



January 2007
KV04-REM
KV04A-REM
KV04AS-REM

ServSwitch™ CX Remote

CUSTOMER Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
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Contents



Welcome

Introduction	2
--------------------	---

Installation & Operation

Connections	4
Cable length advice	4
Connections at the CX Remote module	5
Operation.....	7
General use	7
Locking and unlocking the system	7

Special configuration

Configuration	8
What are hotkeys?	8
Entering, using and exiting configuration mode.....	8
Password setting	9
Hot plugging and mouse restoration	10
Which restore setting do I use?.....	10
Microsoft and Logitech -specific mouse settings	10
Video compensation (sharpness and brightness).....	11
Skew adjustment	12
Miscellaneous settings.....	13
Performing flash upgrades	14

Further information

Getting assistance.....	15
Safety information	15
Radio Frequency Energy.....	16
Certification notice for equipment used in Canada.....	17
Normas Oficiales Mexicanas (NOM) statement	18
Instrucciones de seguridad	18
BlackBox subsidiary contact details.....	20

CONTENTS
WELCOME
INSTALLATION & OPERATION
SPECIAL CONFIGURATION
FURTHER INFORMATION

Welcome



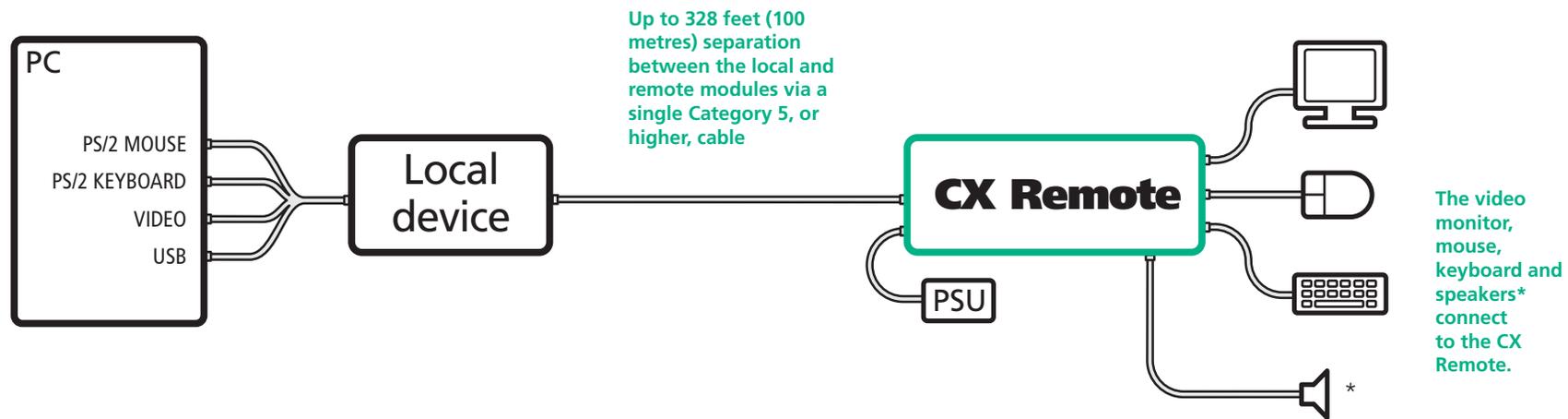
Introduction

Thank you for choosing the ServSwitch CX Remote from Black Box. This compact module can be used in conjunction with other Black Box products, such as a SAM (Server Access Module) or other industry leading product. In close harmony with the other Black Box device which remains local to the host computer, the CX Remote allows you to place the controlling keyboard, video monitor and mouse

more than 328 feet (100 metres) from a computer system. The range topping CX Remote KV04A and KV04AS variants also allow you to extend your audio accessories away from your computer.

The long distance link between the originating device and the CX Remote is made via Category 5, 5e or 6 twisted pair cabling.

Special circuitry within the CX Remote allows you to make adjustments to the sharpness and brightness settings to suit your own preferences. Additionally, the KV04AS variant also features Skew adjustment to counteract the effects of uneven lengths of twisted pair cables that are used to carry the video signals.



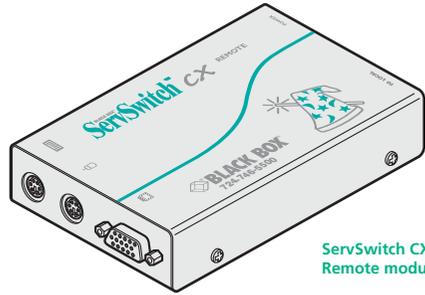
	KV04	KV04A	KV04AS
PS/2 keyboard connection	✓	✓	✓
PS/2 mouse connection	✓	✓	✓
Video connection	✓	✓	✓
Audio connection		✓	✓
Brightness control	✓	✓	✓
Sharpness control	✓	✓	✓
Skew adjustment			✓

This table provides a summary of the abilities of the various CX Remote models.

* KV04A or KV04AS only, not KV04

- CONTENTS
- WELCOME
- INSTALLATION & OPERATION
- SPECIAL CONFIGURATION
- FURTHER INFORMATION

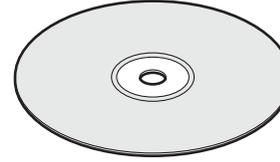
Supplied items



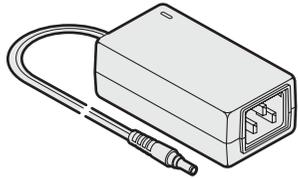
ServSwitch CX
Remote module



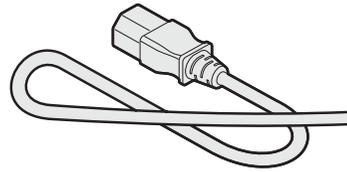
Four self-adhesive
rubber feet



CD-ROM



Power adapter and country-
specific power
lead



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

Installation & Operation



Connections

CX Remote modules offer straightforward installation and generally require minimal configuration. The local device (ServSwitch CX, SAM, etc.) connects directly to the computer, while the CX Remote resides at the other end of the twisted pair cable and attaches to the keyboard, mouse, etc.

- [Connections at the CX Remote module](#)

Cable length advice

The various CX Remote models 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 received by the module. The module receives 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 mis-aligned colours on screen. This is called *skew* and becomes more noticeable as cable runs become longer and screen resolutions/refresh rates increase. KV04AS models are equipped with special features to combat the effects of skew - see [Skew adjustment](#).

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

Models	Category 5	Category 5e or 6
KV04 and KV04A models	100m ¹ [100m ¹]	50 to 100m ¹ [50 to 100m ¹]
KV04AS	300m ² [200m ²]	300m ² [200m ²]

¹ length limited by skew in the cable.

² length limited by bandwidth compensation amplifiers.

In each case the initial values represent maximum distances when using screen resolutions up to 1280 x 1024 @ 60Hz; whereas the [bracketted] values represent distances achievable using resolutions up to 1600 x 1200 @ 60Hz.

CONTENTS

WELCOME

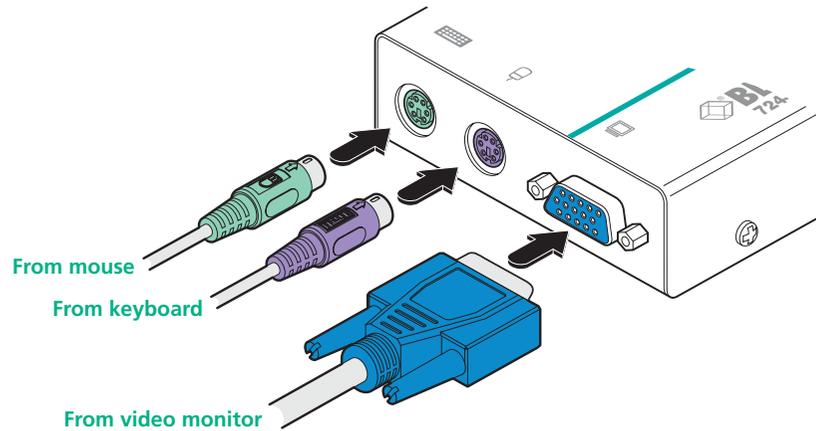
INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

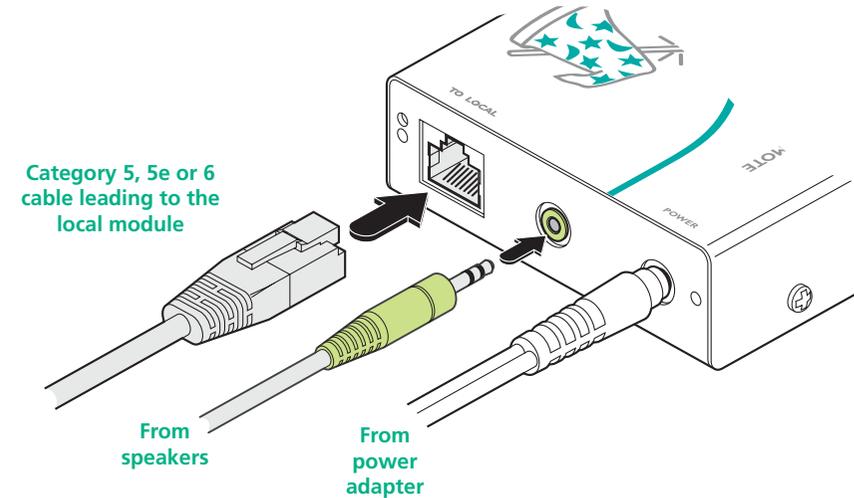
FURTHER
INFORMATION

Connections at the CX Remote 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 local device to the **TO LOCAL** socket of the CX Remote module.



- 4 (KV04A and KV04AS models only) Insert the speaker connector to the light green coloured socket situated between the link connector and the power in socket.
- 5 Insert the output connector of the power supply into the socket at the front edge of the module labelled **POWER**.
- 6 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.
- 7 Where necessary, use the in-built video compensation feature to eliminate any effects caused by the cable run. See [Video compensation](#) for details.



CONTENTS

WELCOME

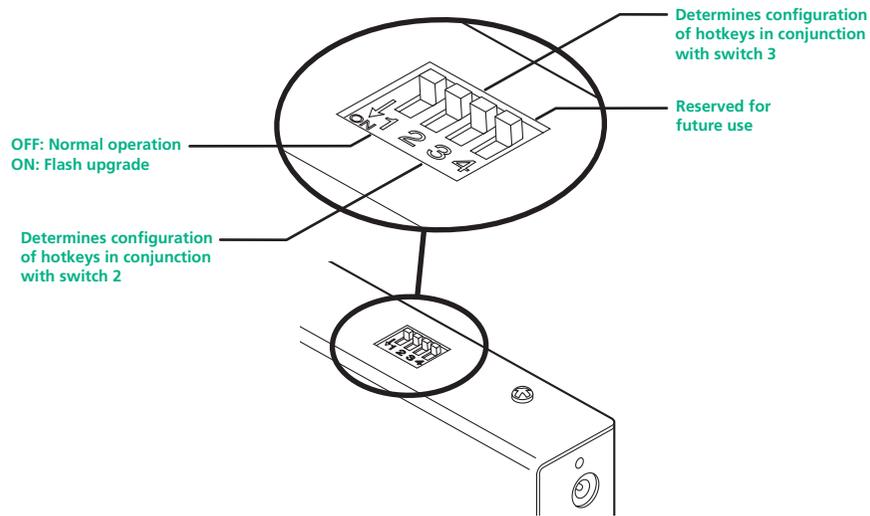
INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

CX Remote module switches

Certain aspects of operation can be affected by the switches on the 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 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 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.



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

Operation

General use

In use, the local device and CX Remote module should be transparent - the system and its peripherals should operate exactly as normal, the only difference being that they are now up to 328 feet 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.

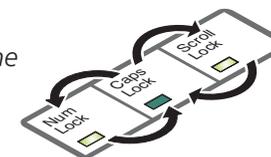
Locking and unlocking the system

In situations where the computer system (and the local device) can be locked away the CX Remote module offers a viable security system to deter unauthorised use. Once a password has been set, a simple key sequence allows the system to be quickly and securely detached from its 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.



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.

To enable the video

Simultaneously press the currently configured hotkeys (by default, **Ctrl** and **Shift**) long with **F1**. This command will be required to restore the video if **Ctrl** and **Shift** along with **L** is used when no password has been set.

To disable the video

Simultaneously, press the currently configured hotkeys (by default, **Ctrl** and **Shift**) along with **O**.



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

Special configuration



Configuration

You can alter the way that the ServSwitch CX extender modules operate 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 restoration and settings](#) – allows you to restore mouse operation and also to change the mouse type.
- [Video compensation](#) - sharpness & brightness – allows you to manually adjust the video image to ensure that it is crisp and bright.
- [Skew adjustment](#) (KV04AS only) – allows you to manually compensate for possible video errors introduced by long, uneven cable connections.
- [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 modules that you are sending a message specifically to them and not to the computer. The hotkeys are ordinarily **Ctrl** and **Shift**, while a third keypress determines what you want the modules to do.

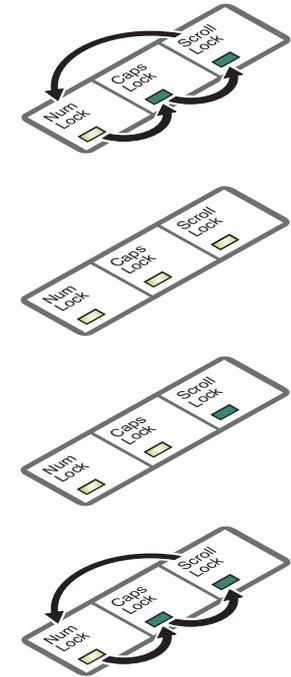
If the standard **Ctrl** and **Shift** hotkeys are also needed for computer tasks, you can change them for another combination using switches 2 and 3 on the CX Remote module:

- 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 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 **P** 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.



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

Hot plugging and mouse restoration

It is strongly recommended that you switch off the computer system before attempting to connect it via the CX remote module. However, if this is not possible then you need to 'hot plug' the CX remote module while power is still applied to the system. There is not normally a danger of damage to the system, however, when mouse communications are interrupted, often they fail to reinitialise when reconnected. The modules 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 CX remote 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 ServSwitch CX extender modules (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 ServSwitch CX extender modules to the system and its keyboard, mouse and monitor.
- 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 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.

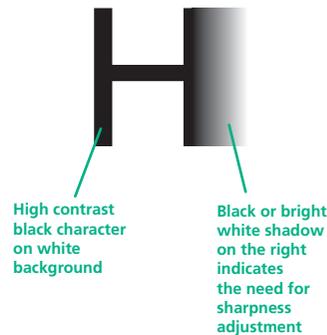
Note: If the high contrast images exhibit shadows with separate colours, then there may be a skew problem which requires a different image adjustment (provided only by the KV04AS variant) - see the [Skew adjustment](#) section for details.

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).



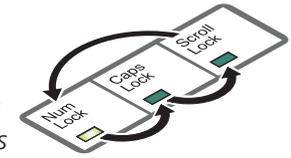
If the image controls cannot provide a crisp image

If, after adjusting the image controls, one or more screen images remain fuzzy or have coloured shadows you may need to use the Skew adjustment feature. Please see [Skew adjustment](#) for details (KV04AS variant only).

To apply remote user video compensation

- 1 On the keyboard that is connected to the CX Remote module, simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with **F2** to enter configuration mode.

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.



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

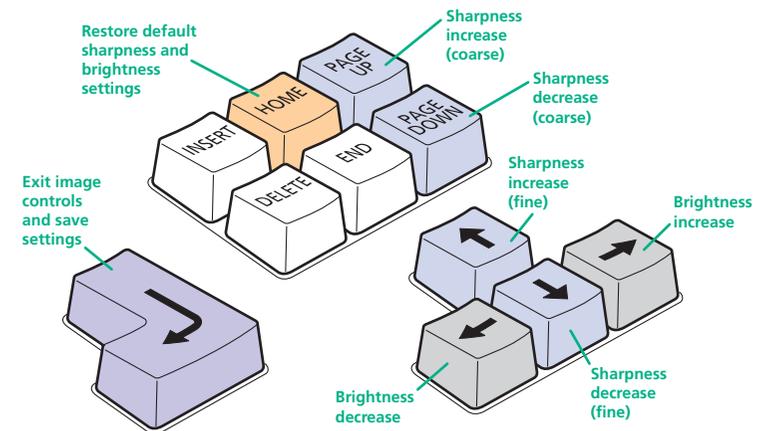
Sharpness: **F4** **F5** for fine adjustment, **F6** **F7** for coarse adjustment.

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

To autoselect sharpness: Press **F2** **F2** **F2** to make the module calculate and apply an automatic compensation level - you can use this as a starting point for your fine tuning.

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

Brightness: **F8** **F9** for adjustment. There are 255 brightness levels.



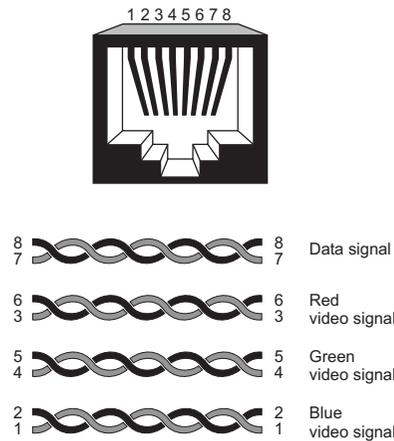
- 3 When no shadows are visible and the displayed images have crisp edges, press **F2** to exit configuration mode and permanently save all settings. The new compensation settings will be stored, even when power is removed or if a complete reset is initiated. These settings should not require further changes unless the cabling arrangements are altered.



Skew adjustment

The category 5, 5e and 6 cabling supported by the CX Remote 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 and 6 cables.

To alleviate this situation, the CX Remote KV04AS provides 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 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.

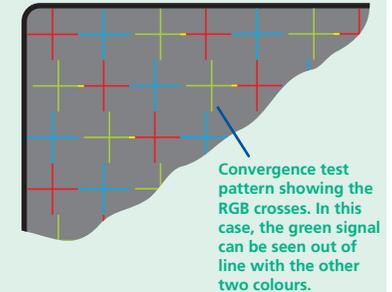


To use skew adjustment

- 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

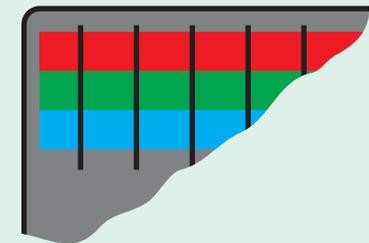
- i Insert the supplied Installation CD-ROM into the CD player of the computer.
- ii Within Windows, use the *My Computer* option (usually available as a desktop icon or within the Start menu) to view the contents of the CD-ROM. Double-click the **Skew** entry to display the standard test pattern. If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

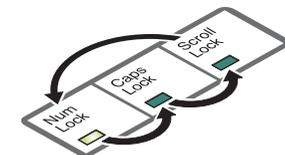
Creating a skew test pattern

- 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.

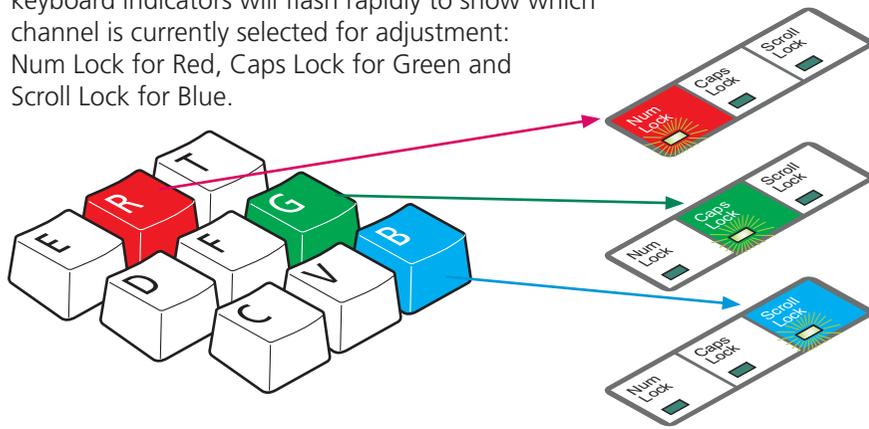


- 2 On the remote user keyboard (connected to CX Remote), simultaneously, press the hotkeys (by default, **Ctrl** and **Shift**) along with **F1** to enter configuration mode.

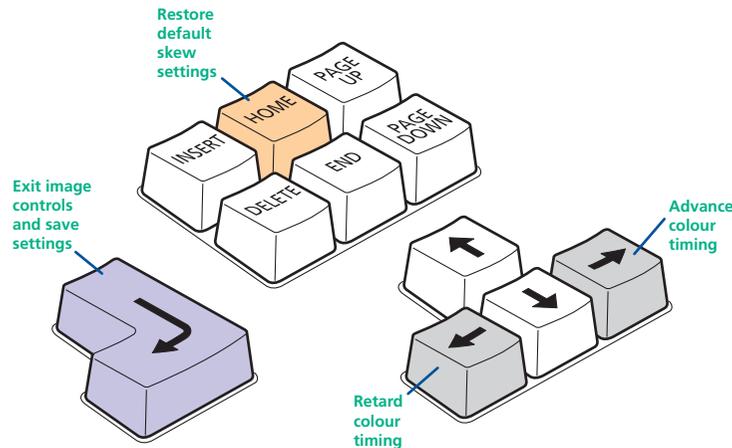
The three keyboard indicators ('Num Lock', 'Caps Lock' and 'Scroll Lock') will now begin to flash in sequence.



- 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 CX Remote module is fully reconfigurable via flash upgrades using the KVM Firmware Uploader utility.

During the upgrade you will be required to connect the CX Remote module directly to a computer system using a special cable. The upgrade utility will update the firmware of the CX Remote. Once completed, the CX Remote will return to its normal operation.

The KVM Firmware Uploader utility is available from Black Box and allows you to check the current revision of the CX Remote firmware. Full instructions are provided with the download file.



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

Further information



Getting assistance

If you are still experiencing problems after checking the list of solutions in the Troubleshooting section then please refer to the customer support information supplied on the front cover.

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 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 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 module and power supply can get warm in operation – do not situate them in an enclosed space without any ventilation.
- The module does not provide ground isolation and should not be used for any applications that require ground isolation or galvanic isolation.

CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

Radio Frequency Energy

A Category 5 (or better) twisted pair cable must be used to connect the Wizard IP unit 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.



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

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.



CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

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.

CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION



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CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION

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CONTENTS

WELCOME

INSTALLATION
& OPERATION

SPECIAL
CONFIGURATION

FURTHER
INFORMATION



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