

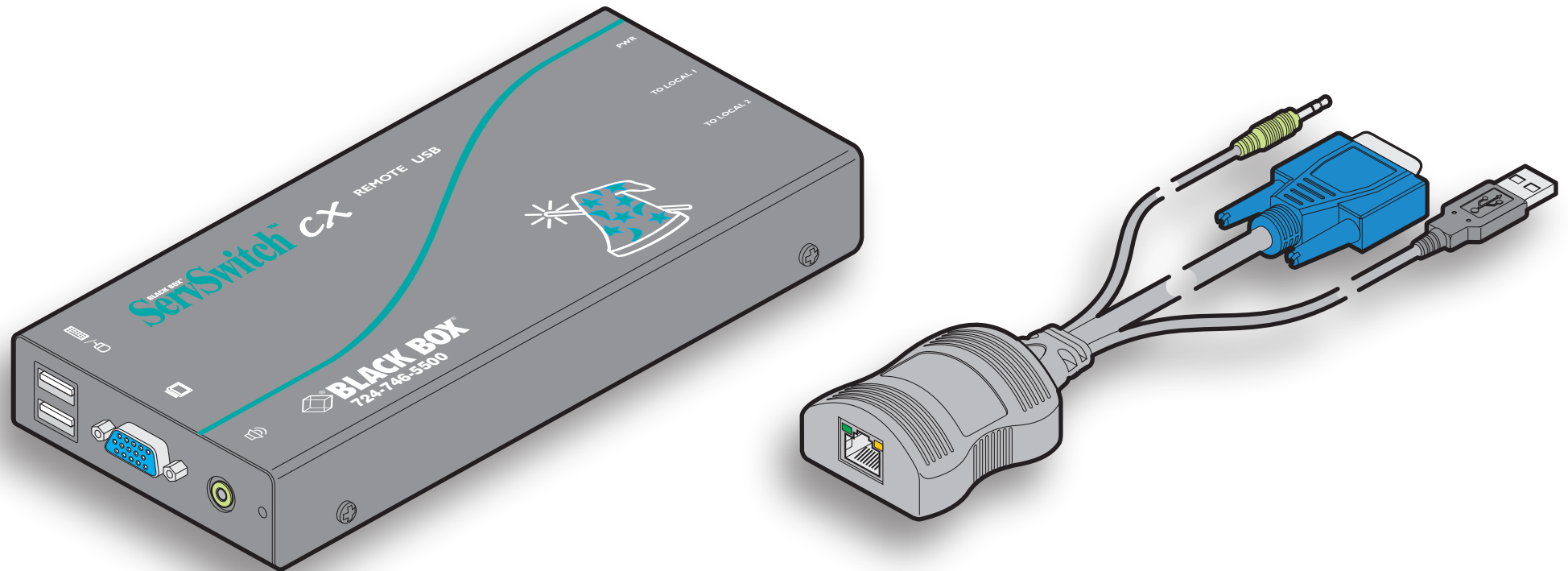


November 2007

KV1400A	KV04-REM
KV1401A	KV04A-REM
KV1402A	KV04AS-REM
KV1403A	KV04U-REM
KV1404A	KV04AU-REM
	KV04AUS-REM

ServSwitch™ CX Remote

USER GUIDE



**CUSTOMER
SUPPORT
INFORMATION**

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Welcome



Introduction

Thank you for choosing from the Black Box ServSwitch CX Remote extender range. These compact modules allow you to remotely control computer systems from a remote keyboard, video monitor, mouse and speaker set ¹. The controlling peripherals can be situated up to 980 feet ² (300 metres) from each computer system.

Peripheral connections to each computer system are handled by Server Access Modules (or SAMs). The long distance link between the SAMs and the ServSwitch CX Remote module is made via Category 5, 5e or 6 twisted pair cabling. The KV04(U) models allow you to make two separate links to different remote systems.

You can also use any ServSwitch CX Remote module together with the ServSwitch CX digital switch in order to control many server systems.

Special circuitry within the remote module allows you to make adjustments to the sharpness and brightness settings to suit your own preferences.

- ¹ Audio equipped (A or AS) models required for speakers.
- ² Skew compensation (AS) models required for full 980 feet (300m) lengths.

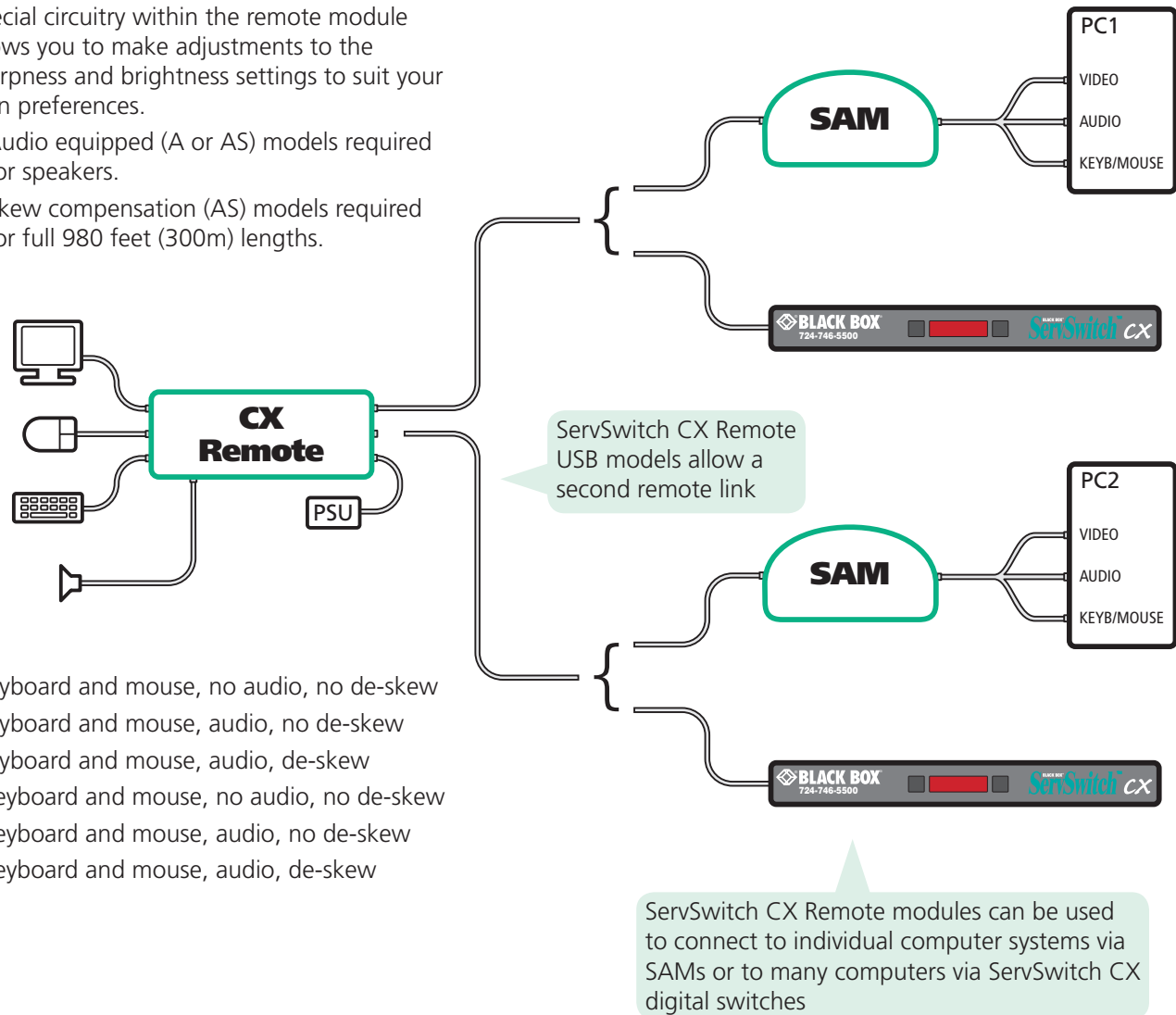
Extender model range

ServSwitch CX Remote modules

KV04-REM	1 link up to 328 feet (100m), PS/2 keyboard and mouse, no audio, no de-skew
KV04A-REM	1 link up to 328 feet (100m), PS/2 keyboard and mouse, audio, no de-skew
KV04AS-REM	1 link up to 980 feet (300m), PS/2 keyboard and mouse, audio, de-skew
KV04U-REM	2 links up to 328 feet (100m), USB keyboard and mouse, no audio, no de-skew
KV04AU-REM	2 links up to 328 feet (100m), USB keyboard and mouse, audio, no de-skew
KV04AUS-REM	2 links up to 980 feet (300m), USB keyboard and mouse, audio, de-skew

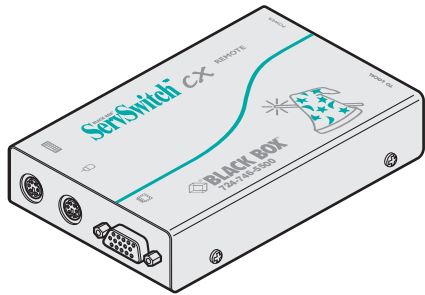
Server Access Modules

KV1400A	PS/2 keyboard and mouse, video
KV1401A	USB keyboard and mouse, video
KV1402A	PS/2 keyboard and mouse, video, audio
KV1403A	USB keyboard and mouse, video, audio
KV1404A	Sun keyboard and mouse, video, audio



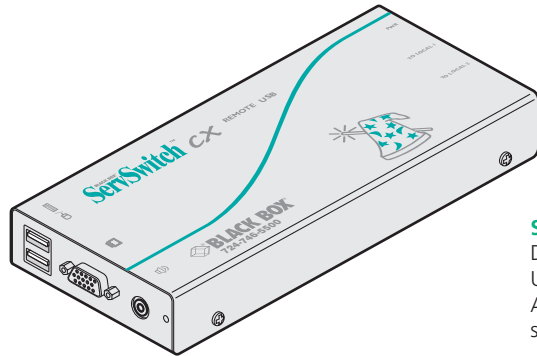
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CX Remote module supplied items



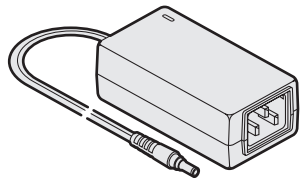
ServSwitch CX Remote

Single remote link
 PS/2 keyboard and mouse connections
 Available with or without audio and skew compensation capabilities

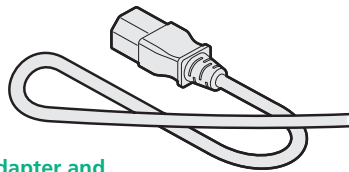


ServSwitch CX Remote USB

Dual remote links
 USB keyboard and mouse connections
 Available with or without audio and skew compensation capabilities



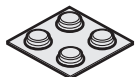
Power adapter and country-specific power lead



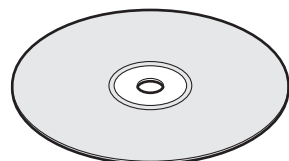
Optional item

Serial flash upgrade cable

4-way jack connector to 9-way D-type male serial connector - not pictured



Four self-adhesive rubber feet

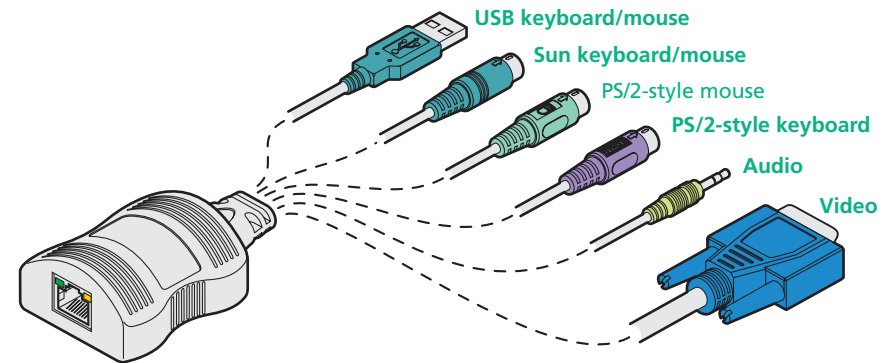


CD-ROM

Server Access Module supplied items

Server Access Modules (SAMs):

PS/2 keyboard and mouse, video	KV1400A
USB keyboard and mouse, video	KV1401A
PS/2 keyboard and mouse, video, audio	KV1402A
USB keyboard and mouse, video, audio	KV1403A
Sun keyboard and mouse, video, audio	KV1404A



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Installation & Operation



Connections

Installation of the ServSwitch CX Remote modules is straightforward and minimal configuration is required in most cases. Each of the (up to) two moulded SAMs (*Server Access Modules*) connect directly to a computer system, while the remote ServSwitch CX Remote module is at the other end of the twisted pair cable run(s) and attaches to the keyboard, mouse, etc.

ServSwitch CX Remote receiver units can also be used with ServSwitch CX digital switches to allow one or more user consoles to be placed remotely from the central unit.

- [Connections at each SAM \(local\) unit](#)
- [Connections at the Servswitch CX Remote \(PS/2\) module](#)
- [Connections at the Servswitch CX Remote USB module](#)

Cable length advice

The ServSwitch CX Remote modules support twisted-pair structured cabling within categories 5, 5e and 6. Of these three cable types, category 5 generally provides the best transmission of video signals because its four pairs of conductors are the most evenly twisted.

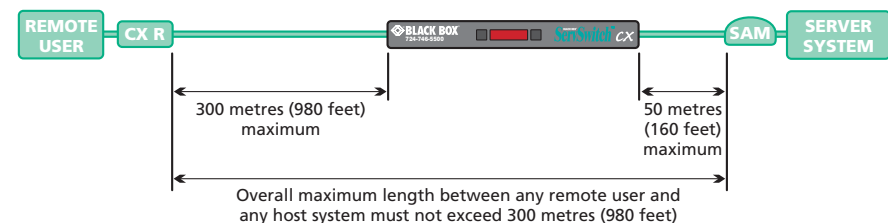
Category 5e and 6 cables use conductor pairs that are unevenly twisted in order to combat interference effects encountered within higher frequency networks. While these uneven twists work well for Ethernet signals, they can impose problems for the video signals transceived by the ServSwitch CX Remote modules. The SAMs send the red, green and blue video signals on separate twisted pairs within the cable. If any of the colour signals are made to travel slightly further or shorter distances than the others, the result is seen as misaligned colours on screen. This is called *skew* and becomes more noticeable as cable runs become longer and screen resolutions/refresh rates increase.

As an approximate guide, you should expect the following maximum cable lengths:

Resolution	ServSwitch CX Remote without de-skew	ServSwitch CX Remote with de-skew
1920 x 1200	50m	50m
1600 x 1200	100m	200m
1280 x 1024	-	300m

When used with an ServSwitch CX switch

It is possible to locate each SAM up to 50 metres from the ServSwitch CX switch. This distance must be taken into account when planning the cable run from the ServSwitch CX Remote to the CX switch. The total distance from any ServSwitch CX Remote to any SAM must not exceed 980 feet (300 metres) or less if an ServSwitch CX Remote without de-skew is used.



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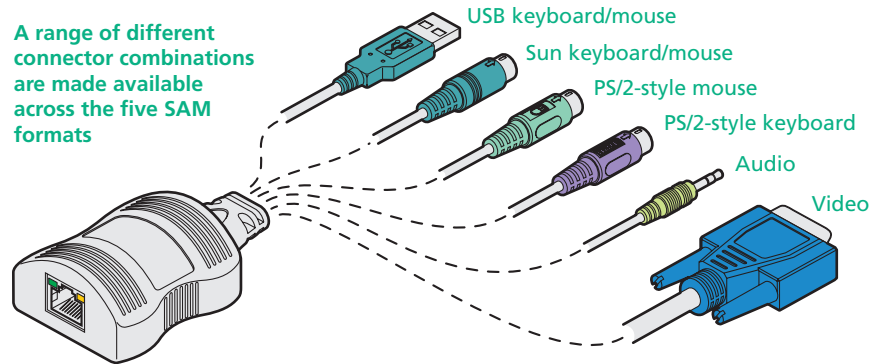
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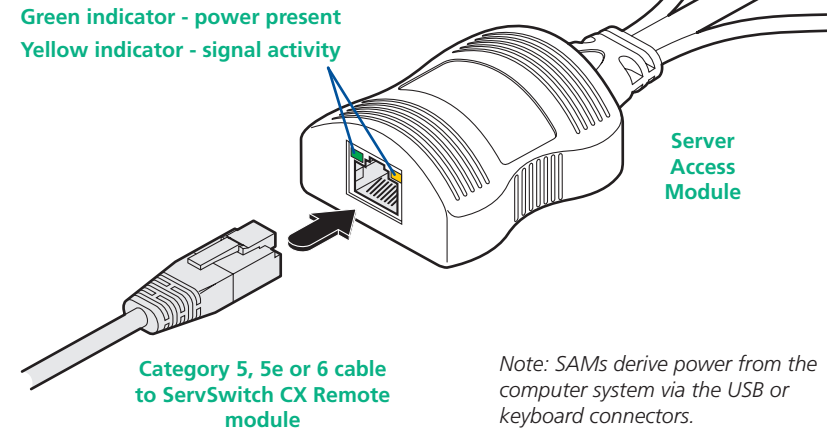
Connections at each SAM (local) unit

- 1 Where possible ensure that power is disconnected from the system(s) to be connected. For SAMs with PS/2 keyboard and mouse connections, see [Hot plugging PS/2-style connections and mouse restoration](#).
- 2 For each SAM, attach its various connectors to the relevant sockets on the computer system.



- 3 Lay a suitable length of category 5, 5e or 6 cabling between each computer system/SAM and the location of the remote peripherals - see [Cable length advice](#).

- 4 For each cable run, attach the cable connector to the socket of the SAM. The other end of each cable run will attach to the remote ServSwitch CX Remote module.



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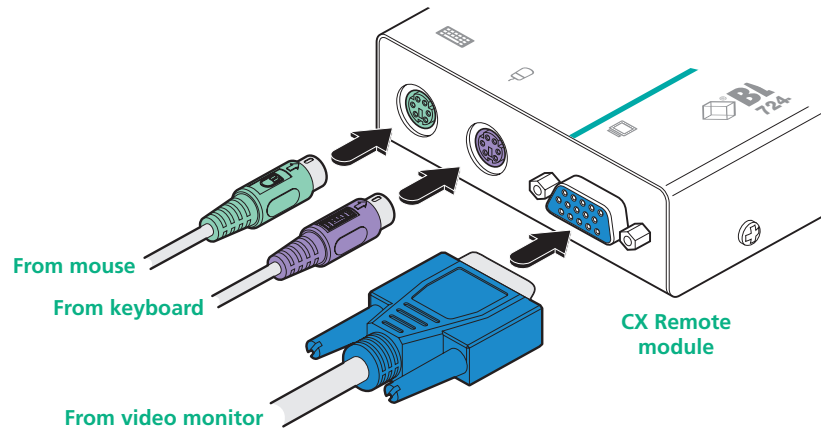
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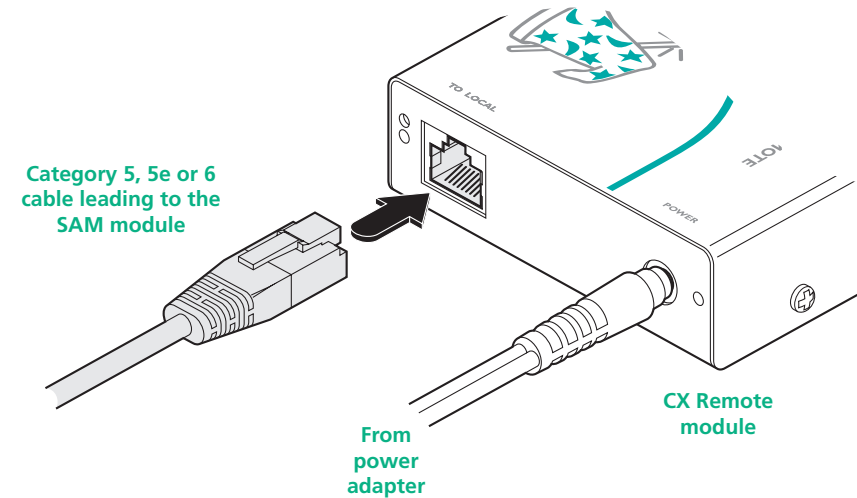
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Connections at the ServSwitch CX Remote (PS/2) module

- 1 Place the CX Remote module adjacent to the remote user location.
- 2 Attach the video monitor, keyboard and mouse connectors to the sockets of the CX Remote module.



- 3 Attach the connector of the cable run leading from the SAM to the **TO LOCAL** socket of the CX Remote module.



- 4 Insert the output connector of the power supply into the socket at the front edge of the CX Remote module labelled **POWER**.
- 5 Insert the IEC connector of the supplied power lead into the corresponding socket of the power supply. Connect the other end of the power lead to a nearby mains socket.
- 6 Where necessary, use the in-built video compensation feature to eliminate any effects caused by the cable run. See [Video compensation](#) for details.



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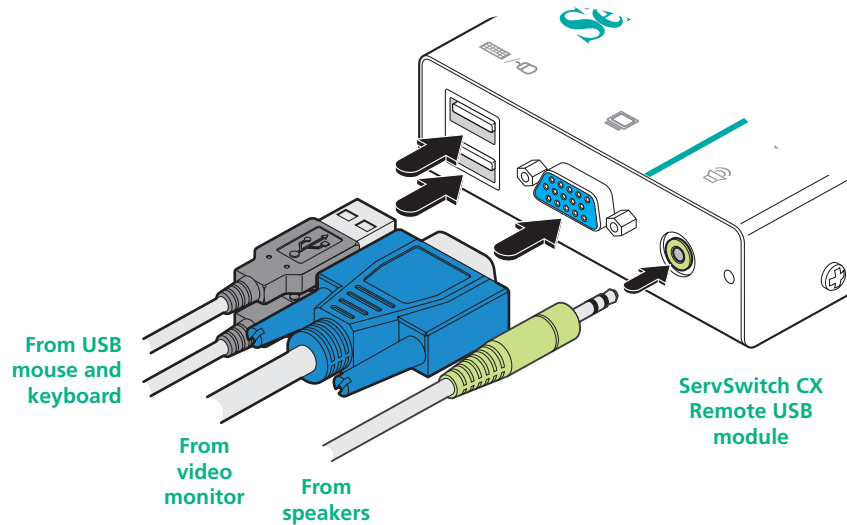
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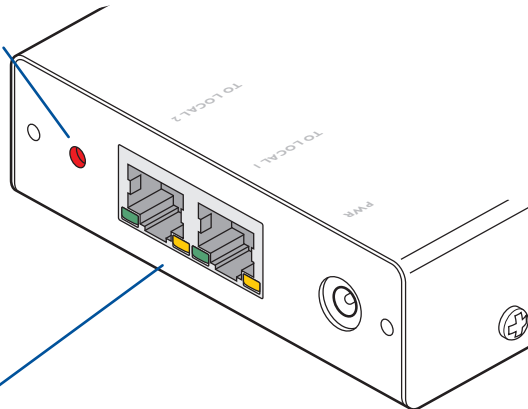
Connections at the ServSwitch CX Remote USB module

- 1 Place the ServSwitch CX Remote USB module adjacent to the remote user location.
- 2 Attach the video monitor, USB keyboard, USB mouse and speaker connectors to the sockets of the ServSwitch CX Remote module.



ServSwitch CX Remote USB indicators

Red indicator - power present



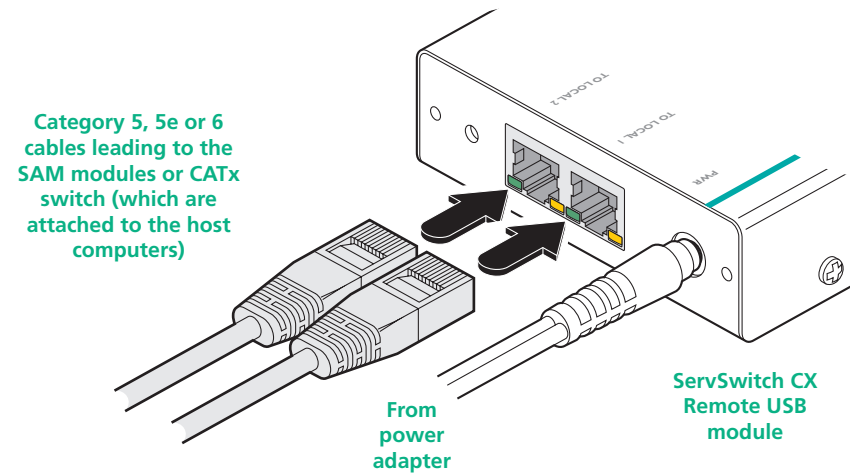
Green indicators - On when the corresponding channel is selected

Yellow indicators - On when link to SAM or ServSwitch CX switch is made
Flashing to show signal activity

Both green indicators off - ServSwitch CX Remote module is password locked

Green indicator for channel 1 flashing - Module is in flash upgrade mode (SW1 ON)

- 3 Attach the connector of each cable run leading from the SAMs (and/or ServSwitch CX digital switch) to the **TO LOCAL 1** and **TO LOCAL 2** sockets of the ServSwitch CX Remote USB.



- 4 Insert the output connector of the power supply into the socket at the front edge of the module labelled PWR.
- 5 Insert the IEC connector of the supplied power lead into the corresponding socket of the power supply. Connect the other end of the power lead to a nearby mains socket.
- 6 Where necessary, use the in-built video compensation feature to eliminate any effects caused by the cable run. See [Video compensation](#) for details.



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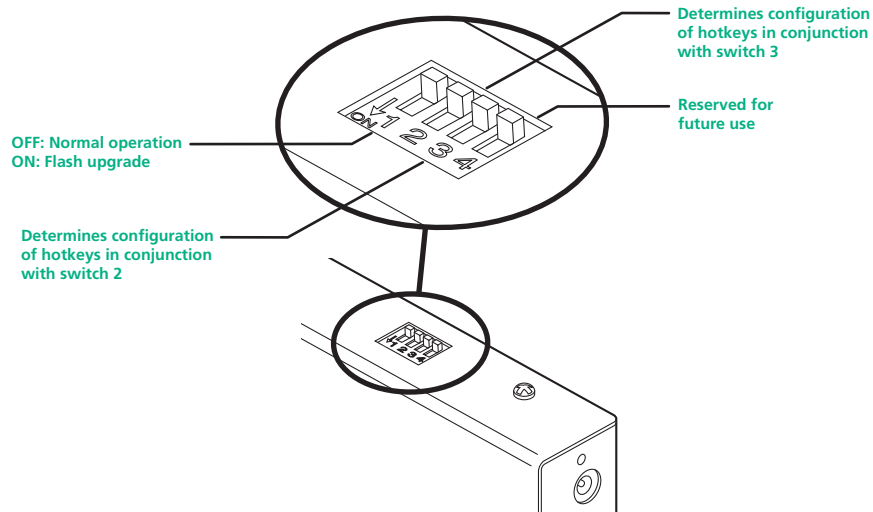
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ServSwitch CX Remote module switches

Certain aspects of operation can be affected by the switches on the ServSwitch CX Remote module.



Note: When shipped, all switches are set in the OFF positions and this will produce normal operation.

Switch 1

OFF: Normal operation.

ON: (Before power is applied) Places the ServSwitch CX Remote module into flash upgrade mode so that the internal software can be changed. Please see the [Flash upgrade](#) section in the 'Special configuration' chapter.

Switches 2 and 3

Switches 2 and 3 determine which two keyboard keys (when pressed in unison) are to be designated as 'hotkeys'. Hotkeys signal to the ServSwitch CX Remote module that the next key to be pressed is a special configuration command for the module and is not to be passed to the computer system.

2 OFF

3 OFF Hotkeys = CTRL and SHIFT

2 OFF

3 ON Hotkeys = ALT and SHIFT

2 ON

3 OFF Hotkeys = CTRL and ALT

2 ON

3 ON Hotkeys disabled

Switch 4

This switch is reserved for future use.



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Operation

General use

In use, the ServSwitch CX Remote module should be transparent - the system and its peripherals should operate exactly as normal, the only difference being that they are now a long distance apart.

In some installations, you may see some 'shadows' to the right of high contrast screen characters. This can be caused by an incorrectly selected sharpness setting and it may be necessary to make adjustments to correct this. Please see [Video compensation - sharpness and brightness](#) in the 'Special configuration' section.

Selecting and using computers

To select a system using the keyboard (USB models)

Use the keypress combinations (on the common keyboard) to switch between the two computer systems. In each case, you need to simultaneously press the currently configured hotkeys (by default, **Ctrl** and **Shift**) together with the number of the required system:

- System 1: Press the hotkeys (by default, **Ctrl** and **Shift**) along with **1**
- System 2: Press the hotkeys (by default, **Ctrl** and **Shift**) along with **2**

Once entered, (providing the system isn't locked - see opposite) the remote peripherals will be connected to the chosen system and you can begin using it as normal.

To disconnect from systems (using the keyboard)

Press the currently configured hotkeys (by default, **Ctrl** and **Shift**) along with **0**

To select a system using a 3 button mouse

You can use a 3 button mouse to change between channels. A 3 button mouse can either have three distinct buttons or alternatively be a 'wheel mouse' where the central scroll wheel may be depressed.

Notes: You first need to enable mouse switching - see [Mouse switching control](#). When mouse switching is enabled, the click of the centre button (or wheel) will not be passed to the host computer - the rotary action of a scroll wheel will, however, continue as normal.

Press and hold the centre mouse button and then click the left mouse button to change between the two channels.

Locking and unlocking the system

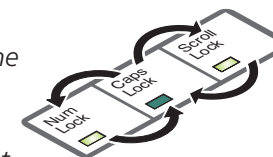
In situations where the computer systems (and their local SAMs) can be locked away, the ServSwitch CX Remote module offers a viable security system to deter unauthorised use. Once a password has been set, a simple key sequence allows each system to be quickly and securely detached from the common peripherals. Only the correct password will reconnect the remote and local modules.

To lock the system

- 1 First set a password. For further details, please refer to the [Password setting](#) section in the 'Special configuration' chapter.
- 2 Simultaneously press the currently configured hotkeys (by default, **Ctrl** and **Shift**) along with **L**.

The screen will go blank and the three keyboard indicators will begin alternately flashing between the 'Num Lock' and 'Scroll Lock', and 'Caps Lock'. This sequence indicates that a password is required.

Additionally neither of the green indicators adjacent to the CATx connectors on the ServSwitch CX Remote module will be lit.



To unlock the system

- 1 Enter the correct password and press **Enter**.

Note: Passwords are NOT case sensitive.

*Note: If an invalid password has been entered and the keyboard indicators are not flashing as described above, press **Enter** to clear the incorrect attempt.*

- 2 If the correct password is entered, the screen will be restored and normal operation can continue.



Special configuration



Configuration

You can alter the way that the ServSwitch CX Remote module operates to suit your requirements. This is done using the Configuration mode and you can affect the following settings:

- [Password setting](#) – allows you to lock the remote module to prevent unauthorised system access.
- [Mouse switching control](#) - determines whether channels may be selected using a three button mouse.
- [Video compensation](#) - sharpness & brightness – allows you to manually adjust the video image to ensure that it is crisp and bright.
- [Video skew adjustment](#) - ServSwitch CX Remote AS or AUS models only - allows you to compensate for the effects of long cable runs on colour reproduction.
- [Miscellaneous settings](#) – report firmware version and restore settings.

What are hotkeys?

Hotkeys are two normal keyboard keys that, when pressed simultaneously with a third key, signal to the ServSwitch CX Remote module that you are sending a message specifically to it and not to the connected computer. The hotkeys are ordinarily **Ctrl** and **Shift**, while a third keypress determines what you want the module to do.

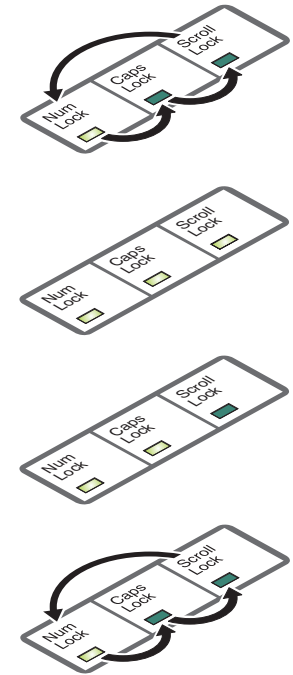
If the standard **Ctrl** and **Shift** hotkeys are also needed for computer tasks, you can change them for another combination using switches 2 and 3 on the ServSwitch CX Remote module:

- 2 OFF
- 3 OFF Hotkeys = **Ctrl** and **Shift** (default setting)
- 2 OFF
- 3 ON Hotkeys = **Alt** and **Shift**
- 2 ON
- 3 OFF Hotkeys = **Ctrl** and **Alt**
- 2 ON
- 3 ON Hotkeys disabled

Entering, using and exiting configuration mode

To enter and use configuration mode:

- 1 Simultaneously press the currently configured hotkeys (by default, **Ctrl** and **Shift**) along with **Enter**.
The three keyboard indicators ('Num Lock', 'Caps Lock' and 'Scroll Lock') will now begin to flash in sequence to show that you are in configuration mode.
- 2 Press the first letter of the required configuration option, for instance **F**.
All three keyboard indicators will illuminate continuously.
- 3 Press the number of the required configuration option, for instance **8**.
The 'Scroll Lock' indicator will extinguish, leaving the 'Num Lock' and 'Caps Lock' indicators lit.
- 4 Press **Enter** to confirm your option.
The three keyboard indicators ('Num Lock', 'Caps Lock' and 'Scroll Lock') will now begin to flash in sequence again.








To exit from configuration mode:

- 1 Within configuration mode, the three keyboard indicators should be flashing in sequence to show that the module is ready to receive a new command.
- 2 Press **Enter**.
The three indicators will return to their normal states.

Password setting

Password protection allows you restrict access to the system only to authorised personnel. A password first needs to be set and then, using the keyboard attached to the remote ServSwitch CX Remote module, a simple key sequence allows the system to be quickly and securely detached from its peripherals.

To set a password

- 1 Simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with  to enter configuration mode.
- 2 Press **F** followed by .
- 3 Now enter your new password, within the following constraints:
 - Passwords are NOT case sensitive,
 - Passwords may be any length from one character to a maximum of forty characters,
 - The following keys may NOT be used: **Ctrl**, **Alt**, **Shift**, or .
- 4 When you have entered the password, press  to signal its completion.
- 5 Press  once more to exit configuration mode.

For full details about how to lock and unlock the system using your password, please see the [Locking and unlocking the system](#) section in the 'Installation and operation' chapter.

To clear a password (and restore factory default settings)

This procedure is applicable for the **ServSwitch CX Remote USB** model only. To clear a password (and restore factory settings) on a standard ServSwitch CX Remote model, use the **F8** reset function covered within the [Miscellaneous settings](#) section (the ServSwitch CX Remote USB model may also be reset using this method).





- 1 Connect the ServSwitch CX Remote module to a computer in the same manner as you would to carry out a flash upgrade - see [Performing flash upgrades](#).
- 2 While power is applied, set the ServSwitch CX Remote upgrade switch SW1 to its ON position.
- 3 Remove power from the ServSwitch CX Remote unit and then re-apply power.
- 4 Set the computer serial settings to the following: 19200, n, 8, 1
- 5 Using 'TeraTerm' (recommended) or an alternative terminal program, send "CLEAR<cr>" - in upper or lower case from the keyboard. The ServSwitch CX Remote unit should respond with "OK".
- 6 The password is now clear and all factory default settings restored.

Mouse switching control (USB models)

In order to allow a 3 button mouse (or scroll wheel mouse) to be used to change channels, it is first necessary to enable the feature using the process described here. For details about switching using a mouse - see [Selecting and using computers](#).

Note: When mouse switching is enabled, the click of the centre button (or wheel) will not be passed to the host computer - the rotary action of a scroll wheel will, however, continue as normal.

To enable/disable mouse switching

- 1 Simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with  to enter configuration mode.
- 2 To enable mouse switching: Press **M** **2** 
To disable mouse switching: Press **M** **1** 
- 3 Press  to exit configuration mode.



Hot plugging PS/2-style connections and mouse restoration

For computer systems that use PS/2-style keyboard and mouse connections, it is strongly recommended that you switch off the computer system before attempting to connect it via the SAM. However, if this is not possible then you need to 'hot plug' the SAM while power is still applied to the system (keyboards and mice with USB connections are unaffected by hot-plugging). There is not normally a danger of damage to the system, however, when PS/2 mouse communications are interrupted, often they fail to reinitialise when reconnected. SAMs provide a feature to reinstate mouse communications once the necessary connections have been made.

There are two main types of data formats used by current PC mice, these are the older 'PS/2' format and the more recent 'IntelliMouse®' format introduced by Microsoft. These use slightly different data arrangements and it is important to know which type was being used before you hot-plugged the SAM module. The previous setting depends both on the type of mouse and the type of driver as various combinations of PS/2 and Intellimouse are possible. Using the incorrect restore function may produce unpredictable results and require the system to be rebooted.

Which restore setting do I use?

The general rule is that unless both the mouse *and* the driver are *both* Intellimouse compatible then you need to restore the mouse as 'PS/2'.





Recognising an Intellimouse-style mouse

The Intellimouse format was introduced to support, among other features, the scroll wheel function. If your mouse has a scroll wheel, then it is likely to support the Intellimouse format. If you have a Microsoft mouse, then it will usually state that it is an Intellimouse on its underside label.

Recognising an Intellimouse driver

Before hot plugging your SAM (or afterwards using only keyboard control), access the Windows Control Panel and select either the *Mouse* option (on Windows NT, 2000 and XP) or the *System* option (on Windows 95, 98, ME). Look for the name of the driver, which will usually include the words *PS/2* or *Intellimouse*.

To restore mouse operation when hot plugging:





- 1 Carefully connect the SAM to the system and its keyboard, mouse, monitor and audio output (if used).
- 2 Simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with  to enter configuration mode.
- 3 Enter the appropriate restore function code:
 - *PS/2* – press **M** **6** 
 - *IntelliMouse* – press **M** **7** 
- 4 To exit configuration mode, press .
- 5 Move the mouse a short distance and check for appropriate on-screen cursor movement. If the mouse cursor darts erratically around the screen, then cease moving the mouse. This is an indication that the chosen restore function is incorrect. Try again using the other restore function.

Note: The restore functions predict the likely mouse resolution settings but may not restore the exact speed or sensitivity settings that were originally set.

Microsoft and Logitech -specific mouse settings

In certain installations some Logitech mouse drivers may lose the action of the mouse buttons when used with the standard 'Microsoft compatible' signalling protocol used between the modules. To solve this problem, select the 'Logitech compatible' mouse signalling protocol.

To change mouse signalling protocols

- 1 Simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with  to enter configuration mode.
- 2 Enter the appropriate protocol code:
 - *Microsoft compatible* – press **M** **3** 
 - *Logitech compatible* – press **M** **4** 
- 3 To exit configuration mode, press .



Video compensation (sharpness and brightness)

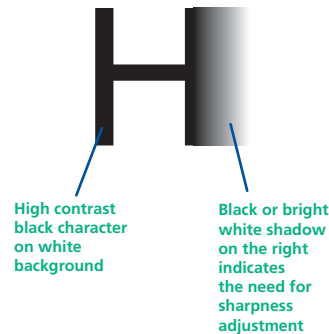
Using the in-built ServSwitch CX Remote controls you can adjust the picture sharpness and brightness to improve the remote picture quality.

Video compensation is best carried out when viewing high contrast images with vertical edges, such as black lines on a white background. When doing so, if you notice that the screen image is 'fuzzy' or 'dark' then the image controls may not be able to solve this condition.

To display a suitable high contrast image

The best way to clearly view the effect of sharpness and brightness adjustments is to display a high contrast image, with vertical edges, on the screen.

- Open a word processor, type the capital letter 'H', or 'M' and increase the point size to 72 or higher. For best results, the background should be white and the character should be black.
- A BLACK shadow on the right of the character indicates UNDER compensation.
- A WHITE shadow on the right of the character indicates OVER compensation.



Note: The Word processor method is accurate and quick. However, for the very finest video compensation, use the latest "skew" test pattern program which shows both the skew pattern and a section of mixed size Hs (black on white and white on black).

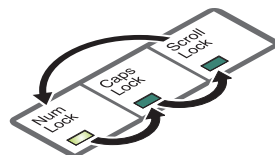
To apply remote user video compensation

Video compensation is controlled by the ServSwitch CX Remote module and it maintains independent compensation settings for each of its two ports.

Note: When used with an ServSwitch CX switch, also see the section opposite.

- 1 *First select the port that you wish to adjust:* On the keyboard that is connected to the ServSwitch CX Remote module, simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with **F1** for the first port or **F2** for the second port.
- 2 *Now enter video configuration mode:* On the same keyboard, simultaneously, press the hotkeys along with **F3**.

The three keyboard indicators ('Num Lock', 'Caps Lock' and 'Scroll Lock') will now begin to flash in sequence. The speed of the sequence indicates the level of the sharpness adjustment currently applied: the slower the rate, the lower the level of sharpness being applied.



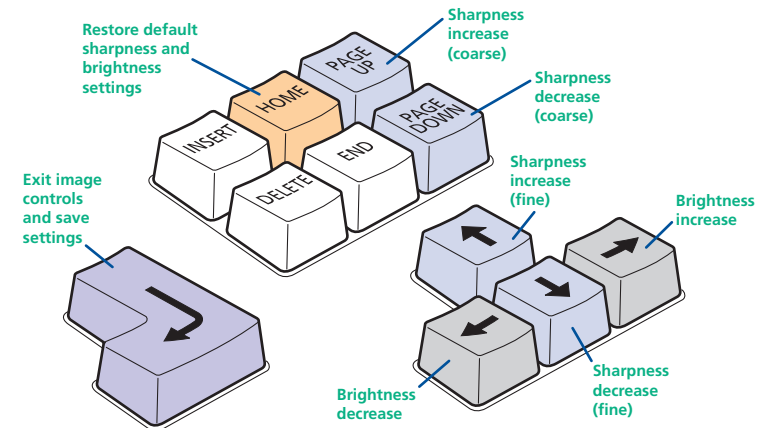
- 3 While viewing the displayed screen image, use the following keys to adjust the controls:

Sharpness: **↑** **↓** for fine adjustment, **Page Up** **Page Down** for coarse adjustment.

There are 255 sharpness levels (one coarse step jumps 10 levels).

Note: If the monitor goes blank and switches off (due to oversetting the sharpness adjustment) press the Home key to restore.

Brightness: **←** **→** for adjustment. There are 255 brightness levels.

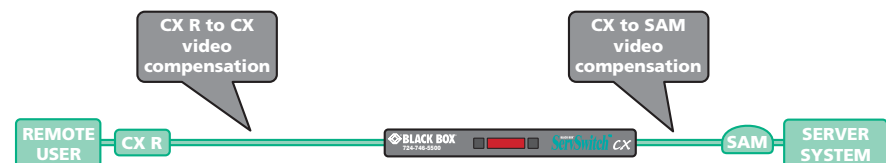


- 4 When no shadows are visible and the displayed images have crisp edges, press **F4** to exit configuration mode and permanently save all settings. The new compensation settings will be stored, even when power is removed or if a complete reset is initiated. These settings should not require further changes unless the cabling arrangements are altered.

Note: To adjust video compensation for the other channel, you must exit from configuration mode (as described above), select the other channel (as described in step 1) and then re-enter configuration mode (step 2).

When used with a ServSwitch CX digital switch

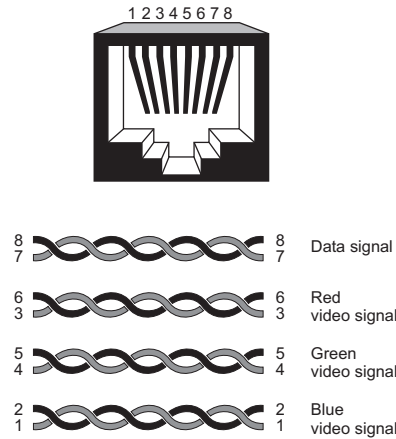
The CATx switch will communicate with the ServSwitch CX Remote module and automatically add any further switch to SAM video compensation (set within the OSD of the switch) to compensate for the distance between the CX switch and the final SAM. *Important: Ensure that the switch to SAM compensation has been configured before adjusting the ServSwitch CX Remote video compensation.*



Video skew adjustment (AS and AUS models only)

The category 5, 5e and 6 cabling supported by the modules consists of four pairs of wires per cable. Three of these pairs are used to convey red, green and blue video signals to the remote video monitor. Due to the slight difference in twist rate between these three pairs, the red, green and blue video signals may not arrive at precisely the same time. This is visible as separate colour shadows on high contrast screen images and is particularly apparent when using higher screen resolutions and some types of category 5e cables.

To alleviate this situation, the CX Remote AS and AUS modules provide internal skew adjustment that can help to rectify the situation. The skew adjustment works by delaying or advancing the timing of any of the red, green or blue colour signals so that they are all delivered to the monitor at precisely the same time. For best results, the "skew" program supplied on the disk or available from Black Box technical support is the most accurate way of setting skew as the red, green and blue lines are rendered exactly on the screen as single pixel wide lines. The skew.bmp test pattern can also be used but it is less accurate. Alternatively, you can create your own skew pattern using a standard image creation package, as detailed opposite.

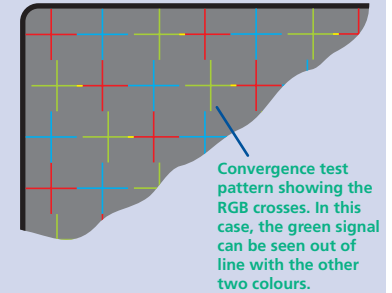


To use skew adjustment

- 1 Display a skew pattern on the appropriate computer. You can either use the supplied skew pattern or create your own:

Using the supplied skew pattern

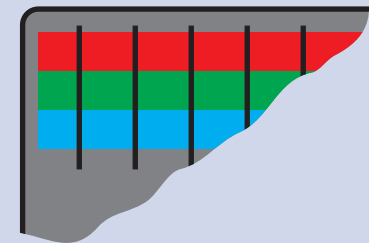
- i Insert the supplied Installation CD-ROM into the CD player of the computer.
- ii Within Windows, use the *My Computer* option (usually available as a desktop icon or within the Start menu) to view the contents of the CD-ROM. Double-click the **Skew** entry to display the standard test pattern. If necessary, maximise the application window so that the image fills the screen.



The screen will show a series of fine red, green and blue crosses which should all be in line, vertically and horizontally. Skew affects the horizontal placement of the colours and using this pattern it is much easier to discover which, if any, colours are being adversely affected by the cable link.

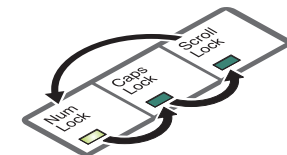
Creating a skew test pattern

- i Run any image creation/editing application, such as the Paint program supplied with Windows.
- ii Using the image application create three stacked horizontal rectangles (one red, one green and one blue) that fill the width of the screen.
- iii Draw a vertical black line down across the coloured bars and then repeat this vertical line at intervals along the width of the coloured bars. These lines create breaks across the colours and give you more opportunities to view the horizontal position of each colour relative to the others.

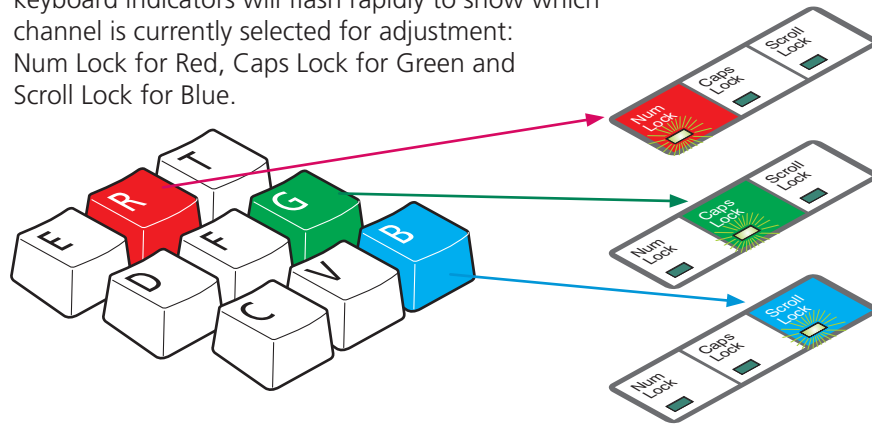


- 2 On the keyboard connected to the ServSwitch CX Remote module, simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with **Num Lock** to enter configuration mode.

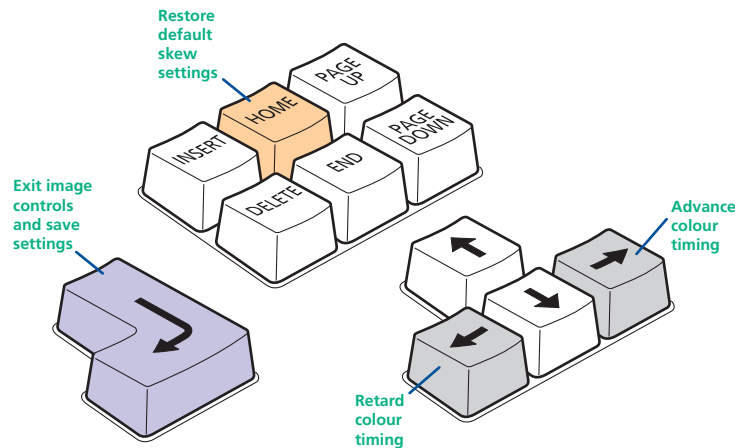
The three keyboard indicators ('Num Lock', 'Caps Lock' and 'Scroll Lock') will now begin to flash in sequence.



- 3 As appropriate, press either the R, G or B keyboard keys to select the appropriate colour channel. Corresponding keyboard indicators will flash rapidly to show which channel is currently selected for adjustment: Num Lock for Red, Caps Lock for Green and Scroll Lock for Blue.



- 4 Press the ← and → keys to retard or advance the timing of the selected colour channel respectively. On screen you will see a change in the position of the selected colour crosses (or colour bars) in relation to the other two.



- 5 When the selected colour crosses (or colour bars) are correctly positioned, press ↵ to exit that colour channel. The keyboard indicators will return to flashing in sequence.
- 6 If required, repeat steps 3 to 5 to select and adjust any colour channel until the vertical lines of the red, green and blue crosses are all aligned.
- 7 When all colours are correctly aligned on all video channels, press ↵ to exit configuration mode and permanently save all settings.

Note: Once you have made the skew adjustments, it may be necessary to re-adjust the image controls to attain optimum screen images.

Miscellaneous settings

The following are configuration settings within the modules that are not covered in other sections of this guide. These can be achieved once within configuration mode by pressing the indicated keys:

Report firmware version - F1 ↵

Before initiating this command, ensure that the system is running an application that can display typed keys as screen characters - e.g. a word processor or Windows Notepad. The current firmware version will be written to the application in the form of the letter 'V' followed by three numbers - for example V201 means version 2.01.

Reset all configuration options to default states - F8 ↵

Returns all user configurable options to the settings that are installed at manufacture. The password will be cleared, however, any current image control settings or skew adjustments will not be reset.



Performing flash upgrades

The ServSwitch CX Remote modules and SAMs are fully reconfigurable via flash upgrades using the KVM Firmware Uploader utility.

While the two different types of remote modules use the same KVM Firmware Uploader utility to perform the flash upgrade, they need to be connected to the upgrade computer in different ways, as follows:

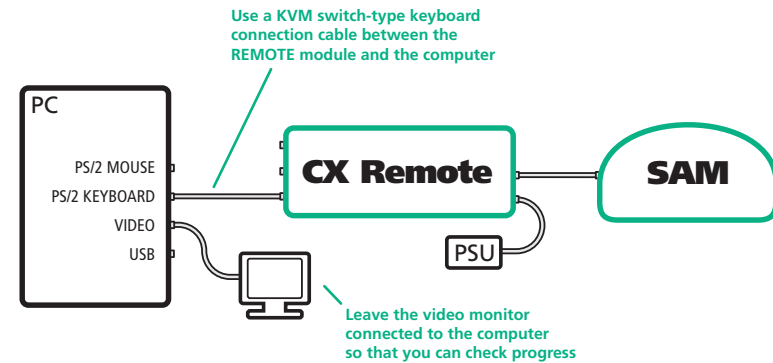
- ServSwitch CX Remote (PS/2) modules - Use an optional PS/2-style keyboard cable to connect the PS/2 keyboard port of the module to the computer (see opposite) and run the KVM Firmware Uploader utility - see the [next page](#).
- ServSwitch CX Remote USB modules - Use an optional upgrade cable to link the special programming socket (next to the switch block) to the computer and run the KVM Firmware Uploader utility - see the [next page](#).

In both cases, the KVM Firmware Uploader utility will update the firmware of the ServSwitch CX Remote (USB) module and also temporarily transform it so that it can update the SAM unit. Once completed, the ServSwitch CX Remote will return to its normal operation.

The KVM Firmware Uploader utility and optional cables for both module types are available from Black Box technical support. The utility also allows you to check the current revision of the ServSwitch CX Remote (USB) firmware.

To connect a ServSwitch CX Remote (PS/2) module for upgrade

- 1 Disconnect all cables from the ServSwitch CX Remote module and take it to the computer.
- 2 Use a 'KVM switch-type' keyboard cable (6pin mini-DIN male to 6pin mini-DIN male plugs with all lines connected) - not supplied. Attach one end of the cable to the keyboard port of the computer. Connect the other end of the cable to the keyboard port of the module.



- 3 On the module, change switch 1 to the ON position. If you wish to check or upgrade the SAM, ensure that it is connected to the ServSwitch CX Remote module in the usual manner.
- 4 Attach the power supply unit to the POWER input of the module and connect the mains lead to a nearby wall socket.
- 5 Switch on the computer and follow the instructions for using the [KVM Firmware uploader utility](#).

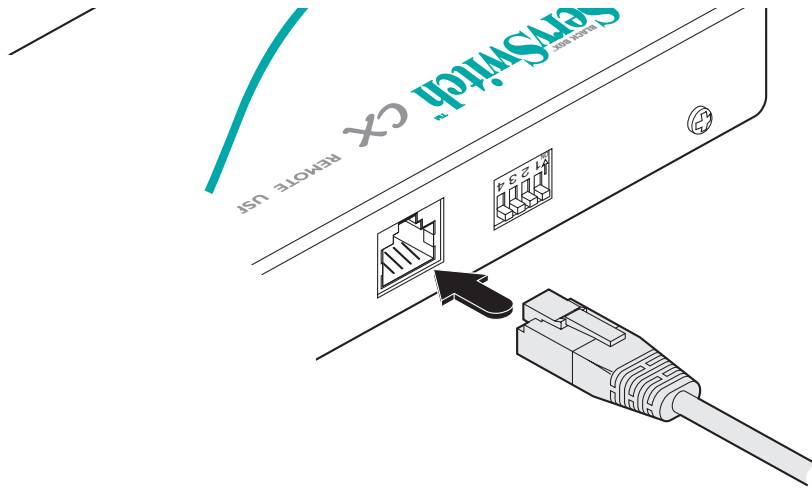
After the firmware upgrade has completed

- 1 Switch off the computer and disconnect the REMOTE module. Return REMOTE switch 1 to the OFF position.
- 2 Refer to the 'Installation and operation' chapter for detailed instructions on correctly connecting the module and the SAM to the computer, its peripherals and the power supply.



To connect a ServSwitch CX Remote USB module for upgrade

- 1 Remove power from the ServSwitch CX Remote module. If one or both SAMs also need to be upgraded, ensure that they are connected to the ServSwitch CX Remote in the usual manner.
- 2 On the side of the ServSwitch CX Remote USB module, place switch 1 into its ON position.
- 3 Use the optional upgrade cable to link between the socket adjacent to the ServSwitch CX Remote switch block and a vacant RS232 9-way serial port of the computer system to be used.



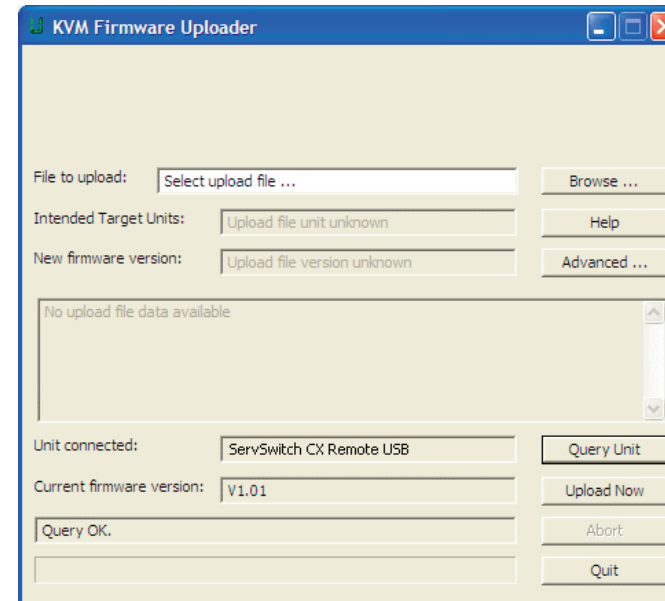
- 4 Apply power to the ServSwitch CX Remote module. The green indicator on the **TO LOCAL 1** socket will flash to indicate upgrade mode.
- 5 On the computer, follow the instructions for using the *KVM Firmware uploader utility* - see *opposite*.

After the firmware upgrade has completed

- 1 Switch off the computer and disconnect the REMOTE module. Return REMOTE switch 1 to the OFF position.
- 2 Change the ServSwitch CX Remote switch 1 to the OFF position and cycle the power. When the power is re-applied the ServSwitch CX Remote module and any upgraded SAMs will operate using the new firmware.

To use the KVM Firmware Uploader utility

- 1 Locate the KVM Firmware Uploader utility application (either on a supplied CD-ROM or from a download) and select the KVMUploader icon to run the upgrade utility. The KVM Firmware Uploader dialog will be displayed:

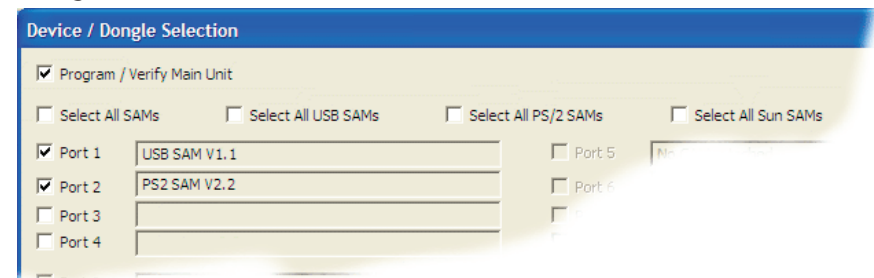


- 2 Click the *Query Unit* button to confirm that communication is possible with the CX Remote module and to establish the existing firmware details.

Note: The computer to which each SAM is connected must be powered before the respective SAM can be accessed.

If the application cannot contact the module, recheck the connection cable and click the *Advanced...* button to check that the correct serial port is being used. Change the serial port within the *Advanced* section, if necessary.

The results of the unit query will be displayed in the Device/Dongle Selection dialog:



The type and firmware revision of each discovered SAM will be displayed alongside the port number to which it is connected.



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- Using the Device/Dongle Selection dialog determine which items should receive a firmware upgrade:
 - Use the *Program / Verify Main Unit* option to include or exclude the ServSwitch CX Remote module itself.
 - Use the *Select All SAMs* option to upgrade every discovered SAM.
 - Use the *Select All USB / PS2 / Sun SAMs* options to upgrade only SAMs of a certain type.
 - Use the individual port options to select particular SAM devices to upgrade.

When the required options have been selected, click OK.

Note: Approximate upgrade times are: ServSwitch CX Remote module = 4½ minutes; each selected SAM = 20 seconds.

- From the main KVM Firmware Uploader dialog, click the *Browse...* button and select the upgrade file that is appropriate to your ServSwitch CX unit:
ServSwitch CX Remote: ServSwitch CX Remote_Vxxx
where Vxxx is the upgrade file version number.

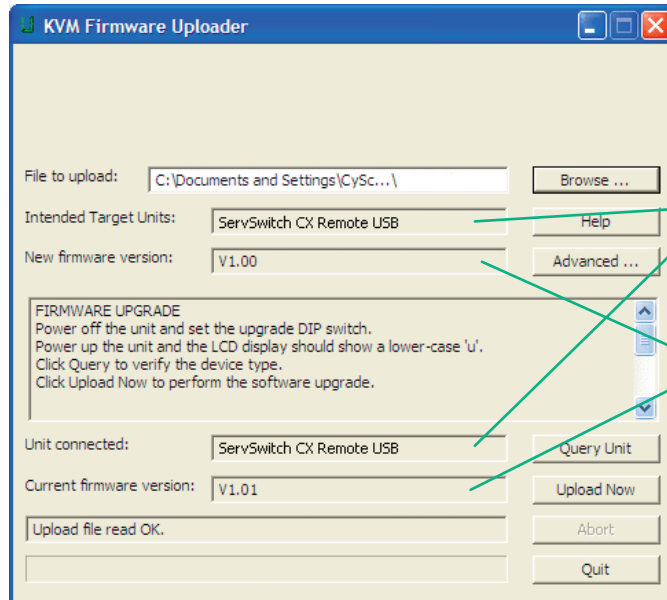
The upgrade file details will be displayed within the dialog.

IMPORTANT: Check that the 'Intended Target Units' field matches the 'Unit Connected' field. If these fields do not match then you may have an incorrect upgrade file, check with Black Box before proceeding. Check also that the 'New firmware version' is greater than the 'Current firmware version'.

- To begin the upgrade process, click the Upload Now button. The progress will be shown within the dialog. Should you decide not to continue with the upload at any stage, click the Abort button; response to this is usually immediate, however, during an erase command, the upload will not be aborted until the erase is complete (this may take a few seconds).

Issues to consider when performing flash upgrades

The upgrade program rewrites the ServSwitch CX Remote firmware code. If the upgrade process is interrupted then the ServSwitch CX Remote will have invalid code and will not be able to operate. It is therefore good practice to ensure that the upgrade process is always fully completed. A partial or failed upgrade may be rectified by performing another upgrade. If the upgrade process is interrupted accidentally then you should immediately repeat the upgrade process without moving switch 1 from the upgrade (ON) position. Switch 1 forces the ServSwitch CX Remote into flash upgrade mode and prevents the upgraded code from being run. Running faulty or partially upgraded code may have unpredictable results and may damage your ServSwitch CX Remote or computing equipment.



Check that the 'Intended Target Units' field matches the 'Unit Connected' field.

Check also that the 'New firmware version' is greater than the 'Current firmware version'.

Further information



Getting assistance

- Email in the US: **techsupport@blackbox.com**
in the UK: **techhelp@blackbox.co.uk**
- Phone in the US: **724-746-5500**
in the UK: **+44 (0)118 965 6000**

Safety information

- For use in dry, oil free indoor environments only.
- Do not use to link between buildings.
- Ensure that all twisted pair interconnect cables are installed in compliance with all applicable wiring regulations.
- Do not connect CATx link interfaces (RJ45 style connectors) to any other equipment, particularly network or telecommunications equipment.
- Warning – the power adapter contains live parts.
- No user serviceable parts are contained within the power adapter - do not dismantle.
- Plug the power adapter into a socket outlet close to the ServSwitch CX Remote module that it is powering.
- Replace the power adapter with a manufacturer approved type only.
- Do not use the power adapter if the power adapter case becomes damaged, cracked or broken or if you suspect that it is not operating properly.
- If you use a power extension cord with the ServSwitch CX Remote module, make sure the total ampere rating of the devices plugged into the extension cord do not exceed the cord's ampere rating. Also, make sure that the total ampere rating of all the devices plugged into the wall outlet does not exceed the wall outlet's ampere rating.
- Do not attempt to service the modules yourself.
- The ServSwitch CX Remote module and power supply can get warm in operation – do not situate them in an enclosed space without any ventilation.
- The ServSwitch CX Remote module does not provide ground isolation and should not be used for any applications that require ground isolation or galvanic isolation.

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Radio Frequency Energy

A Category 5 (or better) twisted pair cable must be used to connect the units in order to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

All other interface cables used with this equipment must be shielded in order to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

European EMC directive 89/336/EEC

This equipment has been tested and found to comply with the limits for a class A computing device in accordance with the specifications in the European standard EN55022. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions may cause harmful interference to radio or television reception. However, there is no guarantee that harmful interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to correct the interference with one or more of the following measures: (a) Reorient or relocate the receiving antenna. (b) Increase the separation between the equipment and the receiver. (c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected. (d) Consult the supplier or an experienced radio/TV technician for help.

FCC Compliance Statement (United States)

This equipment generates, uses and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a class A computing device in accordance with the specifications in Subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Canadian Department of Communications RFI statement

This equipment does not exceed the class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le règlement sur le brouillage radioélectriques publié par le ministère des Communications du Canada.



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FCC requirements for telephone-line equipment

- 1 The Federal Communications Commission (FCC) has established rules which permit this device to be directly connected to the telephone network with standardized jacks. This equipment should not be used on party lines or coin lines.
- 2 If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until the repair has been made. If this is not done, the telephone company may temporarily disconnect service.
- 3 If you have problems with your telephone equipment after installing this device, disconnect this device from the line to see if it is causing the problem. If it is, contact your supplier or an authorized agent.
- 4 The telephone company may make changes in its technical operations and procedures. If any such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.
- 5 If the telephone company requests information on what equipment is connected to their lines, inform them of:
 - a The telephone number that this unit is connected to.
 - b The ringer equivalence number.
 - c The USOC jack required: RJ-11C.
 - d The FCC registration number.Items (b) and (d) can be found on the unit's FCC label. The ringer equivalence number (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.
- 6 In the event of an equipment malfunction, all repairs should be performed by your supplier or an authorized agent. It is the responsibility of users requiring service to report the need for service to the supplier or to an authorized agent.

Certification notice for equipment used in Canada

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications-network protective, operation, and safety requirements.

The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company.

The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility—in this case, your supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.



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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 liquidos 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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Documentation by:  www.ctxd.com

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BlackBox subsidiary contact details



Country	Web Site/Email	Phone	Fax
United States	www.blackbox.com	724-746-5500	724-746-0746
Austria	www.black-box.at support@black-box.at	+43 1 256 98 56	+43 1 256 98 56
Belgium	www.blackbox.be support.nederlands@blackbox.be support.french@blackbox.be support.english@blackbox.be	+32 2 725 85 50	+32 2 725 92 12
Denmark	www.blackbox.dk support@blackbox.dk	+45 56 63 30 10	+45 56 65 08 05
Finland	www.blackbox.fi tuki@blackbox.fi	+35 201 888 800	+35 201 888 808
France	www.blackbox.fr tech@blackbox.fr	+33 1 45 606 717	+33 1 45 606 747
Germany	www.black-box.de techsupp@black-box.de	+49 811 5541 110	+49 811 5541 499
Italy	www.blackbox.it supporto.tecnico@blackbox.it	+39 02 27 404 700	+39 02 27 400 219
Netherlands	www.blackbox.nl techsupport@blackbox.nl	+31 30 241 7799	+31 30 241 4746
Norway	www.blackboxnorge.no support@blackboxnorge.no	+47 55 300 710	+47 55 300 701
Spain	www.blackbox.es tecnico@blackbox.es	+34 9162590732	+34 916239784
Sweden	www.blackboxab.se support@blackboxab.se	+46 8 44 55 890	+46 08 38 04 30
Switzerland	www.black-box.ch support@black-box.ch	+41 55 451 70 71	+41 55 451 70 75
UK	www.blackbox.co.uk techhelp@blackbox.co.uk	+44 118 965 6000	+44 118 965 6001
Ireland	www.blackbox.co.uk techhelp@blackbox.co.uk	+353 1 662 2466	+353 1 662 2477

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