

October 2006

BLACK BOX™
ServSwitch™ BRAND
Mini CATx KVM Extender

 **BLACK BOX**
NETWORK SERVICES



ACU7001A
ACU7009A

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 **BLACK BOX**
NETWORK SERVICES

Welcome to the ServSwitch™ Family!


Thank you for purchasing a BLACK BOX® ServSwitch™ Brand Mini CAT5 KVM Extender model! We appreciate your business, and we think you'll appreciate the many ways that your enhanced keyboard / video / mouse extender system 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™ Brand Mini CAT5 KVM Extender, including how to install, operate, and troubleshoot it. The Extender product codes with automatic equalization and skew compensation covered in this manual are:

ACU7001A
ACU7009A

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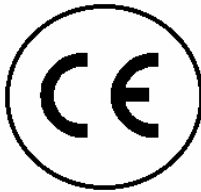
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This equipment complies with the requirements of the European EMC Directive 89/336/EEC.



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.

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1. Specifications

Compatibility — Keyboard: PC/AT®, PS/2; USB
 Monitor: VGA, SVGA, XGA;
 Mouse: PS/2 two-button, Microsoft®, USB
 IntelliMouse®, Logitech™ three-button

Resolution / Distance (Max — Up to 200 ft. (60.9 m): 1600 x 1280;
 Up to 300 ft. (91.4 m): 1280 x 1024;
 Up to 1,000 ft. (304.8 m): 1024 x 768

Operating Environment — Temperature: 32 to 113° F (0 to 45° C);
 Humidity: 0 to 80% non-condensing

Connectors — PS/2 Models ACU7001A

Local unit	Remote Unit
Keyboard/Mouse (2) MiniDIN6M	Keyboard/Mouse (2) MiniDIN6F
Video: (1) HD15M	Video: (1) HD15F
Interlink: (1) RJ45F	Interlink: (1) RJ45F

Connectors — USB Models ACU7009A

Local unit	Remote Unit
Keyboard/Mouse (1) USB Type A M	Keyboard/Mouse (2) USB Type A F
Video: (1) HD15M	Video: (1) HD15F
Interlink: (1) RJ45F	Interlink: (1) RJ45F

Power — Local units: From the connected PC;
 Remote units: C7 jack, 100–240 VAC, 50–60 Hz, external,
 auto-sensing, with IEC 320 connector

Size — Local units: 0.6"H x 1.4"W x 2.4"D (1.5 x 3.6 x 6.1 cm);
 Remote units: 0.8"H x 2.2"W x 2.5"D (2 x 5.6 x 6.4 cm)

2. Quick Start

2.1 Installation

Installing your ServSwitch Brand Mini CATx extender is a very easy and simple process.

First connect the remote unit to your KVM stations keyboard, monitor, and mouse cables. Also connect the power adapter to the remote unit.

NOTE: DO NOT APPLY POWER TO THE REMOTE UNIT AT THIS TIME

Next connect the local unit to your computer's keyboard, monitor, and mouse ports. Depending on the type of equipment, this may be PS/2 or USB keyboard and mouse ports.

Next, connect the remote unit to the local unit with up to 1,000 feet of CATx cable.

Last, initially apply power to the system in the following sequence:

1st – Turn on the remote KVM monitor

2nd – Apply power to the remote ServSwitch Brand Mini KVM extender

3rd – Boot the PC

Applying power to the remote unit with power ON the remote KVM monitor assures that the DDC information from the connected monitor is read properly.

The ServSwitch Brand will automatically set-up the configuration for optimum video, automatically compensate for cable lengths and transmit keyboard and mouse signals to the local unit.

The LED indicators on each unit show the link status and data flow.

If the LED blinks every ½ second no link is detected, check the CATx connections.

If the LED is briefly blinking every 3 seconds a Link has been detected and operation is normal.

Figure 1 shows an example of typical installation using the USB model.

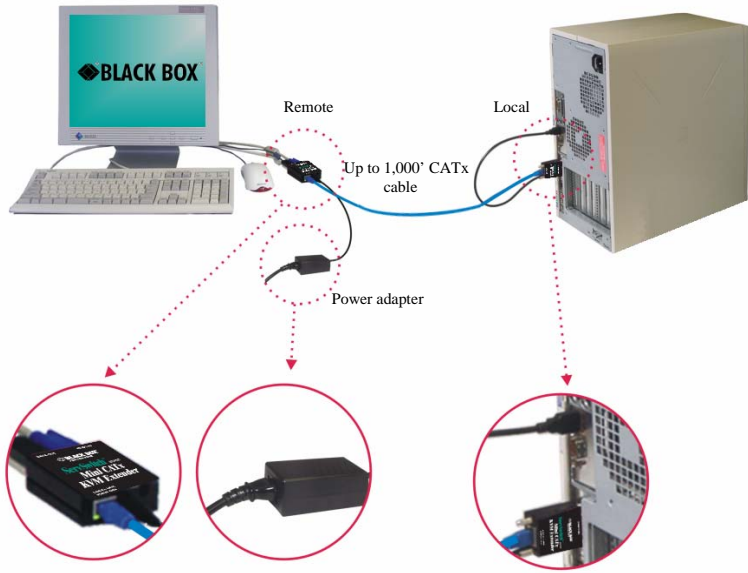


Figure 1. Connectivity Diagram

3. Introduction

Thank you for choosing the Black Box[®] ServSwitch Brand Mini CATx extender. Using the ServSwitch Brand Mini CATx extender to remotely access your computer has several applications that make it convenient for the users. You can locate your computers in a secure area and access them from other unsecured areas. Computers used in hazardous industrial environments can be accessed remotely, keeping the users safe and unexposed to any hazards.

The ServSwitch Brand Mini CATx extender system consists of two units, a transmitter unit and a receiver unit. The transmitter connects easily to your computer or KVM switch. The receiver connects to a remote keyboard, video monitor and a mouse. The transmitter and receiver are connected together with industry standard CAT5, CAT5e, CAT6, or CAT7 shielded or unshielded, solid core twisted-pair cable terminated with RJ45M connectors. All models can extend the distance from the CPU up to 1,000 feet. Applications can be executed, computer maintenance performed, and any function normally done can be performed with virtually no degradation in video quality and performance.

Installation only takes a few minutes since the ServSwitch Brand Mini CATx extender automatically sets up various parameters and functions based on your system topology. There are no jumpers to set or adjustment knobs to turn. Parameters like video gain and equalization are automatically compensated for and properly adjusted based on the length of CATx cable used. Video skew compensation is automatically calculated and the red, green, and blue video components are adjusted for crystal clear viewing. Some fine tuning can easily be done using keyboard commands, but are rarely needed.

The only cable needed to install your product is a CATx cable to connect the transmitter to the receiver. CATx cable can be ordered from Black Box in 25-1,000 foot lengths.

This chapter describes everything that comes with the ServSwitch Brand Mini CATx extender, the external and operating features of the ServSwitch Brand Mini KVM Extender, and the cabling you'll need.

3.1 The Complete Package

Your ServSwitch Brand Mini KVM Extender package includes:

- The ServSwitch Brand Mini KVM Extender units
 - Local unit ACU70xxA-L
 - Remote unit ACU70xxA-R
- Power Adapter
- “Y” cable included with PS/2 models
- Installation and operations manual

If anything arrived damaged, contact Black Box.

3.2 Features

Some useful features of your ServSwitch Brand Mini CATx extender are:

- Use CAT5, CAT5e, CAT6, or CAT7 UTP cable to place a remote KVM station up to 1,000 feet (304.8 m) from local equipment.
- Automatic adjustment of video equalization and gain based on cable length. No manual adjustment is required.
- Automatic adjustment of video skew compensation. No manual adjustment is required.
- Compact! Connect them directly to a PC's keyboard, VGA monitor, and mouse connectors..
- Versions compatible with PS/2, USB, or PS/2 *and* USB keyboards and mice.
- Maximum resolutions of: 1600 x 1280 at 200 feet (60.9 m)
1280 x 1024 at 300 feet (91.4 m)
1024 x 768 at 1,000 feet (304.8m)
- Features keyboard and mouse emulation for hassle-free boot-ups.
- VESA enhanced DDC enables plug-and-play capability.
- LED indicators display remote link and data status.
- Flash upgradeable firmware prevents obsolescence.

4. Models

Transmitters

Receivers

PS/2



USB



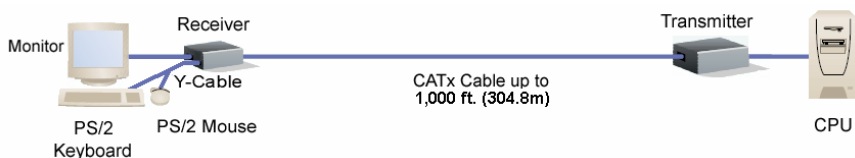
Figure 2. Models

4.1 Cable Requirements

All you need to have your system up and running is the proper length of CATx cable. The transmitter connects directly to a PC and the remote KVM stations keyboard, monitor, and mouse cables connect directly to the receiver.

5. Installation

Installing the ServSwitch Brand Mini KVM Extender is a very easy plug-and-play process. For the PC, PS/2 and USB models simply connect the HD15M connector on the transmitter to the HD15F video out connector on the PC. Connect the PS/2 or USB keyboard and mouse transmitter cables to the corresponding connector ports on the PC. Connect the receiver directly to the keyboard, monitor, and mouse cables used for the KVM station. Using a PS/2 keyboard and PS/2 mouse will require a “Y” cable to connect to the Receiver unit’s single PS/2 port. Connect the power adapter to the receiver unit’s power port. Finally, connect the Transmitter’s RJ45 connector to the receiver’s RJ45 connector using up to 1,000 feet of CATx cable.



5.1 Powering Up the System

It is important to initially apply power, in this order; KVM monitor, the receiver unit, and last, boot the PC. The monitor connected to the receiver unit must be on before power is applied to the receiver for the proper DDC table information to be read from the attached monitor. When the PC is booted, the KVM monitor will display a clear, clean image of the boot sequence.

If you change monitor types, first remove power to the receiver unit, change the monitor, and then apply power to the receiver unit. This insures the receiver and transmitter obtain the correct DDC table from the monitor. It is also recommended that the PC be rebooted when a monitor is changed.

6. Operation

Operation of your system is no different than having your keyboard, monitor, and mouse connected directly to a PC or KVM switch. The only difference is they can be up to 1,000 feet away. You can operate your system normally, programs can be executed, maintenance can be performed, and any operation normally performed can be done with virtually no derogation in video quality and performance.

If your ServSwitch Brand Mini KVM Extender is connected to a ServSwitch, you can access the switch and perform set-up and configuration functions, switch to a computer and fully control that computer.

6.1 Keyboard Commands

The ServSwitch Brand Mini KVM Extender can provide additional information and fine tune the video using simple keyboard commands. To execute a keyboard command (shown below) type and release the attention key, then type the appropriate command key within two seconds.

Command	Description
Left Ctrl, Left Shift, e:	Perform a cable length measurement
Left Ctrl, Left Shift, keyboard +:	Increase the video gain by 1
Left Ctrl, Left Shift, keyboard -:	Decrease the video gain by 1.
Left Ctrl, Left Shift, keypad +:	increase the video equalization by 1
Left Ctrl, Left Shift, keypad -:	Decrease the video equalization by 1
Left Ctrl, Left Shift, k	Saves any changes made
Left Ctrl, Left Shift, r	Re-initialize keyboard and mouse
Left Ctrl, Left Shift, i* (See * Below)	Sends Transmitter, CPLD, and receiver firmware version to a text editor on the CPU the unit is connected. Firmware is reported as follows: Transmitter = hxyy, CPLD = yx, Receiver = dxyy: Where x is a decimal digit, and y is an alphabetic character
Left Ctrl, Left Shift, g* (See * Below)	Send the most recent gain, equalization, cable length, autotdr status, red, green, and blue skew values to a text editor.

* CAUTION: DO NOT EXECUTE THESE COMMANDS WITHOUT A TEXT EDITOR ACTIVE. A text editor such as notepad must be started and selected prior to executing these keyboard commands.

6.2 Keyboard Commands - Country Codes

The following country code table allows you to enter the country code for type of keyboard and operating system used. This function is only required if your operating system is country specific and requires that a keyboard map specific for your operating system be entered. Sun Japanese keyboards and others that require this should enter their country code.

To enter the country code, enter the following key sequence:

Lctrl, Lshift, l, x, Enter, (non-cap L, x)

or

Lctrl, Lshift, l, x, y, Enter,

where X and Y are keyboard numeric keys.

If the country code number is a single digit (0-9), enter one digit (or two digits, ie.06), followed by enter. If the country code is a double digit (10-35), enter both numbers, followed by enter. Each key is pressed and released, and no more than 2 seconds can elapse between any two keys of the sequence, or the command will abort. The command only has to be entered once. ServSwitch™ Brand Mini CAT5 KVM Extender saves the value in flash. The entered value does not change if the unit is flashed with new code.

Code	Country	Code	Country
00	Not Supported	18	Netherlands/Dutch
01	Arabic	19	Norwegian
02	Belgian	20	Persian (Farsi)
03	Canadian-Bilingual	21	Poland
04	Canadian-French	22	Portuguese
05	Czech Republic	23	Russia
06	Danish	24	Slovakia
07	Finnish	25	Spanish
08	French	26	Swedish
09	German	27	Swiss/French
10	Greek	28	Swiss/German
11	Hebrew	29	Switzerland
12	Hungary	30	Taiwan
13	International (ISO)	31	Turkish-Q
14	Italian	32	UK
15	Japan (Katakana)	33	US
16	Korean	34	Yugoslavia
17	Latin American	35	Turkish-F
		36-255	Reserved

7. Flash upgrade procedure

The ServSwitch Brand Mini CATx extender was designed to easily keep up with the ever changing electronic world. The flash feature of the ServSwitch Brand Mini CATx extender means the product will always be up to date with new technologies, features, and enhancements.

Updating the flash memory is an easy process using Black Box's flash utility. The universal flash utility is easily installed and can be used on a variety of Black Box products. When executed, the flash program will automatically detect the product type to flash, validate the connections, and verify the product firmware version.

To flash update the ServSwitch Brand Mini CATx extender firmware you will need the flash utility program, the firmware update file, and the flash update cable (DB9 to RJ45). The flash utility and current firmware file for the ServSwitch Brand Mini CATx extender can be downloaded from our web site.

After downloading the flash utility program and the firmware update file, execute the program "SetupBBKVMUtil-x_xx.exe" (x_xx = version level) to install the flash utility program. Installation and set-up follow the standard Windows® installation procedure. Follow the on-screen instructions to properly install the flash utility.

When installation of the flash utility is complete, connect the ServSwitch Brand Mini CATx extender receiver unit's RJ45F (Link) connector to the serial port (Com1/DB9M) on the PC the flash utility program was installed on using the flash utility cable. Connect the power adapter to the ServSwitch Brand Mini CATx extender receiver unit and apply power.

With all cable connections in place and the flash utility installed, execute the flash program "...Black Box KVM Utility\KVMUtility.exe". Depending on the installation options chosen, you can execute the utility by clicking on the Black Box KVM Utility Icon from the desktop, Start Menu, or Quick Start toolbar. The utility program, when executed, will automatically start scanning for a connected supported Black Box product (ServSwitch Brand Mini CATx extender receiver). The utility program will automatically start scanning COM1 and the PS/2 port for a supported device. If a supported device is not found on COM1 or the PS/2 port, the program will display the information. To exit, press any key.

If the product has been connected to a port other than COM1, don't exit the utility program but modify the port to scan by clicking on "File" then "Scan for Device On". Next, click on the down arrow(s) to select a different COM port or change the serial parameters as shown in Figure 3

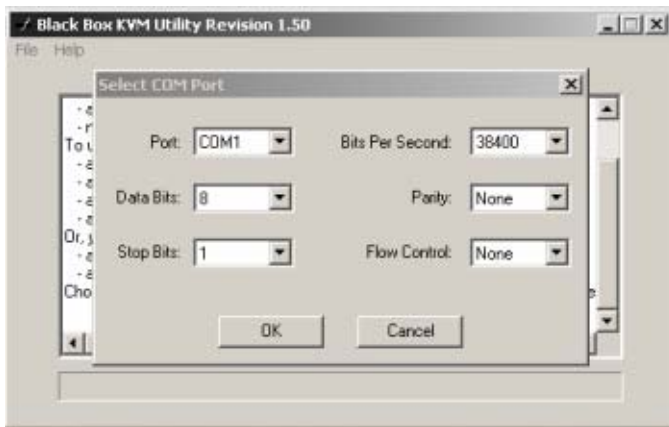


Figure 3. Change scan ports

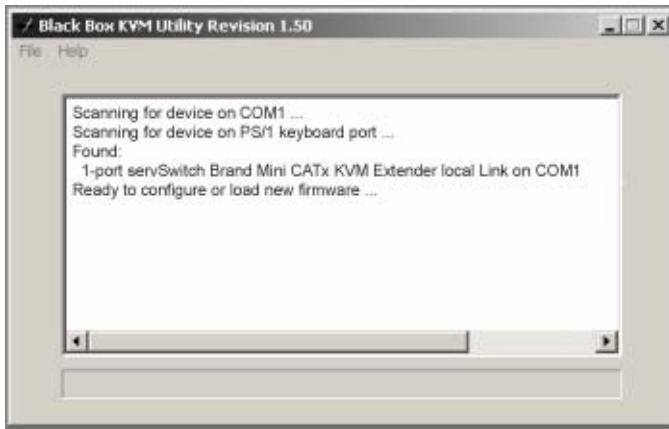


Figure 4. Found scanned device

Upon successfully scanning and identifying a supported device, the detected information shown in Figure 4 will display showing the product type and the port it is connected to. The ServSwitch Brand Mini CATx extender is ready to flash with the new firmware.

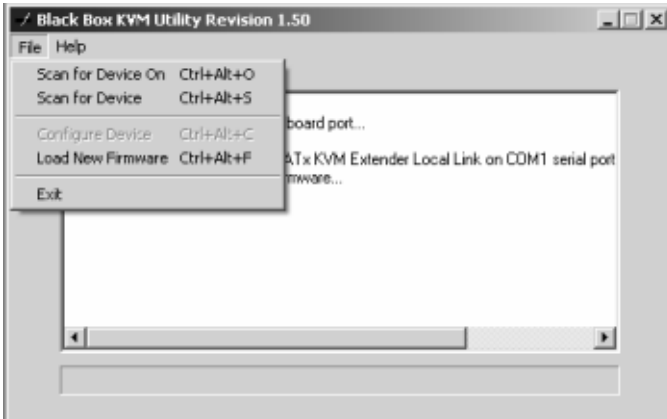


Figure 5. Flash scan

To load the updated firmware to the ServSwitch Brand Mini CATx extender, click on “File”, then “Load New Firmware”. Select the downloaded firmware update file to load. This will be a file with .hex file extension. Figure 6 shows the flash update screen which shows the progress and, when finished, the status of the flash process. When the message “New firmware successfully loaded on device” displays, the ServSwitch Brand Mini CATx extender product is updated and ready to use with the updated firmware.

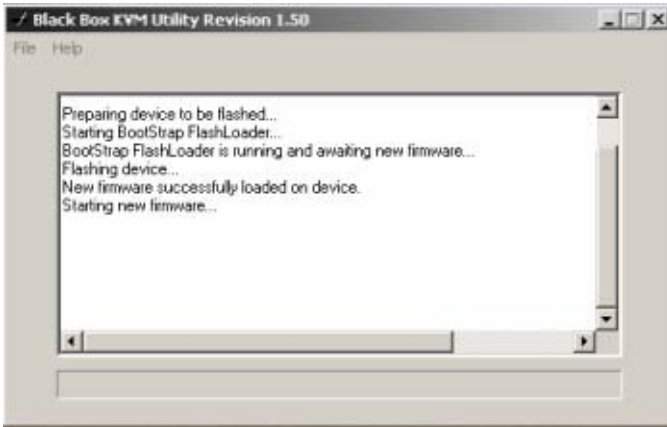


Figure 6. Firmware update screen

Click on “Help” for additional information and examples.

8. Troubleshooting

The troubleshooting section is used as a guide to understanding the capabilities of the ServSwitch Brand Mini KVM Extender and for general troubleshooting. If you have any problems or questions concerning the installation, operation or usage of the ServSwitch Brand Mini KVM Extender that is not covered in this manual, please contact Black Box for technical support.

- **No video on the receiver monitor**
 - Check CATx connection at the receiver, transmitter, patch panels (if applicable)
 - Check HD15 video connection at the receiver and transmitter
 - Verify video is present at the video card output
- **Monitor resolution settings can not be set for the monitor used**
 - This generally occurs when power is applied to the receiver unit and the attached monitor's power is OFF. To correct this, remove power from the receiver unit. Apply power to the attached monitor with power OFF on the receiver unit. Next apply power to the receiver unit and boot the PC. The attached monitor capabilities will be detected and usable.
- **Keyboard has no effect**
 - Keyboard and mouse cables reversed at the PC
 - Check keyboard cable connection at the Receiver
- **Mouse erratic or not functioning**
 - Mouse and keyboard cables reversed at the PC
 - Check mouse cable connection at the Receiver
- **No video, keyboard or mouse functions**
 - Check all cable connection at the Receiver
 - Check all cable connections at the Transmitter
 - Check RJ45 connector LEDs. If the green and yellow LEDs are alternately flashing, the firmware has become corrupt and the unit must be flashed. This can occur if a power loss occurs during the flash procedure.
- **No mouse functions, keyboard functions ok**
 - On some keyboards with integrated trackball mouse, if you connect a separate USB mouse, it must be connected first, then the USB keyboard with the integrated mouse.

9. Service

9.1 Calling Black Box

If you determine that your ServSwitch Brand Mini KVM Extender is malfunctioning, *do not attempt to alter or repair the unit*. It contains no user-serviceable parts. Call 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;
- 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.

9.2 Shipping and Packaging

If you need to transport or ship your ServSwitch Brand Mini KVM Extender.:

- Package it carefully. We recommend that you use the original container.

10. Part Numbers

Part Number	Description
ACU7001A-L	PS/2 Local unit, CPU to Remote station
ACU7001A-R	PS/2 Remote unit, CPU to Remote station
ACU7009A-L	USB Local unit, CPU to Remote station
ACU7009A-R	USB Remote unit, CPU to Remote station
EYN840A	CAT5 UTP cable

Notes:

Notes: