

APRIL 2002

*Installation Guide for
ServSwitch™ Brand
CAT5 KVM Extender
Standalone Remote Units
and Remote Hubs*



**ACUREM
ACUMREM
ACUSREM
ACUVREM
ACUWREM
ACUREMSW
ACU1006MRA
ACU1006MRVA**

 **BLACK BOX**
NETWORK SERVICES

Welcome to the ServSwitch™ Family!

Thank you for purchasing a BLACK BOX® ServSwitch™ Brand CAT5 KVM Extender model! We appreciate your business, and we think you'll appreciate the many ways that your enhanced keyboard/video/mouse 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 installation guide will tell you how to configure and install your new ServSwitch™ Brand CAT5 KVM Extender Standalone Remote Unit or Remote Hub. For an introduction to the Remote Unit or Remote Hub, see **Chapter 2**. The Extender Standalone Remote Unit and Remote Hub product codes covered in this guide are:

ACUREM
ACUMREM
ACUSREM
ACUVREM
ACUWREM
ACUREMSW
ACU1006MRA
ACU1006MRVA

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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.

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This is a class A product. In a domestic environment, this product might cause radio interference, in which case the user might be required to take adequate remedial measures.

This product complies with the following harmonized standards:

- EN55022 (1994), EN55024 (1998)
- EN61000-3-2 (1995), EN61000-3-3 (1995), EN60950 (2000)

When you use this product in environments that have high levels of electromagnetic interference, you might experience some slight disturbance in its operation. If this occurs, please refer to the Troubleshooting chapter of this installation guide or call technical support.

To maintain compliance, use only cables supplied (or recommended) for use with this product.



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

- Cable Required:** Between Remote and Local: Category 5 solid unshielded or shielded twisted pair (UTP or STP), wired to the EIA/TIA-568A or (preferred) -568B standard, terminated with RJ-45 male connectors; for pinning/pairing, see **Appendix A**
- Compliance:** CE Class A, FCC Part 15 Subpart B Class A, IC Class/classe A
- Compatibility:** Video: VGA, SVGA, XGA, XGA-2, or RGsB (sync on green), although if your system has monitor ID-bit requirements, you might need to call Black Box for technical support;
 Keyboard: IBM PC/AT® or PS/2® compatible (PC/AT types require connector adapter);
 Mouse: IBM PS/2 compatible two-button, Microsoft® IntelliMouse®, or Logitech® PS/2 compatible 3-button
- Interfaces:** Between Locals and Remotes: Proprietary composite of all supported types of computer I/O;
 To attached user-station equipment:
 Depending on the type of unit, either separate or proprietary composite VGA video and IBM PS/2 compatible keyboard and mouse;
 KVM/Serial and KVM/Serial/Audio Remotes only:
 EIA/TIA RS-232, DTE;
 KVM/Serial/Audio Remotes only: Bidirectional 3.5-mm mini stereo audio
- Video Bandwidth (to -3 dB):** All non-Micro models:
 Intrinsic: 300 MHz;
 Across 100 meters (330 feet) of UTP: 95 MHz (with equalization)

- Resolution:** With Micro Remotes: Up to 1280 x 1024 noninterlaced;
With other types of Remotes:
Up to 1600 x 1280 noninterlaced at up to 60 m (200 ft.);
Up to 1280 x 1024 noninterlaced at up to 120 m (400 ft.);
Up to 1024 x 768 noninterlaced at up to 300 m (1000 ft.)
- Video I/O**
- Signal Levels:** 0.7 volts peak-to-peak
- Video Compensation:** With Micro Remotes: For short- or long-distance (user-switchable);
With other types of Remotes: 3-stage continuously variable
- Synchronization:** H/V or composite, TTL signal levels; sync polarity is preserved
- Video Coupling:** DC
- Serial Characteristics:** KVM/Serial models:
Data rate: 9600 or 19,200 bps (user-selectable); can also be set to 1200 bps (see **Appendix C**);
Data format: 8 data bits, no parity, 1 stop bit (fixed);
Flow control:
Hardware: RTS/CTS passed through or looped back, DTR/DSR passed through or looped back, or none (user-selectable);
Software: Transparent to software flow control;
KVM/Serial/Audio models:
Data rate: Transparent to data rates up to 19,200 bps;
Data format: Transparent to data format;
Flow control: Transparent to hardware and software flow control (RTS, CTS, DTR, and DSR are all passed through across the link)

Audio

Characteristics: KVM/Serial/Audio models:
 Signal format: Digitized at almost CD quality (16-bit sampling at 38.4 kHz);
 Signal levels: Line level (5 volts peak-to-peak maximum);
 Input impedance: 47 k Ω ;
 Signal direction: Simultaneous bidirectional;
 Extra microphone support at Remote Unit: Pullup resistor provides bias for condenser microphone; optional amplification to +17 dB for external microphone

Maximum

Distance: 5 m (16 ft.) from the Remote to the attached remote equipment;
 50 m (160 ft.) between a Local and a Micro Remote;
 300 m (1000 ft.) between a Local and any other type of Remote

NOTE

With high-quality cables, it might be possible to run farther than 5 m (16 ft.) from the Remote Unit to attached equipment.

User Controls:

All full-size (non-Micro) Remotes:
 (2) Front-mounted dials: Brightness and Focus;
 (3) Internal video-distance (cable-length) jumpers;
 (1) Internal 4-position DIP switch for various options;
 ACUMREM, ACUWREM: (1) Bottom-mounted 2-position DIP switch for video distance (cable length) and keyboard-command recognition;
 ACU1006MRA, ACU1006MRVA: (6) Internal 2-position DIP switches for video distance (cable length) and keyboard-command recognition, (1) for each Local-to-Remote link;
 ACUSREM only:
 (1) Internal data-rate jumper;
 (1) Internal flow-control jumper block;
 ACUVREM, ACUWREM:
 (1) Internal microphone-amplification jumper;
 ACU1006MRVA only:
 (6) Internal microphone-amplification jumpers,
 (1) for each Local-to-Remote link

Indicators:	None
Connectors:	Remote Units support (1) user station and Local-to-Remote link, Remote Hubs support (6); On the right side of ACUREM, on the front of all other models: (1) RJ-45 female for each Local-to-Remote link; On the right side of ACUREM, on the rear of all other models: (1) 2.5-mm center-positive barrel jack for power; On the left side of ACUREM, on the rear of all other models: (1) HD15 female for video output to each user station's monitor; (2) 6-pin mini-DIN female for input from each user station's keyboard and mouse; On the rear of each KVM/Serial and KVM/Serial/Audio model: (1) DB9 male for serial I/O to/from each user station's RS-232 device; On the rear of each KVM/Serial/Audio model: (2) 3.5-mm mini stereo jacks for each user station: (1) for speaker/headphone output, (1) for microphone input; On the rear of each ACUREMSW only: (1) DB25 female for composite I/O to/from the keyboard, mouse, and video ports of the remote CPU
Temperature Tolerance:	32 to 104°F (0 to 40°C)
Humidity Tolerance:	5 to 90% noncondensing
Enclosure:	Steel

Power: From desktop power supply (certified to the relevant international safety standards):
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 (isolated from mains ground): 9 VDC regulated, at up to 1 amp, from transformer to Remote Unit

CAUTION!

If you ever need to replace the Remote Unit's power supply, the replacement power supply must have identical output characteristics. Using a power supply with different output—even if it's "almost the same"—could damage your equipment.

Size: ACUMREM: 1.1"H x 4.4"W x 3.3"D (2.8 x 11.2 x 8.4 cm);
ACUWREM: 1.7"H x 4.4"W x 3.3"D (4.3 x 11.2 x 8.4 cm);
ACUVREM: 1.75"H (1U) x 7.7"W x 4"D (4.4 x 19.6 x 10.2 cm);
ACU1006MRA and ACU1006MRVA: 1.75"H (1U) x 17.25"W x 4.2"D (4.4 x 19.6 x 10.2 cm); rear-panel connectors protrude an additional 0.2" (0.5 cm);
All other models: 1.4"H x 7.7"W x 4"D (3.6 x 19.6 x 10.2 cm)

Weight: ACUMREM: 8.3 oz. (235 g);
ACUREMSW: 1.4 lb. (0.6 kg);
ACU1006MRA and ACU1006MRVA: 4 lb. (1.8 kg);
All other models: 1.1 lb. (0.5 kg)

2. Introduction

NOTE

There are a large number of different models in the Rackmount Extender series. If you ever need a quick rundown of the features of any particular model, refer to Appendix E.

You can use a ServSwitch™ Brand CAT5 KVM Extender Standalone Remote (Remote Unit or Remote Hub) with one of several types of Extender Locals (Local Units or Local Hubs) to extend the distance from a PC-compatible CPU to user equipment including a VGA monitor, keyboard, and mouse across as much as 300 meters (1000 ft.) of industry-standard Category 5 UTP or STP 4-pair cable.

This installation guide describes how to install six types of Extender Standalone Remote Units: non-serial KVM (product code ACUREM), non-serial KVM Switching (ACUREMSW), non-serial KVM Micro (ACUMREM), KVM/Serial (ACUSREM), KVM/Serial/Audio (ACUVREM), and KVM/Serial/Audio Micro (ACUWREM). It also describes how to install two types of 6-Port Extender Remote Hubs: non-serial KVM Micro (ACU1006MRA) and KVM/Serial/Audio Micro (ACU1006MRVA).

CAUTION!

There are three main varieties of CAT5 KVM Extender equipment: non-serial, KVM/Serial, and KVM/Serial/Audio. Do *not* connect Locals of one variety to Remotes of a different variety. Extender systems with mismatched Locals and Remotes *do not work*.

- One or two ACU1006MRA Remote Hubs, or two or more ACUREM, ACUREMSW, or ACUMREM Remote Units, can be used with a 6-Port (ACU1006RA) or 12-Port (ACU1012RA) Single-Access Rackmount ServSwitch™ Brand CAT5 KVM Extender Local Hub so that you can keep multiple CPUs in a central location and control them using user stations that are clustered (with Remote Hubs) or kept in widely separated locations (with Remote Units). The ACUREM, ACUMREM, and ACU1006MRA can also be used for this purpose with a 6-Port Dual-Access Extender Hub (ACU1006DRA). The ACUSREM KVM/Serial Remote Unit can be used in the same way with the 6-Port Single-Access (ACU1006SRA) or Dual-Access (ACU1006DSRA) KVM/Serial Extender Hub. The ACUVREM KVM/Serial/Audio Remote Unit and ACU1006MRVA KVM/Serial/Audio Remote Hub can be used in the same way with the 6-Port Single-Access KVM/Serial/Audio Hub (ACU1006VRA).

- A regular ACUREM Remote Unit can also replace the one that came with your Single-Access (ACU1001A) or Dual-Access (ACU1009A) ServSwitch™ Brand CAT5 KVM Extender. An ACUMREM Remote Unit can replace the one that came with your Single-Access (ACU3001A) or Dual-Access (ACU3009A) KVM Micro Extender. An ACUSREM KVM/Serial Remote Unit can replace the one that came with your Single-Access (ACU1002A) or Dual-Access (ACU1008A) KVM/Serial Extender. An ACUVREM KVM/Serial/Audio Remote Unit can replace the one that came with your Single-Access (ACU1022A) or Dual-Access (ACU1028A) KVM/Serial/Audio Extender. An ACUWREM KVM/Serial/Audio Micro Remote Unit can replace the one that came with your Single-Access (ACU3022A) KVM/Serial/Audio Micro Extender.
- You can use one Remote Hub to replace several Remote Units in different Extender systems, so that multiple Local Units in different locations can be controlled from a centralized group of user stations (or a single user station on a KVM switch). Use an ACU1006MRA KVM Remote Hub to control CPUs attached to any mix of non-serial KVM and KVM Micro Local Units (ACU1001A, ACU1009A, ACU3001A, and/or ACU3009A). Use an ACU1006MRVA to control CPUs attached to any mix of full-size KVM/Serial/Audio and KVM/Serial/Audio Micro Local Units (ACU1022A, ACU1028A, and/or ACU3022A).
- With any of the Local types mentioned in the previous paragraphs, it is possible to connect different Remotes at different times in order to create a “switched” KVM-extension system with multiple user stations. You can do this by moving cable between patch-panel ports or directly between Remotes, though you should do this as infrequently as possible to avoid wearing out the connectors on your cable and devices. Or you can use a CAT5 switch, but the switch must carry all eight wires (maintaining the twists between the wire pairs) and must have enough bandwidth to support your system’s video demands. Please call Black Box Technical Support to discuss your application before installing such a system.
- As the ServSwitch™ Brand CAT5 KVM Extender product line grows, Remotes might also be usable with other types of Locals. Call Black Box Technical Support if you’re not sure whether you can use your Remote with a particular type of Extender Local.

At the time of this writing, these items should be included with your Extender Standalone Remote package:

- (1) Remote Unit or Remote Hub.
- (1) 9-VDC, 1-amp power-supply transformer and output cord.
- (1) Input cord for the power supply, suitable for your country or region.
- (1) Copy of this installation guide.
- *Switching Remote Unit (ACUREMSW) only:* (1) 1-m (3.3-ft.) three-to-one CPU KVM-extension cable that will run from the Remote Unit to the remote CPU. This cable has a DB25 male connector on the Extender end and an HD15 male and two 6-pin mini-DIN male connectors on the CPU end.
- *Remote Hub (ACU1006MRA and ACU1006MRVA) only:* (2) Rackmount brackets for mounting the Remote Hub in a standard 19" rack (see **Appendix B**).

The components of the Extender package are, however, subject to change without notice.

Please contact Black Box right away if any of these items are damaged when you receive them.

3. Configuration

The users' manuals for the various ServSwitch™ Brand CAT5 KVM Extender systems and/or their Locals identify the cables you'll need to connect various types of equipment to the system, so this guide will only deal with configuring the Remotes and attaching devices directly to them.

The two-position DIP switches on the Micro Remotes are external; see **Section 3.1**. All of the Remote's other configuration controls are internal, but should only need to be set once; see the relevant sections starting with **Sections 3.2**. To get at them, first open the Remote by unscrewing the four screws on its case and lifting off the top half of the case. When you've finished setting the configuration jumpers and switches as described in the rest of this chapter, close the Remote by replacing the top half of the case and screwing the screws back in.

CAUTION!

The Remote's circuit boards can be damaged by static electricity, so take every reasonable precaution against it. At the very least, discharge yourself on a metallic surface before opening it; if possible, stand on an anti-static mat and wear a grounding strap or anti-static gloves.

3.1 Setting the 2-Position DIP Switch on the Micro Remotes

There's a two-position DIP switch on the bottom of the ACUMREM and ACUWREM Micro Remote Units, and there are six of these two-position DIP switches on the bottom of the ACU1006MRA and ACU1006MRVA Extender Micro Remote Hubs. Position 1 of each switch governs the Micro Remote's video equalization for that link, while position 2 controls how the Micro Remote handles keyboard-command recognition:

- **Position 1 (video equalization):** The Micro Remote contains video-equalization circuitry which compensates for the loss in image quality that occurs when you drive video across cables longer than 25 m (80 ft.). If you'll be running cable to such distances between your Local and the Micro Remote, you need to configure the Extender for extra equalization before you install it.

To do this, set position 1 of the Remote's DIP switch for that link to UP (OFF) if you'll be running cable for that link up to (but not more than) 25 m (80 ft.). To boost the equalization if you'll be running cable between 25 and 50 m (80 and 160 ft.), move position 1 to the DOWN (ON) setting.

If you are not running the cable too far but your video looks bad no matter how you set this DIP switch, the problem is almost certainly being caused by one of two things. First, check your interconnect-cable routing—does the cable pass close to a motor, generator, fluorescent lights, etc.? Second, check the

wiring of the interconnect cable. Compare its pinning and pairing with those shown in **Appendix A**. (Please realize that signal equalization cannot be exact; regardless of the setting of this DIP switch, the remote video image might never appear quite as sharp as it would appear with the monitor directly attached to the CPU.)

- **Position 2 (keyboard-command recognition):** The function of this position depends on which type of Micro Remote you have:
 - On the ACUMREM and ACU1006MRA, position 2 controls how the Remote handles [Scroll Lock]. Normally, pressing [Scroll Lock] on the Micro Remote's attached keyboard causes the Extender to reset itself or, in Dual-Access systems, to go into Private Mode. But the Extender treats this keypress as a command and absorbs it, so there's no way to send [Scroll Lock] to the PC or KVM switch attached to the corresponding CPU port on the Extender's Local.

Leave position 2 of the Micro Remote's DIP switch 2 in the factory-default UP (OFF) setting if [Scroll Lock] isn't necessary for your application and can continue to be used to trigger reset/Private Mode on that Local CPU port. If you need to be able to use the [Scroll Lock] key for something else on that port, move position 2 to the DOWN (ON) setting to disable reset and Private Mode and cause the Extender to pass [Scroll Lock] through to the attached PC or switch.
 - On the ACUWREM and ACU1006MRVA, position 2 controls the Remote's keyboard-command hotkey, the character that you can send from that link's attached keyboard to cue the Extender to expect to receive a command. Each time you press the hotkey, it will be absorbed by the Extender if it's followed by a valid command character.

The hotkey can be either left-[Ctrl] or right-[Ctrl]. In position 2's factory-default OFF setting, right-[Ctrl] is the hotkey. But you might want to use left-[Ctrl] for a particular link instead, particularly if (a) a KVM switch you'll be attaching to its CPU port uses right-[Ctrl] as *its* command hotkey, or (b) a computer you'll be attaching to the Extender is a workstation such as a Compaq Alpha, HP, etc. (Instead of a standard right-[Ctrl] key, these workstations' keyboards have a [Compose] key, which shouldn't be absorbed by the Extender because it's required for use with some of the software written for these workstations.) To have a link use left-[Ctrl] for its hotkey, move position 2 to ON. (If neither right- nor left-[Ctrl] are suitable for this purpose in your application, please call Black Box Technical Support.)

3.2 Setting the Cable-Length Jumpers in All Non-Micro Remote Units

The full-size (non-Micro) Remote Units contain video-equalization circuitry which compensates for the loss in image quality that occurs when you drive video across long cables. With cables in the neighborhood of 300 meters (1000 feet) long, this loss is considerable.

There are three jumpers on the main circuit board of these Remote Units that you can use to select an equalization-adjustment range appropriate to the length of the interconnect cable you'll be running between the Remote Unit and the Local. (Figure 3-1 on the next page shows where these jumpers are.) Once you set them, you can alter the compensation level with the two rotary controls on the Remote Unit's front panel while the Extender is operating in order to "tune in" the image more precisely (see **Section 4.4**).

The three cable-length jumpers should be set as follows (*all three jumpers must be set the same way*):

Cable Length in Meters (Feet)	Jumper Position
0 to 100 (0 to 330)	Off  (factory default)
100 to 200 (330 to 655)	A 
200 to 300 (655 to 1000)	B 

NOTE

If you will be running cable to near the limit of one of these cable-length ranges, say as far as 80 m (260 ft.), and you will be using high-resolution (1024 x 768 or higher) video, you might be able to achieve more accurate video compensation (see Section 4.4) by selecting the higher cable length range (the 100-to-200-m range in this case).

If you are conducting a same-room test prior to your final installation, as we recommend—see the "Test-Placing the Extender" section in the users' manual for your Extender system—set the jumpers as appropriate for the length of the test cable first; then, if the Units pass the test, reset the jumpers for your actual installation length.

SERVSWITCH™ BRAND CAT5 KVM EXTENDER STANDALONE REMOTES

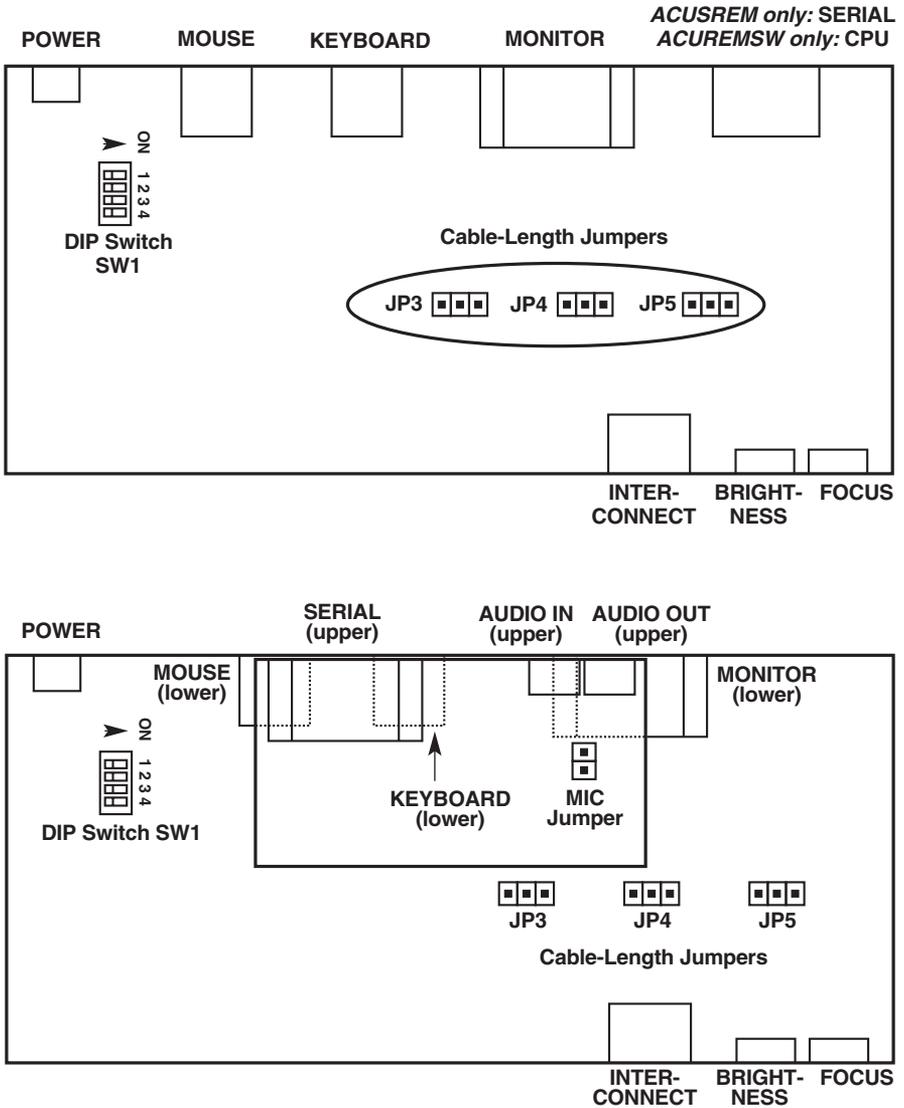


Figure 3-1. The full-size Remote Units' PCBs (main PCB of all but the KVM/Serial/Audio shown at top, main PCB and audio daughtercard of the KVM/Serial/Audio below), showing the jumpers and DIP switch.

3.3 Setting the 4-Position DIP Switch in All Non-Micro Remote Units

You'll also find a four-position DIP switch labeled SW1 on the main circuit board inside the full-size (non-Micro) Remote Units. The functions of this DIP switch are different for different Extender models.

3.3.1 ACUREM AND ACUSREM

For ACUREM and ACUSREM, position 4 of this switch is usable in all applications, but do *not* change the settings of positions 1 through 3 of this switch unless you are using the Remote Unit in a Dual-Access (ACU1006DRA or ACU1006DSRA) system. Each position controls a configuration setting that will apply to the Remote Unit's attached remote user station and (in Dual-Access systems) any corresponding local user station:

- **Position 1 (Dual-Access systems only):** When position 1 (the topmost jumper, or the leftmost if you hold the Remote Unit by its left end) is in its factory-default OFF setting, the remote monitor attached to that Remote Unit is blanked while the Extender is in Private Mode for the corresponding CPU, so that users at the remote station can't see what the user at the local station is doing. However, if you want to prevent the remote monitor from being blanked during Private Mode—so that users at the remote station can still see what's going on—set position 1 to ON.
- **Position 2 (Dual-Access systems only):** When position 2 (the second one from the top, or second from the left if you hold the Remote Unit by its left end) is in its factory-default ON setting, the inactivity timeout for the corresponding CPU is set to two seconds: Once the local or remote keyboard and mouse have been idle for two seconds, the user at the other station can take control of the CPU. If you suspect that the system will be switched too quickly with that setting, move position 2 to OFF to set the timeout to 15 seconds instead.

KVM/Serial systems only: Note that serial activity or inactivity has no effect on the inactivity timeout; KVM switching will take place without regard for (or effect on) serial transmissions.

- **Position 3 (Dual-Access systems only):** When position 3 (the third one from the top, or third from the left if you hold the Remote Unit by its left end) is in its factory-default ON setting, Extender users have to press a key on their keyboard to take control of their CPU when it becomes idle. If you want users to be able to take control by typing at their keyboard *or* by moving their mouse, move position 3 to OFF.

KVM/Serial systems only: The remote user can send or receive serial data while the local user is in KVM control (active or idle), but this *won't* cause KVM control to be switched to the remote user.

- **Position 4:** When position 4 (the bottom one, or the rightmost one if you hold the Remote Unit by its left end) is in its factory-default ON setting, the Extender resets the keyboard and mouse at your station (and at your station *only*) when you press [Scroll Lock]. But if you need the [Scroll Lock] key for some other function, you can force the Extender to pass [Scroll Lock] through to the corresponding PC—disabling the reset function for that PC—by setting position 4 to OFF.

Be aware that in a Dual-Access Extender system, disabling Scroll-Lock reset *also* affects the *local station's* keyboard and mouse, and disables Private Mode for that CPU as well.

3.3.2 ACUREMSW AND ACUVREM

For ACUREMSW and ACUVREM, only position 2 of this DIP switch is meaningful; don't change the settings of any of the other switch positions. (Position 2 is the second one from the top, or second from the left if you hold the Remote Unit by its left end.) This setting applies to the the Remote Unit's attached remote user station and (in Dual-Access systems) any corresponding local user station. It controls the Extender's keyboard-command hotkey, the character that you can send from either attached keyboard to cue the Extender to expect to receive a command. Each time you press the hotkey, it will be absorbed by the Extender if it's followed by a valid command character.

The hotkey can be either left-[Ctrl] or right-[Ctrl]. In position 2's factory-default OFF setting, right-[Ctrl] is the hotkey. But you might want to use left-[Ctrl] instead, particularly if (a) a KVM switch you'll be attaching to this Extender link's CPU port uses right-[Ctrl] as *its* command hotkey, or (b) a computer you'll be attaching to this Extender link's CPU port is a workstation such as a Compaq Alpha, HP, etc. (Instead of a standard right-[Ctrl] key, these workstations' keyboards have a [Compose] key, which shouldn't be absorbed by the Extender because it's required for use with some of the software written for these workstations.) To have the Extender use left-[Ctrl] for its hotkey, move position 2 to ON. (If neither right- nor left-[Ctrl] are suitable for this purpose in your application, please call Black Box Technical Support.)

3.4 Setting the Data-Rate Jumper in the ACUSREM

There's also a daughtercard inside each ACUSREM KVM/Serial Remote Unit, shown in Figure 3-2, that—together with a matching card in the Local—controls serial communication. In the Remote Unit, this daughtercard has a pair of jumper posts labeled “Baud” that control the data rate of the serial link. In their factory-default state, there is no jumper linking these two posts; in this setting, the data rate is 9600 bps. If you want the link to operate at 19,200 bps instead, install a jumper on these posts.

CAUTION!

Do not change the settings of any of the jumpers or headers on this daughtercard except for this data-rate jumper and the flow-control jumpers discussed in the next section.

NOTE

It is possible to set a KVM/Serial Extender system to operate at 1200 bps in order to support *some* of the devices that run at this speed, including some industrial trackballs. See Appendix C.

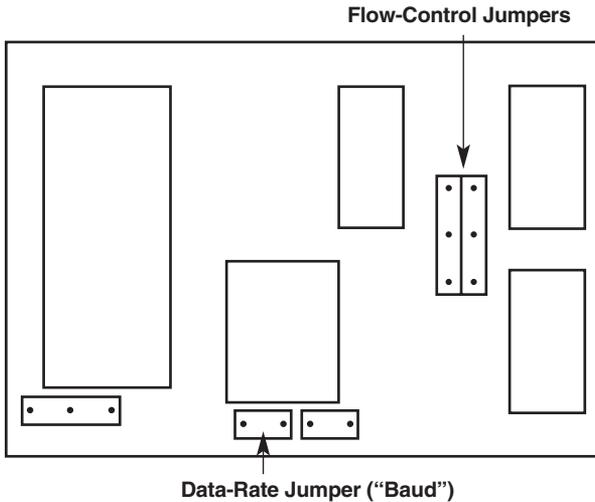


Figure 3-2. The serial daughtercard and its controls.

3.5 Setting the Flow-Control Jumpers in the ACUSREM

Most applications for the serial connection in KVM/Serial Extender systems won't require hardware flow control. However, some PCs still need to see active flow-control signals in order for their serial ports to function, so the Extender's factory-default setting for hardware flow control is "all signals looped back." If you need a different setting, the serial daughtercard in the ACUSREM Remote Unit has a series of jumpers that allow you to select either RTS/CTS or DTR/DSR flow control, or to loop back one pair of signals but not the other.

Figure 3-2 on the previous page shows the daughtercard, and Figure 3-3 on the next page shows how the flow-control jumpers should be set for various handshaking options. (You must set the flow-control jumpers on the matching daughtercard in the Local the same way.) Please call Black Box Technical Support if you're unsure what kind of flow control your application will call for.

3.6 Setting the Microphone-Amplification Jumper in the KVM/Serial/Audio Remotes (Not Normally Necessary)

All sound cards that we have tested so far with the KVM/Serial/Audio Extenders are able to amplify the incoming signal from a microphone—the card should be set to amplify the signal by +20 dB. If the sound card of the computer you'll be attaching can do this, or if the microphone itself has on-board amplification, you can skip ahead to **Chapter 4**.

However, if you'll be attaching both (a) a microphone that can't amplify itself and (b) a sound card or audio device that can't amplify the microphone's signal, you'll have to set the KVM/Serial/Audio Extender to do the amplification by installing a jumper on the jumper posts labeled "MIC" mounted on the audio daughtercard for that microphone's Extender link. There's one daughtercard inside the ACUVREM Remote Unit (see Figure 3-1 in **Section 3.2**) and the ACUWREM Remote Unit; there are six daughtercards (one for each link) inside the ACU1006MRVA Remote Hub. Once you install a jumper on the MIC jumper posts for a particular link (there should already be a jumper "hanging off" one of the posts that you can use), the Extender will amplify that link's incoming microphone signal by +17 dB.

For microphone-installation directions, see **Section 4.2.1**.

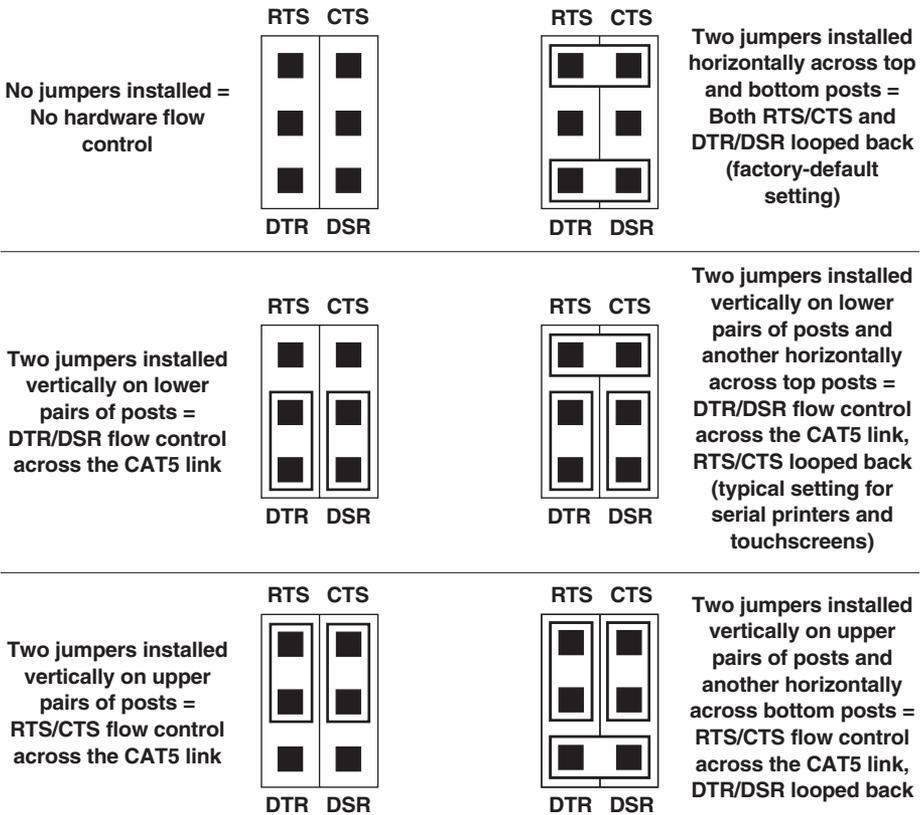


Figure 3-3. Flow-control jumper settings.

4. Installation and Adjustment

To install your ServSwitch™ Brand CAT5 KVM Extender Standalone Remote Unit, first test-place it (if you want to) as described in **Section 4.1**, then attach devices as described in **Section 4.2**, then finish your installation as described in **Section 4.3**. Lastly, adjust the video compensation of any full-size (non-Micro) model as described in **Section 4.4**.

4.1 Test-Placement (Optional)

Refer to the users' manual for your Extender system for a full system-installation procedure, including descriptions of the cables and adapters you'll need. We recommend testing your Extender system with a test setup confined to a single room; that way, if any components are bad, you can find out before you run cable halfway across your campus. If you want to do this, gather your equipment in your test site; otherwise, place the Extender's Remote(s) and Local(s), and the equipment you'll be attaching to them, in your desired locations. (If you'd like to rackmount a full-size [non-Micro] Remote Unit, see **Appendix B**.)

4.2 Attaching Devices

For instructions on making device connections, refer to these subsections:

- **Section 4.2.1** for the special considerations involved in making audio connections in a KVM/Serial/Audio system.
- **Section 4.2.2** for attaching a CPU to the CPU port on an ACUREMSW Switching Remote Unit.
- **Section 4.2.3** for attaching a KVM switch to the CPU port on an ACUREMSW Switching Remote Unit.
- **Section 4.2.4** for attaching a monitor, keyboard, mouse, etc., to the user port on a Remote Unit.
- **Section 4.2.5** for attaching a KVM switch to the user port on a Remote Unit.

To attach a serial device to a KVM/Serial or KVM/Serial/Audio Remote Unit, follow the instructions in **Section 4.2.4**. Also refer to that section to attach an audio device to a KVM/Serial/Audio Remote Unit. Because few KVM switches handle serial communication in a way that's compatible with the KVM/Serial Extender, we generally don't recommend attaching KVM switches to it. (One exception is the ServSwitch Multi; to attach it to the KVM/Serial or KVM/Serial/Audio Extender, follow the instructions in **Section 4.2.3** or **4.2.5**.)

If you're attaching a ServSwitch family KVM switch, refer to the users' manual for your Extender system for descriptions of which switches belong in which category.

As you attach devices to the Remote Unit, here are some things you'll want to keep in mind:

- *Use caution if you are attaching KVM switches:* Different ServSwitch family KVM switches use different proprietary signaling between cascaded switch units. The only ServSwitch family switch models whose cascade signals the Extenders can carry are the models with a regular ServSwitch style DB25 composite interface (see the list in your Extender system's manual), so these are the only models for which you can install an Extender link between two cascaded (master and submaster) switch units.

Under no circumstances should you ever try to use an Extender to connect two incompatible ServSwitch units. Having an Extender between them will not make them compatible.

- Each powered device should be powered OFF when you attach it.
- Make sure you don't attach your keyboard and mouse, or the keyboard and mouse strands of any multi-stranded cable, backwards. (Fortunately, the strands of most multi-stranded cables used with the Extender are fairly easy to identify: The keyboard strand is usually orange or purple and labeled with a "K" or a picture of a keyboard, while the mouse strand is usually green and labeled with an "M" or a picture of a mouse.)
- The 3.5-mm stereo "audio in" and "audio out" connectors on the various Remotes will be labeled differently, but "audio in" will always be associated with the word "In" and "audio out" will always be associated with the word "Out."
- If you run audio cables to and from a KVM/Serial/Audio model, make sure to run from the "audio out" connector on the device to the "audio in" connector on the Extender Remote, and from "audio in" or "microphone" on the device to "audio out" on the Extender Remote.

4.2.1 SPECIAL CONCERNS ABOUT CONNECTING AUDIO DEVICES TO THE KVM/SERIAL/AUDIO EXTENDER

Before you connect any sound equipment to the KVM/Serial/Audio Extender, here are some things you should keep in mind:

The Extender's audio interface is stereo, bidirectional (sound can be transmitted in both directions across the link at the same time), and line-level (it supports devices that transmit and receive at up to 5 volts peak-to-peak). In the output ("line out") direction, it's designed to take the output from a computer's sound card or other line-level source and send it to a set of powered speakers at the remote site. In the input ("line in") direction, it's designed to take input from a microphone at the remote site and send it to a local sound card or other line-level destination. It can also send signals in the opposite directions (for example, sound from a remote source to local speakers, or from a local microphone to a remote recorder), although a local microphone would have to be self-amplified and would have to output signals at line level.

- To attach headphones or powered speakers: Plug the headphones or speakers directly into the Local's or Remote's "audio out" connector. Run a standard 3.5-mm mini stereo audio cable such as product code EJ110-0010 from the "audio in" connector of the Remote or Local at the other end of the link to the "LINE OUT" connector of a PC or sound card—colored lime (yellow-green) in the PC99 specifications, but often colored differently—or of a CD player or other audio source.
- To attach a microphone that the sound card will be amplifying (the preferred type of microphone attachment): Plug the microphone directly into the Remote's "Line In" connector. Run a standard 3.5-mm mini stereo audio cable such as product code EJ110-0010 from the Local's "audio out" connector to the sound card's "MIC" ("microphone in") connector (colored pink in the PC99 specifications, but often colored differently).

To attach a self-amplified microphone, CD player, etc.: Plug the device directly into the Local's or Remote's "audio in" connector. Run an audio cable such as EJ110-0010 from the "audio out" connector of the Remote or Local at the other end of the link to the "LINE IN" connector of a PC's sound card—colored light blue in the PC99 specifications—or of a tape recorder or other audio destination.

To attach a microphone that the Extender will have to amplify itself: Set the Remote's MIC jumper as described in **Section 3.6**. Plug the microphone directly into the Remote's "audio in" connector. Run an audio cable such as EJ110-0010 from the Local's "audio out" connector to the sound card's "LINE IN" connector (colored light blue in the PC99 specifications).

4.2.2 ATTACHING A CPU TO THE CPU PORT ON AN ACUREMSW SWITCHING REMOTE UNIT

Attach the keyboard, video, and mouse connectors of the included CPU-style three-to-one KVM-extension cable to the matching ports on the CPU, as shown in Figure 4-1. Attach the DB25 male connector of this cable to the Switching Remote Unit's DB25 female composite CPU-port KVM connector.

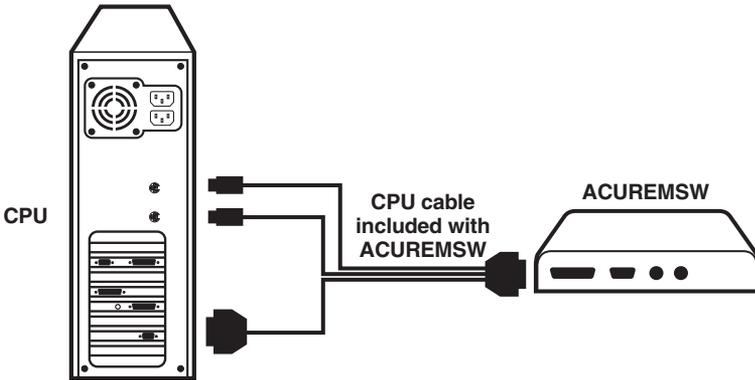


Figure 4-1. Attaching a CPU to a Switching Remote Unit's CPU port.

4.2.3 ATTACHING A KVM SWITCH TO THE CPU PORT ON AN ACUREMSW SWITCHING REMOTE UNIT

The way you'll do this will depend on what kind of user ports the KVM switch has: multiple connectors (see **Section 4.2.3.A**) or single composite connectors (see **Section 4.2.3.B**). (Refer to the listings in your Extender system's user manual for which switch models are in which category.)

4.2.3.A Attaching a KVM Switch with Multiple User-Port Connectors

Attach the keyboard, video, and mouse connectors of the included CPU-style three-to-one KVM-extension cable to the matching user-port connectors on the KVM switch, as shown in Figure 4-2. Attach the DB25 male connector of this cable to the Switching Remote Unit's DB25 female composite CPU-port KVM connector.

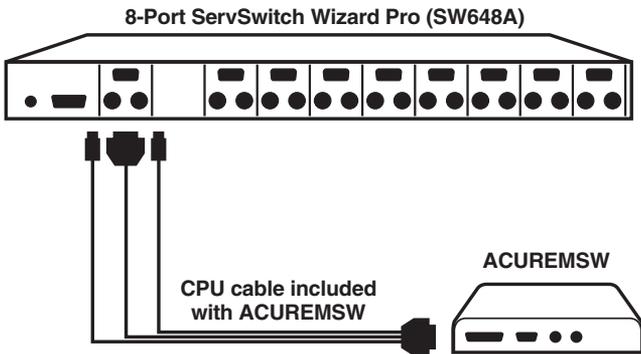


Figure 4-2. Attaching a KVM switch with multiple user-port connectors to a Switching Remote Unit's CPU port.

4.2.3.B Attaching a KVM Switch with Single Composite User-Port Connectors

If the KVM switch's user ports are ServSwitch style DB25 connectors, run a ServSwitch to ServSwitch Expansion Cable (product code EHN284) from one of these connectors to the Switching Remote Unit's DB25 female composite CPU-port KVM connector, as shown in Figure 4-3.

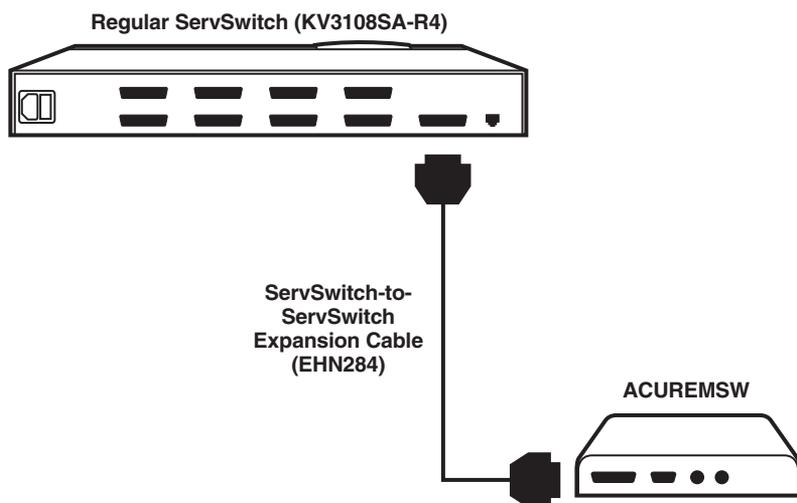


Figure 4-3. Attaching a KVM switch with single ServSwitch style DB25 user-port connectors to the CPU port on a Switching Remote Unit's CPU port.

If the KVM switch's user ports are some other type of composite connectors (as is the case for the ServSwitch Multi), first plug a User Cable designed for the switch into one of the switch's user ports. Then plug the included CPU-style three-to-one KVM-extension cable into one of the Switching Remote Unit's DB25 female composite CPU-port KVM connectors. Connect the matching ends of the extension cabling and User Cable together as shown in Figure 4-4.

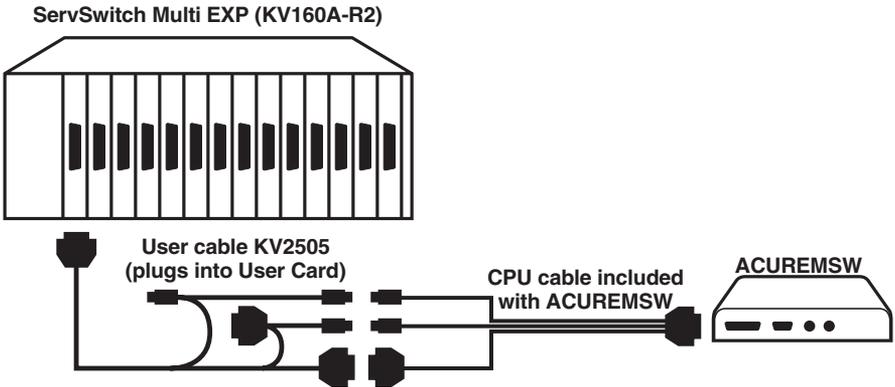


Figure 4-4. Attaching a ServSwitch Multi to the Switching Remote Unit's CPU port.

4.2.4 ATTACHING USER EQUIPMENT TO THE USER PORT

Plug a remote user station's monitor, keyboard, mouse, any touchscreen or other serial device, and any audio devices directly into the matching user-port connectors on a Remote Unit, as shown in Figure 4-5, or the matching connectors of one of the user ports on a Remote Hub, as shown in Figure 4-6 on the next page.

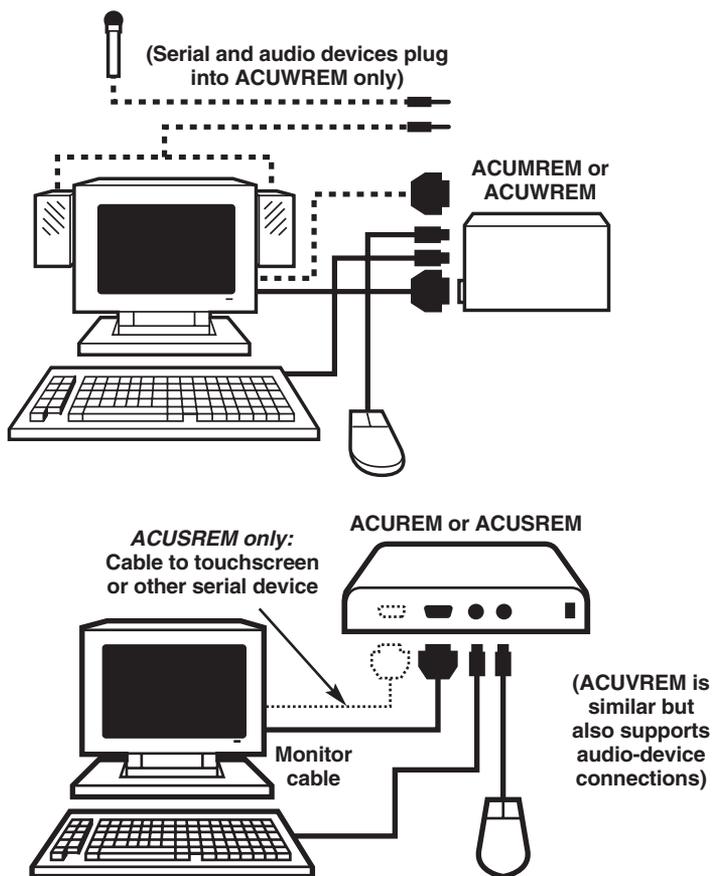


Figure 4-5. Attaching user equipment to a Micro Remote Unit (top) or a full-size (non-Micro) Remote Unit (bottom, ACUREM or ACUREM shown).

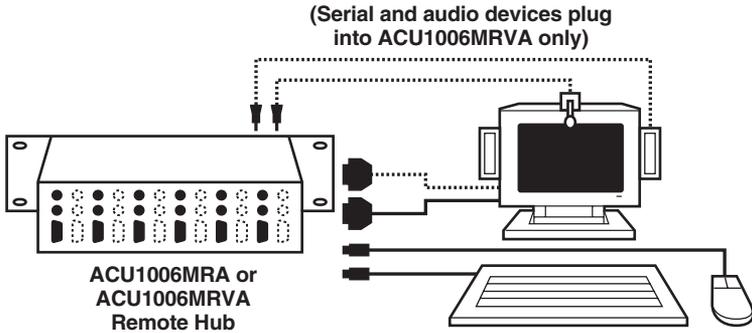


Figure 4-6. Attaching user equipment to a user port on a Remote Hub.

4.2.5 ATTACHING A KVM SWITCH TO THE USER PORT

The way you'll do this will depend on whether the KVM switch's CPU ports are multiple connectors (see **Section 4.2.5.A**) or single composite connectors (see **Section 4.2.5.B**). (Refer to the listings in your Extender system's user manual for which switch models are in which category.)

4.2.5.A Attaching a KVM Switch with Multiple CPU-Port Connectors

Run extension cabling from the Remote's user-port connectors to the matching CPU-port connectors on the KVM switch. This extension cabling can be individual keyboard-, video-, and mouse-extension cables (product codes EVMPS03-MM for keyboard and mouse, EVNPS05-MM for video), but we recommend our specially bonded three-to-three CPU-extension cable (product code EHN408):

- If you're using individual extension cables, run the video-extension cable between the two video/monitor connectors, the keyboard-extension cable between the two keyboard connectors, and the mouse-extension cable between the two mouse connectors.
- If you're using one of our three-to-three bonded extension cables, run the cable's video strand between the two video/monitor connectors, the cable's keyboard strand between the two keyboard connectors, and the cable's mouse strand between the two mouse connectors, as shown in Figure 4-7 on the next page. (The keyboard and mouse connectors on the bonded cable have different colors and icon labels for easy identification.)

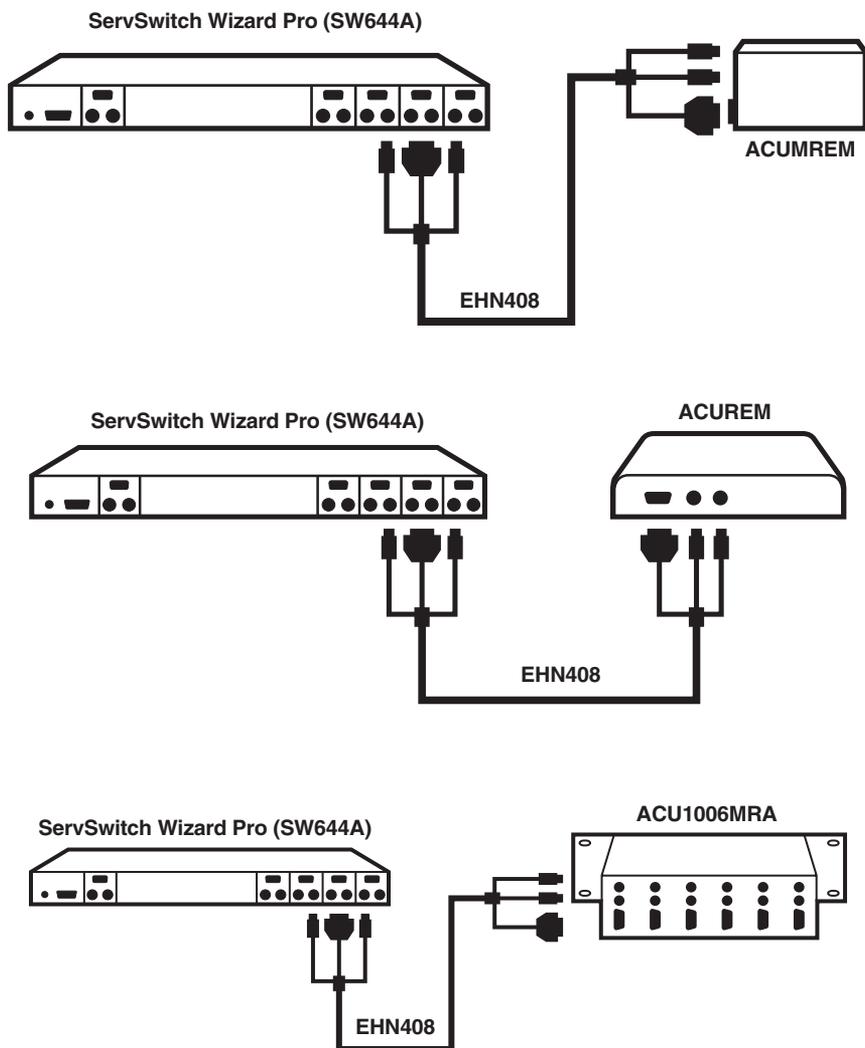


Figure 4-7. Attaching a KVM switch with multiple CPU-port connectors to a Micro Remote Unit (top), a full-size (non-Micro) Remote Unit, ACUREM shown), and an ACU1006MRA Remote Hub (bottom).

4.2.5.B Attaching a KVM Switch with Single Composite CPU-Port Connectors

Run a CPU Cable designed for the KVM switch—refer to your Extender system’s user manual for product codes—from one of the switch’s CPU-port connectors to the user-port connectors of the Remote, as shown in Figure 4-8 below and Figure 4-9 on the next page.

NOTES

If the switch is a ServSwitch Multi, keep these things in mind as you match the serial and audio cables/strands:

- The proper DB9 serial connector to use on its User Cable is the one *without* a yellow band.
- The audio cable from the Extender’s “audio out” connector should be plugged into the *blue-banded* audio connector on the User Cable.
- The audio cable from the Extender’s “audio in” connector should be plugged into the audio connector *without* a blue band on the User Cable.

Also bear in mind that the microphone strand of the ServSwitch Multi User Cable (the one with the *blue-banded* connector) is mono only, so any stereo information that passes through this strand will be lost.

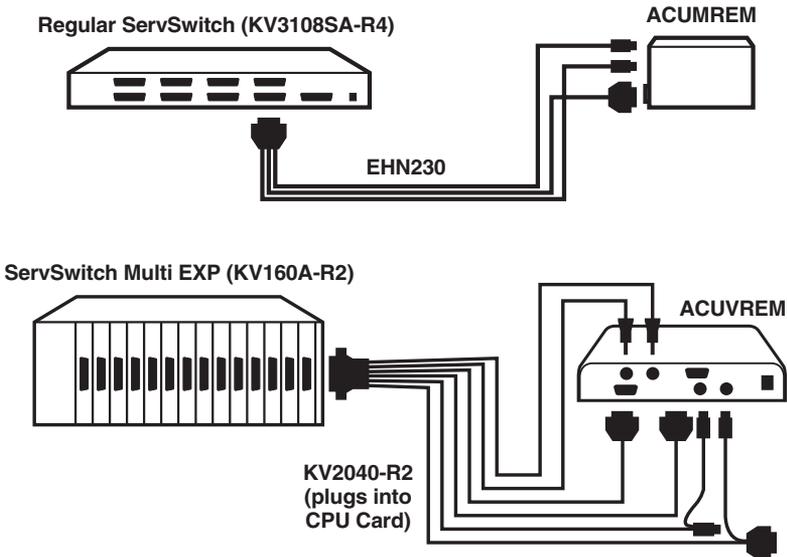


Figure 4-8. Attaching a KVM switch with single composite CPU-port connectors to the user-port connectors on an ACUMREM Remote Unit (top) or any other type of Remote Unit (bottom, ACUVREM shown).

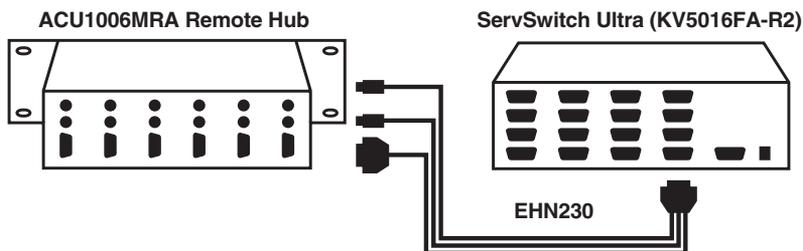


Figure 4-9. Attaching a KVM switch with single composite CPU-port connectors to user-port connectors on a Remote Hub.

4.3 Finishing Your Installation

To finish installing a Remote after attaching devices to it as described in Section 4.2, take these steps:

1. Interconnect the Local(s) and the Remote by running CAT5 cabling between their front-panel modular “Interconnect” jacks. This cabling shouldn’t be longer than 50 m (160 ft.) if you’re attaching a Local to a Micro Remote, or 300 m (1000 ft.) if you’re attaching a Local to a non-Micro Remote. (Your Extender system’s manual will list additional guidelines for this cabling in its “The Cables You’ll Need” section.)

CAUTION!

The Switching Remote Unit (ACUREMSW) has more advanced firmware than the regular Single-Access Local Hubs (ACU1006RA and ACU1012RA); this minor incompatibility will cause the Scroll Lock LED not to light on the remote keyboard, although the [Scroll Lock] key will still work.

Although we don’t recommend doing so, the Switching Remote Unit can in theory be used with a regular Dual-Access Local Hub (ACU1006DRA) that’s running its original firmware. However, in this case the firmware incompatibility is more serious. Do *not* use Private Mode in a system with a Switching Remote attached to a Dual-Access Local Hub that’s still running its original firmware—you will not be able to turn Private Mode off! We *strongly recommend* that you upgrade the firmware at least to version S5.0 on any Dual-Access Local Hub that you want to attach to a Switching Remote Unit. Call Black Box Tech Support if you want to do this.

2. If the Remote is a full-size (non-Micro) Remote Unit, turn its Brightness and Focus dials counterclockwise, by hand or with a screwdriver, as far as they will go.

3. Attach the output cord of the Remote's power supply to the Remote's power jack; then plug the IEC 320 end of the power supply's input cord into the IEC 320 inlet on the power supply's transformer; then plug the other end of the input cord into a utility (mains) power outlet. The Remote should power up immediately; it has no ON/OFF switch. (If the Remote is in the location you want it to be, you can leave it plugged in and powered up more or less indefinitely.)

CAUTION!

If you ever need to replace the Remote's power supply, the replacement power supply must have identical output characteristics (see the "Power" specification in Chapter 1). Using a power supply with different output—even if it's "almost the same"—could damage your equipment.

4. Power ON the devices attached to the Remote and observe and test them as described in your Extender system's users' manual.

If everything works in your test setup, repeat the procedures in **Sections 4.2** and **4.3** for your actual installation. (For information about rackmounting full-size [non-Micro] Remote Units, see **Appendix B**.) If everything works in the actual installation, a Micro Remote should then be ready for continuous operation; see your Extender system's manual for directions. With the other models, you'll probably need to adjust the remote site's video first (see **Section 4.4**).

4.4 Adjusting the Video Compensation on a Non-Micro Remote Unit

For any given full-size (non-Micro) Remote Unit, you should only need to take the steps in this section if the interconnect cabling between the Remote and its corresponding Local is longer than 25 m (80 ft.). If the cabling isn't that long, but the video at the remote site still looks awful, first try adjusting the Remote Unit's Brightness and Focus dials. If the video looks bad no matter how you set these dials, the problem is almost certainly being caused by bad wiring in your interconnect cabling. Compare its pinning and pairing with those shown in **Appendix A**.

NOTES

For all practical purposes, cable equalization cannot be exact: The remote video image will never be as sharp as the original. The Remote Unit's equalization system is designed to produce very good results on short or medium-length cables and acceptable quality across very long cables (those over 150 m [500 ft.] in length).

At any cable range, you can see how the video would appear without any compensation at all by turning the Focus dial counterclockwise as far as it will go.

1. Run an application you intend to use that requires a high screen resolution, such as a Windows® art or design program, a word processor or desktop-publishing package, or even a graphics-intensive game.
2. If the video reaching the remote monitor is “undercompensated,” you'll notice black smearing on the right-hand edge of large horizontal objects such as title bars. The degradation becomes more noticeable as cable length increases.
3. Keep your eyes on a part of the image where the smearing is evident. Now, turn the Remote Unit's Focus dial clockwise, by hand or with a screwdriver, until the smearing disappears and the edge becomes very bright and too sharp. At this point and beyond the video is “overcompensated.”
4. Turn the Focus dial back slightly until you reach a point where the edge looks as it should be (no smearing or over-sharpness). The compensation is now adjusted correctly for the length of interconnection cable used. (If you can't seem to get the compensation close enough, and you're running high-res video to near the limits of the cable length that the Remote Unit is configured for, see the Note in **Section 3.2**.)
5. Use the Brightness dial to adjust the brightness of the overall picture. After you do so, you might need to make a further slight adjustment with the Focus dial.

Once you've finished adjusting the video (and performing any configuration that your Local calls for), your Extender system should be ready for continuous operation. See your Extender system's manual for directions.

5. Troubleshooting

The users' manual for your ServSwitch™ Brand CAT5 KVM Extender system will list some problems that can occur in your Extender system and will make suggestions for what to do about the problems. If nothing helps, take the steps described in this chapter.

5.1 Calling Black Box

If you determine that your Remote Unit 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 firmware-revision level printed on the bottom of the Remote Unit (very important, especially for keyboard and mouse problems);
- the nature and duration of the problem;
- when the problem occurs;
- the components involved in the problem—that is, what type of computers, what type of keyboard, brand of mouse, make and model of monitor, type and make of CAT5 cable, 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.

To solve some problems, it might be necessary to upgrade the firmware of your Remote Unit. If this turns out to be the case for your difficulty, our technical support technicians will arrange for you to receive the new firmware and will tell you how to install it.

5.2 Shipping and Packaging

If you need to transport or ship your Remote Unit:

- 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 A:

Twisted-Pair Cable Pinning/Pairing

The twisted-pair cable you will use to interconnect the Remote and Local in your ServSwitch™ Brand CAT5 KVM Extender system should be terminated with RJ-45 plugs and should be wired according to the EIA/TIA-568 standard (preferably 568B rather than 568A). See the users' manual of your Extender system for a more complete set of cable recommendations.

Looking into the interconnect socket on either Extender unit, or looking at the cable plug from behind, Pin 1 should be on the left and Pin 8 on the right, and the wires should be arranged this way:

Pin	Color	Function, Pair
1	White/Orange	TX, Pair 2
2	Orange/White	RX, Pair 2
3	White/Green	TX, Pair 3
4	Blue/White	RX, Pair 1
5	White/Blue	TX, Pair 1
6	Green/White	RX, Pair 3
7	White/Brown	TX, Pair 4
8	Brown/White	RX, Pair 4

NOTES

In runs of our EHN840 cable over 200 m (655 ft.) long, you might get much better video quality if, at both ends of the cable, you swap the green and brown pairs so that White/Green is on Pin 7, Green/White on Pin 8, White/Brown on Pin 3, and Brown/White on Pin 6.

The Extender has been tested with all major makes of CAT5 cable including Black Box, Berk-Tek™, Mohawk®, and AT&T®. The Extender has also been tested and found to work, *in certain situations*, with 4-pair Category 3 cable or with four pairs of 25-pair UTP trunk cables instead of 4-pair Category 5 cable. But we do *not* recommend such installations; if you want to experiment with them, do so at your own risk.

We don't normally recommend using CAT5e cable (rated for up to 155 Mbps) for runs longer than 100 m (330 ft.), although our EYN795MS cable has performed well in testing in runs up to the full 300 m (1000 ft.). *Avoid* using cables rated "Level 6," "Level 7," etc. If you have problems getting a good picture with CAT5e cable, or if you *must* use cables with bandwidths higher than 155 Mbps, please contact tech support; the signal-skew problems caused by tightly twisted pairs in these cables can sometimes be resolved by swapping which pairs are used for which signals or by using an external delay line.

Appendix B: Rackmounting Remotes

If you'd like to mount any of your ServSwitch™ Brand CAT5 KVM Extender system's Remote Hubs in a 19" rack, use the two included brackets. If you'd like to mount any of your full-size (non-ACUMREM) Standalone Remote Units in a 19" rack, use the two-bracket Rackmount Kit shown in Figure B-1 (product code RMK19U-R2). The Micro Remote Units (ACUREM and ACUMREM) aren't rackmountable.

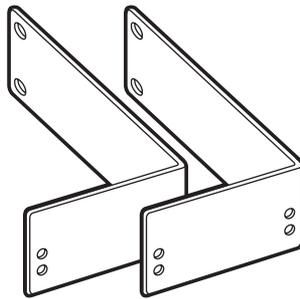


Figure B-1. The RMK19U-R2 Rackmount Kit.

To use the included brackets to mount a Remote Hub, or to use the Kit brackets to mount a Remote Unit, take these steps, referring to Figure B-2 on the next page:

1. Unscrew and keep the two screws on each side of the Remote's case.
- 2A. *Remote Hubs*: Match up the two holes in the "Hub end" of each bracket with the two now-vacant screwholes on each side of the Hub, then fasten the brackets to the unit with the screws you removed in step 1.
- 2B. *Remote Units*: Match up two of the holes in the "Unit end" of each bracket with the two now-vacant screwholes on each side of the Remote Unit. For ACUVREM Units, use the bracket's lower pair of holes (one front and one rear); for all other models, use the upper pair. Fasten the brackets to the Unit with the screws you removed in step 1.
3. Once you've attached both brackets, match the holes in the "rack end" of each bracket to an appropriate set of matching holes on your equipment rack. Screw the Remote assembly to the rack using your own screws, bolts, or cage nuts (not included).

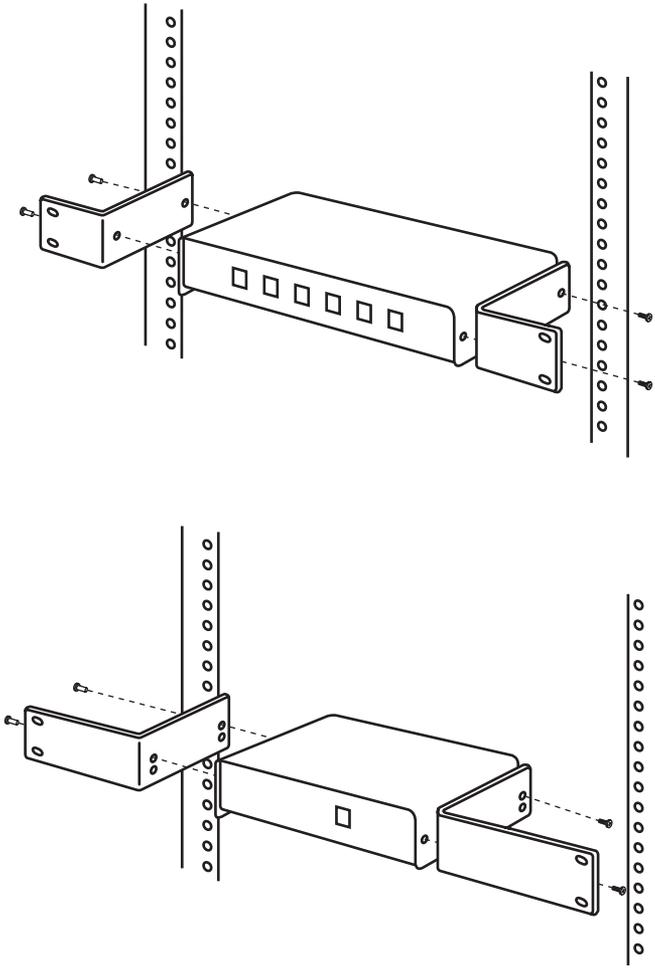


Figure B-2. Mounting the bracketed Remote Hub (above) or Remote Unit (below).

Appendix C: Setting Your KVM/Serial Extender System to 1200 bps

NOTE

This procedure is intended primarily to meet the needs of customers with industrial trackballs and other 1200-bps serial peripherals whose output can't be converted to PS/2 mouse format. We do not recommend using this procedure to connect standard serial mice; use a PS/2 mouse with a PS/2 to serial mouse converter such as our product code AC244A instead.

We suggest that you avoid making this change unless you really need to, because (a) your Local shouldn't be opened any more than necessary and (b) if the Local is a Hub, it can be very easy to lose track of which Hub port is operating at which data rate.

Also note that while this procedure should enable you to use most 1200-bps serial peripherals, it won't work for some of them, because a few types of devices draw more power from the serial port than the Extender can provide.

If you would like to use a 1200-bps serial peripheral such as an industrial trackball with your ServSwitch Brand CAT5 KVM/Serial Extender system, attach the peripheral to the serial port of the ACUSREM Remote Unit. Then take these steps to set the Extender to operate at 1200 bps on the line that leads from the KVM/Serial Local to that Remote Unit, referring to Figure C-1 on the next page:

1. Unplug both the Local and the Remote Unit, so that both are powered OFF.
2. Following the instructions (including those in the Caution notice) at the start of **Chapter 3**, open the Remote Unit. Follow the instructions in your Extender manual to open the Local.
3. If the Local is an ACU1008A Local Unit (for a one-to-one KVM/Serial Extender system), it will have a single serial daughtercard. If it's an ACU1006SRA KVM/Serial Local Hub, it will have six such daughtercards—one for each of its ports. There are a pair of empty jumper posts labeled "Baud" on each of these cards. Each pair of posts has a jumper "hanging off" one post. On the card in the Local that controls serial communication to the 1200-bps peripheral's Remote Unit, move this jumper so that it connects the two posts. This will override the 9600-bps or 19,200-bps data-rate setting in the Remote Unit, so that the Extender system operates at 1200 bps; in a Hub-based system, the rate change will affect *that link only*. (Move this jumper back to its original position at any time to set your system back to 9600 or 19,200 bps.)

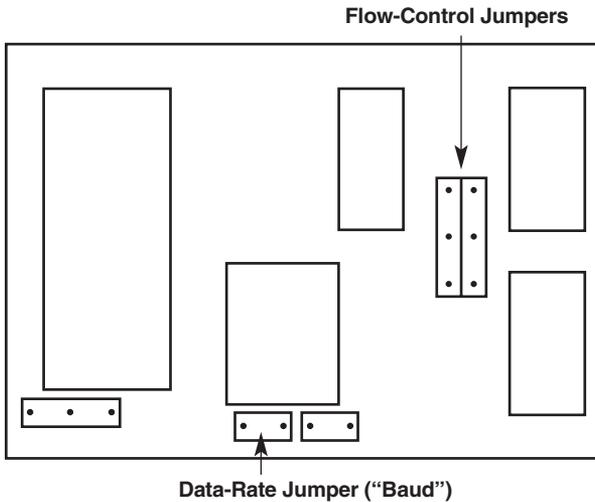


Figure C-1. The serial daughtercard and its controls.

4. Set the flow-control jumpers in *both* the Local *and* the Remote Unit to the “RTS/CTS across link” setting (jumpers vertically linking the upper pairs of posts), as shown in Figure C-2. This will allow the Extender system to detect the mouse properly.

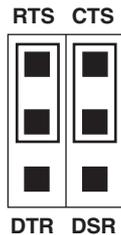


Figure C-2. The necessary “pass RTS/CTS” setting.

5. Close up the Local and the Remote Unit and plug them in again.

Unless your serial device draws too much power (see the Note on the previous page), your Extender system should now be ready for 1200-bps operation.

Appendix D:

Keyboard-Command Summary

Here is a brief list of the keyboard commands you can use to control your ServSwitch™ Brand CAT5 KVM Extender. For detailed descriptions of the commands and the effects they have on the system (including their effects on the keyboard LEDs), refer to your Extender system's user manual.

Single-Access KVM or KVM/Serial Extender Local linked to a Remote other than a Switching Remote Unit

<i>Function:</i>	<i>Keyboard command/activity:</i>
Take control of CPU	Press any key on keyboard or (if Remote is a Micro model or has been set for this—see Section 3.3.1) move mouse.
Reset keyboard and mouse	Press and release [Scroll Lock] once.
Send null byte to mouse	Press and hold left and right mouse buttons, then press and release [Scroll Lock] once.

Dual-Access KVM or KVM/Serial Extender Local linked to a Remote other than a Switching Remote Unit

<i>Function:</i>	<i>Keyboard command/activity:</i>
Take control of CPU	Press any key on keyboard or (if Remote is a Micro model or has been set for this—see Section 3.3.1) move mouse.
Reset keyboard and mouse	Press and release [Scroll Lock] <i>once</i> at Remote, <i>twice</i> at Local.
Send null byte to mouse	Press and hold left and right mouse buttons, then press and release [Scroll Lock] once.
Enter Private Mode	<i>At Local only:</i> Press and release [Scroll Lock] <i>once</i> .

Single-Access KVM Extender Local linked to a Switching Remote Unit (ACUREMSW)

KVM/Serial/Audio systems

<i>Function:</i>	<i>Keyboard command/activity:</i>
Take control of local CPU	Press any key on keyboard or move mouse.
Reset keyboard and mouse	Press and release {hotkey*}, then press and release keypad's up-arrow (number [8]) key.
Send null byte to mouse	Press and release {hotkey*}, then press and release keypad's left-arrow (number [4]) key.
Enter Private Mode	Press and release {hotkey*}, then press and release [Scroll Lock].
Switch to other CPU	<i>At Remote only:</i> Press and release {hotkey*}, then press and release keypad's plus ([+]) key.

*The default {hotkey} is right-[Ctrl], but you can set it to left-[Ctrl]; see **Section 3.3.2**.

Appendix E: Distinguishing Features and Compatibility

This table lists the various models of the ServSwitch™ Brand CAT5 KVM Remote and indicates their chassis size/style; whether they support serial devices (**S**), audio devices (**A**), or a switched remote CPU (**C**)—a check mark means “yes,” no check mark means “no”—; which Local Hubs they’re compatible with (listed by product code only); and which Extenders’ Local Unit they’re compatible with and can replace the Remote Unit for (listed by product code and the word “Local”).

Prod. Code	Chassis	S	A	C	Compatibility
ACUREM	Full				ACU1006RA, ACU1006DRA, ACU1012RA, ACU1001A Local, ACU1009A Local
ACUREMSW	Full			√	ACU1006RA, ACU1012RA, ACU1001A Local
ACUMREM	Micro				ACU1006RA, ACU1006DRA, ACU1012RA, ACU1001A Local, ACU1009A Local, ACU3001A Local, ACU3009A Local
ACU1006MRA	Micro Hub				ACU1006RA, ACU1006DRA, ACU1012RA, ACU1001A Local, ACU1009A Local, ACU3001A Local, ACU3009A Local
ACUSREM	Full	√			ACU1006SRA, ACU1006DSRA, ACU1002A Local
ACUVREM	Full	√	√		ACU1006VRA, ACU1022A Local, ACU1028A Local
ACUWREM	Micro	√	√		ACU1006VRA, ACU1022A Local, ACU1028A Local, ACU3022A Local
ACU1006MRVA	Micro Hub	√	√		ACU1006VRA, ACU1022A Local, ACU1028A Local, ACU3022A Local

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. They reserve 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.

NOTES



REGULAR-1M5

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

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