), 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**)—sometimes causes the Switch 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 Switch doesn't support. If

you have unplugged and reconnected a mouse to the ServSwitch Wizard, make sure that you reset it (see **Section 6.2.3**) or—especially if the mouse is an IntelliMouse—use the mouse-restoration function (see **Section 6.2.1**).

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 PC. Try the mouse-reset function (see **Section 6.2.3**) or the mouse-restoration function (see **Section 6.2.1**), or reboot the CPU.

Problem:

Compaq MX11800 model integrated keyboard and mouse only:
The mouse consistently fails to boot when the Switch 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 Switch 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 The Maintenance-Mode Functions

You can access a number of useful troubleshooting functions of the ServSwitch Wizard by activating the Switch's "maintenance mode." Do this by holding down the top-panel channel-change pushbutton for 5 seconds until the Switch's channel LEDs (LEDs 1 and 2) both light at the same time. (Even in this mode, the Switch will keep performing keyboard and mouse emulation on all ports at all times in order to keep errors from occurring on the attached CPUs.) While you're in maintenance mode, press the "1," "2," "3," or "4" key on the shared keyboard (*not* on the numeric keypad), or the channel-change pushbutton on the top panel of the Switch, to trigger these functions:

- **Restore a CPU mouse connection or synchronize a CPU PS/2 mouse connection** (see **Section 6.2.1**): Press the "1" or "2" key on the shared keyboard to reset the PS/2 mouse or IntelliMouse connection, respectively, on the currently selected computer port. Press the "4" key on the shared keyboard to attempt to synchronize the mouse connection on the currently selected computer port.

- **Query the Switch for its firmware version** (see **Section 6.2.2**): Press the “3” key on the shared keyboard to cause the Switch to report its version number to the currently selected computer port. For you to see this information on screen, the CPU attached to this port must be running a text editor or word processor that is ready to accept keyboard input.
- **Reset the shared keyboard and mouse** (see **Section 6.2.3**): Press the channel-change pushbutton on the Switch’s top panel to reset the shared keyboard and mouse. (The Switch fully maintains the CPU connections during this process.)

After you press the key or pushbutton and the corresponding function is performed to completion, the Switch will automatically return to normal operation.

6.2.1 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 Switch 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 PCs, mouse movement will be lost if the PS/2 mouse is unplugged and plugged back in while the PC is running. Mouse movement can then only be restored by rebooting the PC. This is because the mouse drivers only set up and enable the mouse when the PC 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. These 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 PC 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 PC 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 PC originally booted:

Type of mouse/sys. connected at bootup:	Driver type:	Probable expected data format:	Suggested restoration command:
PS/2	PS/2 only	PS/2	PS/2— press [1]
PS/2	IntelliMouse	PS/2	PS/2— press [1]
IntelliMouse	PS/2 only	PS/2	PS/2— press [1]
IntelliMouse	IntelliMouse	IntelliMouse	IntelliMouse— press [2]

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 change-channel button on the top of the ServSwitch Wizard for five seconds until top-panel channel LEDs 1 and 2 are both lit simultaneously. The Switch is now in maintenance mode.
3. To restore a PS/2 mouse connection, type the number “1” on your shared keyboard. Or, to restore an IntelliMouse connection, type the number “2” on your shared keyboard. The Switch will automatically exit maintenance mode and resume operating normally.

Test the mouse movement by slowly moving the mouse a short distance. In most cases the mouse should now work and no further action will be necessary. But if the mouse darts uncontrollably around the screen, there are two possible reasons:

1. The CPU may be expecting a different mouse data packet format. A PS/2 mouse sends a 3-data-character report and an IntelliMouse sends a 4-data-character report. If you are in doubt, try repeating the three steps above, but set the Switch for the other data format this time.
2. The data packet format might be correct, but the ServSwitch Wizard and the CPU might not be correctly synchronized. In other words, the Switch may be sending the first data character while the CPU is expecting the second data character. Most PC mouse drivers will automatically resynchronize themselves if no mouse data has been received, so this is not normally a problem. However, some mouse drivers do not automatically resynchronize. The Switch has a resynchronization function that you can use to alter the synchronization between the Switch and the CPU by 1 data character. By using this function a maximum of three times,

the synchronization between the Switch and the CPU can be matched.

To attempt to resynchronize the mouse, take these steps:

- a. Press and hold the change-channel button on the top of the ServSwitch Wizard for five seconds until top-panel channel LEDs 1 and 2 are both lit simultaneously. The Switch is now in maintenance mode.
- b. To change the mouse synchronization by 1 character, type the number “4” on your shared keyboard. The Switch will drop back into normal operation. Test the mouse function; if the mouse still isn’t working right, repeat steps a and b up to twice more until correct mouse operation is restored.

6.2.2 QUERING THE SWITCH FOR ITS FIRMWARE VERSION

For technical-support purposes, it might be necessary to find out the firmware-release version of your ServSwitch Wizard. To do this, switch to a CPU that is showing a DOS prompt or is running a text editor, word processor, etc.—it doesn't matter what software is running, as long as it displays characters typed in at the keyboard on the screen. Enter maintenance mode (as described at the start of **Section 6.2**) and type “3” at the keyboard; the version number will be reported on the CPU screen as three numbers, the first of which is the major revision level and the other two of which are the minor revision level. For example, if the Switch reports “118”, the firmware version is 1.18.

6.2.3 RESETTNG THE KEYBOARD AND MOUSE

If your shared mouse has become disconnected, you need to change to a different type of mouse, or if some kind of error has caused your mouse or keyboard to operate incorrectly, you can trigger the ServSwitch Wizard's “keyboard and mouse reset” function, which completely powers off the keyboard and mouse for several seconds before repowering and reinitializing them. (This function only resets the shared keyboard

and mouse; it does not affect the status of any of the other ports on the Switch or of the CPU connections.) To perform this reset, put the Switch into maintenance mode (as described at the start of **Section 6.2**), then press the Switch's top-panel channel-change pushbutton. The Power LED will go out for a few seconds, then will be relit when the keyboard and mouse have been reset; the Switch will then be back to operating normally.

6.3 Resetting the ServSwitch Wizard Itself

The ServSwitch Wizard has a hardware-reset function that does not require you to remove power to the Switch. Set position 5 of the Switch's configuration DIP switch (see **Section 4.2**) ON to do this. This DIP-switch position is directly connected to the Switch's microprocessor; when you set it ON, the microprocessor essentially shuts down. To finish resetting the Switch, move position 5 back to OFF; power is restored to the microprocessor, which then performs a complete hardware reset.

6.4 Calling Black Box

If you determine that your ServSwitch Wizard is malfunctioning, *do not attempt to alter or repair the unit*. 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.

6.5 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 unit back to Black Box for repair or return, contact us to get a Return Authorization (RA) number.

Appendix: Cable and Connector Guidelines

IMPORTANT NOTE

The maximum cable lengths supported vary widely between devices and cables. It might be possible to use cables that are longer than those specified below with certain PCs and peripherals, but this cannot be guaranteed. If you experience problems, try using shorter cables.

A.1 Cabling: Keyboard, Monitor, and Mouse to 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 will need a PC/AT (5-pin DIN female) to PS/2 (6-pin mini-DIN male) adapter. (These are readily available from Black Box as product code FA211.) When you power the ServSwitch Wizard with its optional power supply, you can use User Extension Cables to increase the distance from the Switch up to 32 ft. (10 m; see **Section 3.3**). You *must* use an optional power supply with all of the Switches in your system in order to run this distance; without the optional power supply, do *not* run cable farther than 6 ft. (2 m) to the keyboard, monitor, or mouse.

A.2 Cabling: ServSwitch Wizard to PCs

Video port: HD15 male to HD15 male, wired as a standard VGA PC-to-monitor cable. There are two types commonly available. The better type, which will carry video very well, are constructed with coaxial cable cores. 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 m) unless video quality is not important in your application.

Good coaxial video cables may be run relatively far with little loss of video quality, but the farthest we recommend going—unless you use the ServSwitch Duo Extender (KV6EXT)—is 65 ft. (20 m) over the video strand of our CPU Extension Cables (see **Section 3.3**). You *must* use an optional power supply with all of the Switches in your system in order to run this distance; without the optional power supply, do *not* run cable farther than 32 ft. (10 m) to your CPUs’ video ports.

If you use a ServSwitch Duo Extender with Premium Extender Cable, you can cross Switch-to-CPU distances up to 130 ft. (40 m).

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. These are included with the ServSwitch Wizard Kits, and are also available separately as product code FA212.

Keyboard and mouse cables, such as the keyboard and mouse strands of our CPU Extension Cables (see **Section 3.3**), should be no longer than 65 ft. (20 m). You *must* use an optional power supply with all of the Switches in your system in order to run this distance; without the optional power supply, do *not* run cable farther than 32 ft. (10 m) to your CPUs' keyboard and mouse ports.

RS-232 serial mouse ports: These require a special adapter, with the pinning shown in the illustration on the next page. Such adapters are included with the Kits and are also available separately as product code FA314.

PS/2 type mouse cables, such as the mouse strand of our CPU Extension Cables (see **Section 3.3**), should be no longer than 65 ft. (20 m). Neither should RS-232 cable (if you are using a converter at the Switch end instead of the PC end). You *must* use an optional power supply with all of the Switches in your system in order to run this distance; without the optional power supply, do *not* run cable farther than 32 ft. (10 m) to your CPUs' RS-232 mouse ports.

6-pin mini-DIN female accepts cable from ServSwitch Wizard

DB9 female plugs into PC's serial port

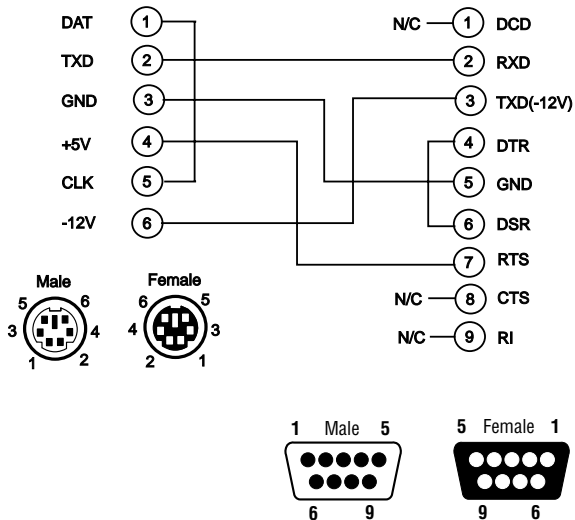


Figure A-1. The RS-232 mouse adapter's pinout.

DISCLAIMERS

While every precaution has been taken in the preparation of this manual, the manufacturer assumes no responsibility for errors or omissions. Neither does the manufacturer assume any liability for damages resulting from the use of the information contained herein. The manufacturer reserves the right to change the specifications, functions, or circuitry of the product without notice.

The manufacturer cannot accept liability for damage due to misuse of the product or due to other circumstances outside the manufacturer's control. And the manufacturer will not be responsible for any loss, damage, or injury arising directly or indirectly from the use of this product.

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