Cybex™ SC Switching System

Installer/User Guide

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.
Visit https://www.vertiv.com/en-us/support/ for additional assistance.

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1 PRODUCT OVERVIEW

Cybex™ SC switches are field-proven, secure, KVM and KM switching solutions with special support for government agencies. This switching system allows users to switch safely between computers operating at different classification levels from a single set of peripherals, providing continuous access to critical data. With multiple security features, the secure design prevents the transfer of data between the connected computers, ensuring data security is not compromised.

WARNING! This product is equipped with active intrusion protection and tamper-evident seals. Tampering with the switch or breaking/removing the seals will permanently disable it and void the warranty. If the enclosure appears to have been tampered with or if all the port LEDs flash continuously, please contact Technical Support.

The appliances covered in this manual include:

KM Models:

- Cybex™ SC KM 120 Secure 2-Port KM Switch
- Cybex™ SC KM 140/145 Secure 4-Port KM Switches

KVM Models:

- Cybex™ SC 820D/920D Secure 2-Port DisplayPort to HDMI KVM Switches
- Cybex™ SC 820H/920H Secure 2-Port HDMI KVM Switches
- Cybex™ SC 820DP/920DP Secure 2-Port DisplayPort KVM Switches
- Cybex™ SC 840/845/940/945 Secure 4-Port DVI-I KVM Switches
- Cybex™ SC 840D/845D/940D/945D Secure 4-Port DisplayPort to HDMI KVM Switches
- Cybex™ SC 840H/845H/940H/945H Secure 4-Port HDMI KVM Switches
- Cybex™ SC 840DP/845DP/940DP/945DP Secure 4-port DisplayPort KVM Switches
- Cybex™ SC 920XD Secure 2-Port Mixed HDMI, DisplayPort and DVI-I KVM Dual Head KVM Switch
- Cybex™ SC 945XD Secure 4-Port Mixed HDMI, DisplayPort and DVI-I KVM Dual Head KVM Switch
- Cybex™ SC 885DP/985DP Secure 8-port DisplayPort KVM Switches
- Cybex™ SC 820/920 Secure 2-Port DVI-I KVM Switches
- Cybex™ SC 885/985 Secure 8-port DVI-I KVM Switches
- Cybex™ SC 920XP Secure 2-Port Mixed DisplayPort and DVI-I KVM Dual Head KVM Switch
- Cybex™ SC 945XP Secure 4-Port Mixed DisplayPort and DVI-I KVM Dual Head KVM Switch

1.1 Features and Benefits

The SC switching system offers the following options, depending on the model:

- Support for HDMI, DVI-I, VGA and/or DisplayPort video
- Support for Common Access Card (CAC), USB biometric device and USB authentication token
- Certification to Evaluation Assurance Level (EAL) 4+
- Support for USB and PS/2 keyboard and mouse

NOTE: Supports most keyboards and mice. For more information, contact Technical Support.

The SC switching system is also designed to provide additional layers of security, preventing unintended data leaks between computers and providing additional USB port protection.

Table 1.1 Security and Protection Features

FEATURE	DESCRIPTION
Complete network segmentation	Data flow is controlled and insulated from peripheral devices using optical data diodes. EDID emulators and internal firewalls protect shared displays and prevent external memory leaks.
Protection from shared resources	The switches are designed to securely operate, even when peripheral devices are vulnerable to signaling attacks. They do not allow computer access to any shared resource and do not share controllable power sources.
Non-reprogrammable firmware	Custom firmware is not reprogrammable preventing the ability to remotely attack switch controllers.
Audio protection	Microphone switching is not supported to prevent data leaks through audio ports.
CONSOLE USB port protection	CONSOLE USB ports protect from the use of unsafe USB storage devices. Unqualified devices are rejected when connected through the switch even though keyboard and mouse data is passed through.

2 BASIC OPERATION

Although installation of your SC switching system is complete, ensure you have one of the following compatible operating systems:

- Microsoft® Windows®
- Red Hat®, Ubuntu® or any other Linux® platform
- Mac OS® X version 10.3 or higher

The switches are compatible with stereo headphones and amplified stereo speakers.

NOTE: Do not connect a microphone device to the switch's audio output port. Opt to use headset devices that do not include microphone capabilities.

Wireless devices and non-standard keyboards with integrated USB hubs and other USB-integrated devices are not fully supported for security reasons.

2.0.1 Factory reset

A factory reset clears the device settings and restores the device to its original configuration.

To factory reset:

Type Ctrl + Ctrl + F11 + R

2.1 Switch Overview

The following figures and tables show the controls and connectors on the front panel and connectors on the back of the switching systems covered in this manual.

NOTE: The SC 800 series models are single-head devices. They have identical ports, except for the number of ports on the device. The SC 900 series models are dual-head devices.

Figure 2.1 SC KM120 Switch

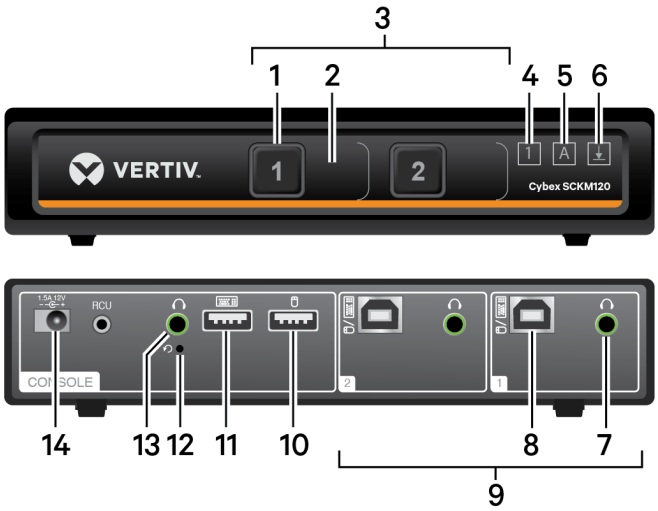


Table 2.1 SC KM120 Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	8	PC keyboard/mouse USB Type-B port
2	Channel label	9	PC ports
3	PC port selectors	10	CONSOLE mouse USB Type-A port
4	Num lock indicator	11	CONSOLE keyboard USB Type-A port
5	Caps lock indicator	12	CONSOLE reset button
6	Scroll lock indicator	13	CONSOLE audio jack (3.5 mm stereo)
7	PC audio jack (3.5 mm stereo)	14	DC Power Inlet

Figure 2.2 SC KM145 Switch

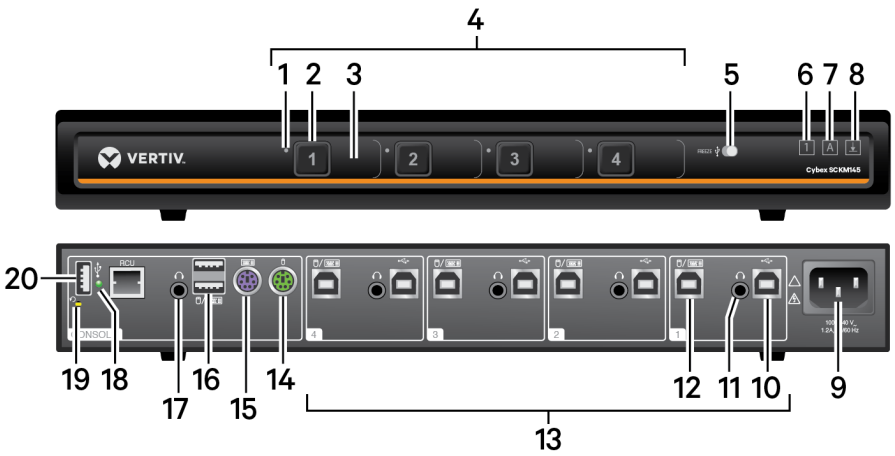


Table 2.2 SC KM145 Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED DPP channel indicator	11	PC audio jack (3.5 mm stereo)
2	LED channel selector	12	PC keyboard/mouse USB Type-B port
3	Channel label	13	PC ports
4	PC port selectors	14	CONSOLE mouse PS/2 mini-DIN 6-pin port
5	DPP freeze button	15	CONSOLE keyboard PS/2 mini-DIN 6-pin port
6	Num lock indicator	16	CONSOLE keyboard/mouse USB Type-A port
7	Caps lock indicator	17	CONSOLE audio jack (3.5 mm stereo)
8	Scroll lock indicator	18	CONSOLE DPP LED connection indicator
9	AC power inlet	19	CONSOLE system reset
10	DPP USB Type-B port	20	CONSOLE DPP USB Type-A port

Figure 2.3 SC 920 DVI-I KVM Switch

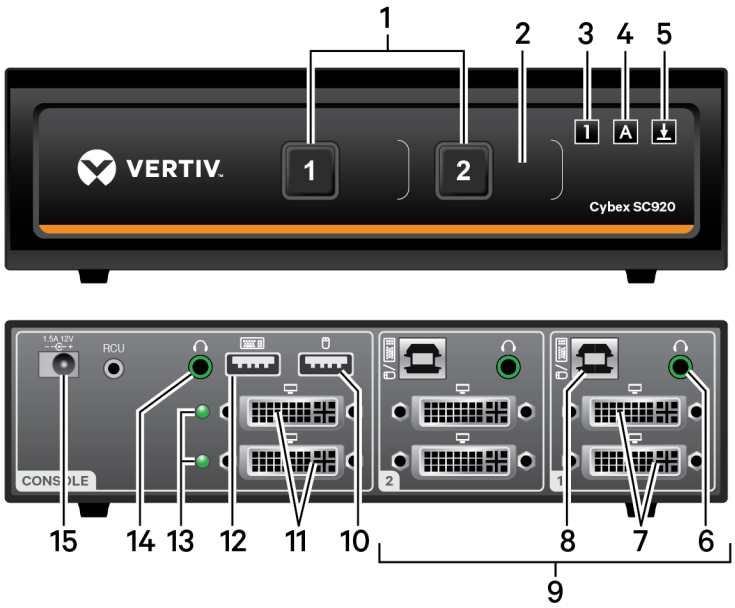


Table 2.3 SC 920 DVI-I KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	9	PC ports
2	Channel label	10	CONSOLE mouse USB Type-A port
3	Num lock indicator	11	CONSOLE DVI-I video ports
4	Caps lock indicator	12	CONSOLE keyboard USB Type-A port
5	Scroll lock indicator	13	Status LEDs
6	PC audio jack (3.5 mm stereo)	14	CONSOLE audio jack (3.5 mm stereo)
7	PC DVI-I video ports	15	DC power inlet
8	PC keyboard/mouse USB Type-B port		

Figure 2.4 SC 940 DVI-I KVM Switch

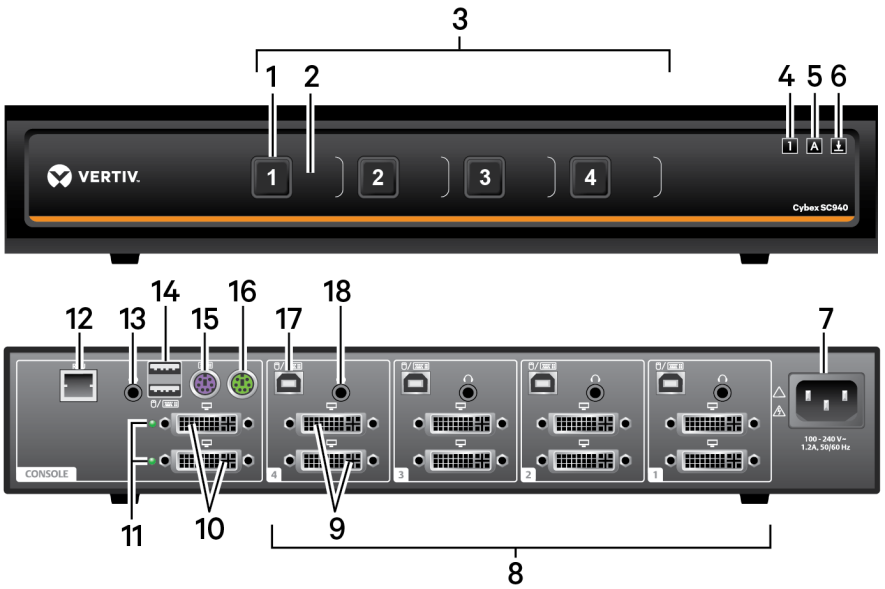


Table 2.4 SC 940 DVI-I KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	10	CONSOLE DVI-I video ports
2	Channel label	11	Status LEDs
3	PC port selectors	12	CONSOLE Remote Control Unit (RCU) port
4	Num lock indicator	13	CONSOLE audio jack (3.5 mm stereo)
5	Caps lock indicator	14	CONSOLE keyboard/mouse USB Type-A port
6	Scroll lock indicator	15	CONSOLE keyboard PS/2 mini-DIN 6-pin port
7	AC power inlet	16	CONSOLE mouse PS/2 mini-DIN 6-pin port
8	PC ports	17	PC keyboard/mouse USB Type-B port
9	PC DVI-I video ports	18	PC audio jack (3.5 mm stereo)

Figure 2.5 SC 940D KVM Switch

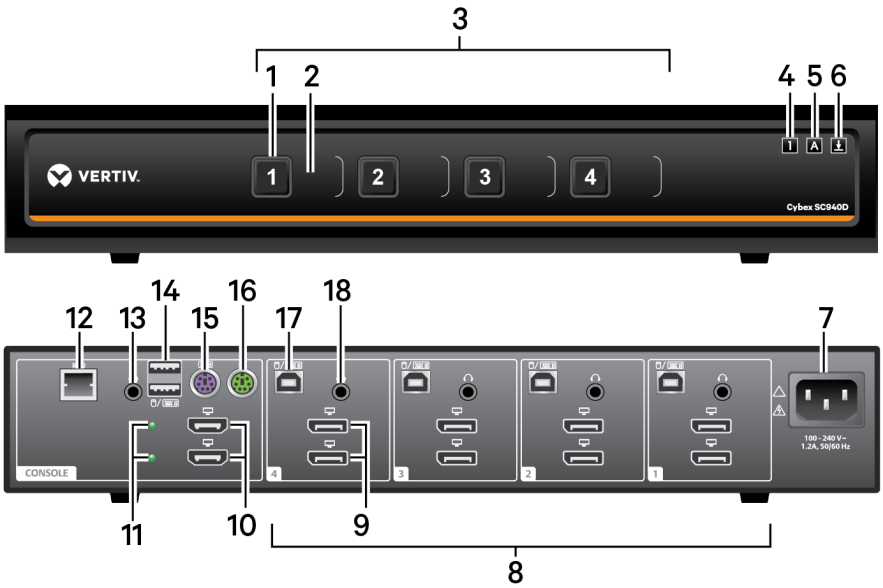


Table 2.5 SC 940D KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	10	CONSOLE HDMI video ports
2	Channel label	11	Status LEDs
3	PC port selectors	12	CONSOLE Remote Control Unit (RCU) port
4	Num lock indicator	13	CONSOLE audio jack (3.5 mm stereo)
5	Caps lock indicator	14	CONSOLE keyboard/mouse USB Type-A port
6	Scroll lock indicator	15	CONSOLE keyboard PS/2 mini-DIN 6-pin port
7	AC power inlet	16	CONSOLE mouse PS/2 mini-DIN 6-pin port
8	PC ports	17	PC keyboard/mouse USB Type-B port
9	PC DisplayPort video ports	18	PC audio jack (3.5 mm stereo)

Figure 2.6 SC 940H KVM Switch

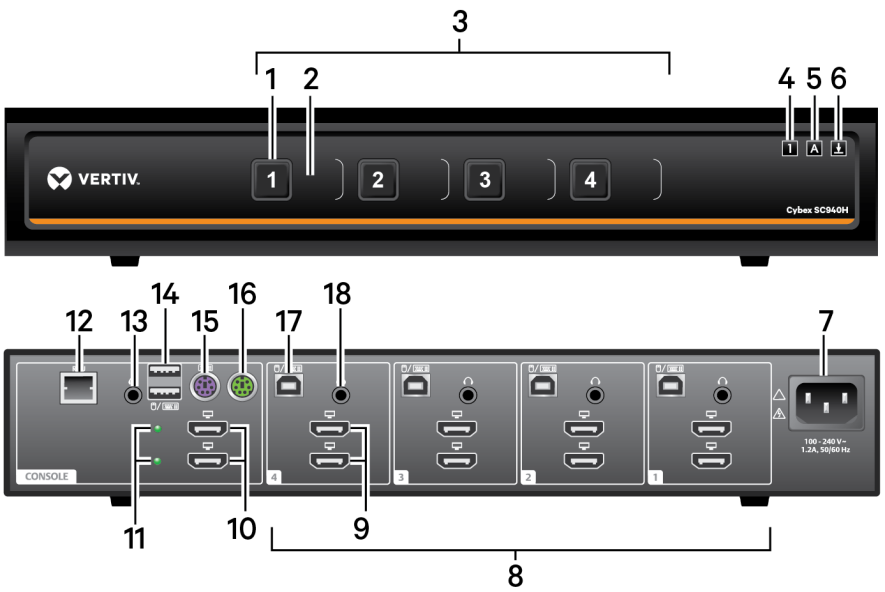


Table 2.6 SC 940H KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	10	CONSOLE HDMI video ports
2	Channel label	11	Status LEDs
3	PC port selectors	12	CONSOLE Remote Control Unit (RCU) port
4	Num lock indicator	13	CONSOLE audio jack (3.5 mm stereo)
5	Caps lock indicator	14	CONSOLE keyboard/mouse USB Type-A port
6	Scroll lock indicator	15	CONSOLE keyboard PS/2 mini-DIN 6-pin port
7	AC power inlet	16	CONSOLE mouse PS/2 mini-DIN 6-pin port
8	PC ports	17	PC keyboard/mouse USB Type-B port
9	PC HDMI video ports	18	PC audio jack (3.5 mm stereo)

Figure 2.7 SC 920DP KVM Switch

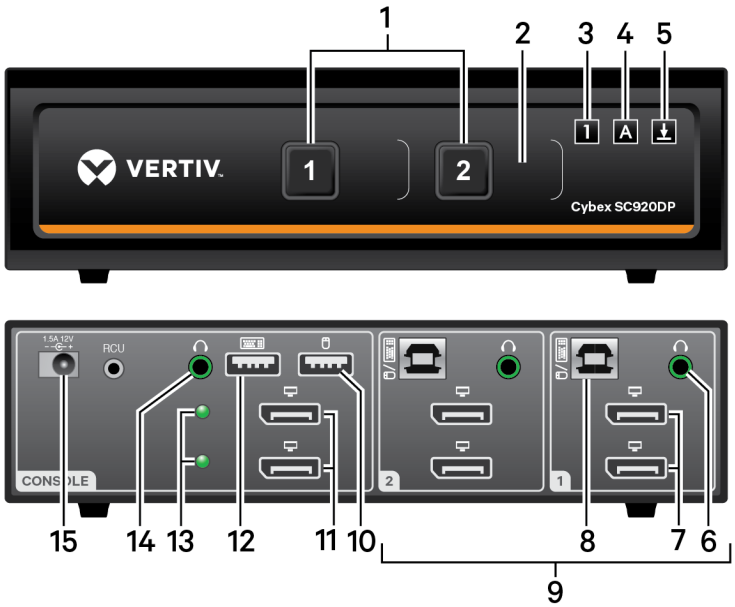


Table 2.7 SC 920DP KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	9	PC ports
2	Channel label	10	CONSOLE mouse USB Type-A port
3	Num lock indicator	11	CONSOLE DisplayPort video ports
4	Caps lock indicator	12	CONSOLE keyboard USB Type-A port
5	Scroll lock indicator	13	Status LEDs
6	PC audio jack (3.5 mm stereo)	14	CONSOLE audio jack (3.5 mm stereo)
7	PC DisplayPort video ports	15	DC power inlet
8	PC keyboard/mouse USB Type-B port		

Figure 2.8 SC 920XD KVM Switch

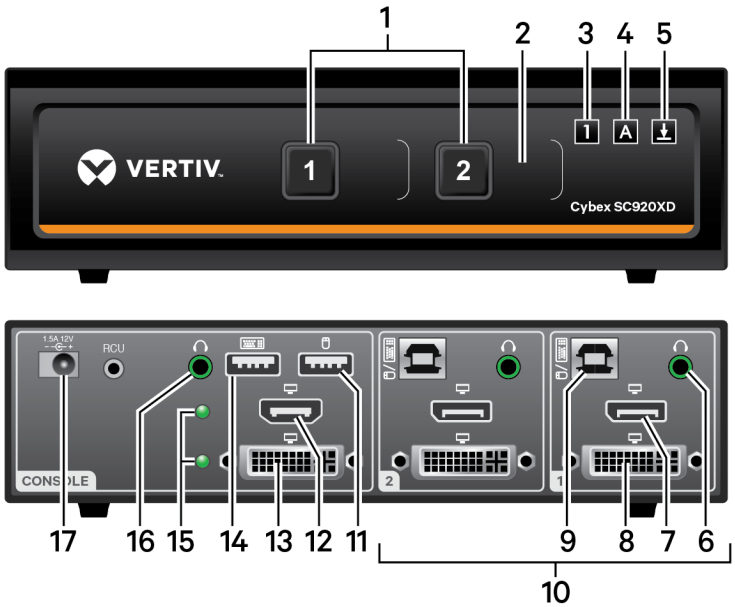


Table 2.8 SC 920XD KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED channel selector	10	PC ports
2	Channel label	11	CONSOLE mouse USB Type-A port
3	Num lock indicator	12	CONSOLE HDMI video port
4	Caps lock indicator	13	CONSOLE DVI-I video port
5	Scroll lock indicator	14	CONSOLE keyboard USB Type-A port
6	PC audio jack (3.5 mm stereo)	15	Status LEDs
7	PC DisplayPort video port	16	CONSOLE audio jack (3.5 mm stereo)
8	PC DVI-I video port	17	DC power inlet
8	PC keyboard/mouse USB Type-B port		

Figure 2.9 SC 945XD KVM Switch

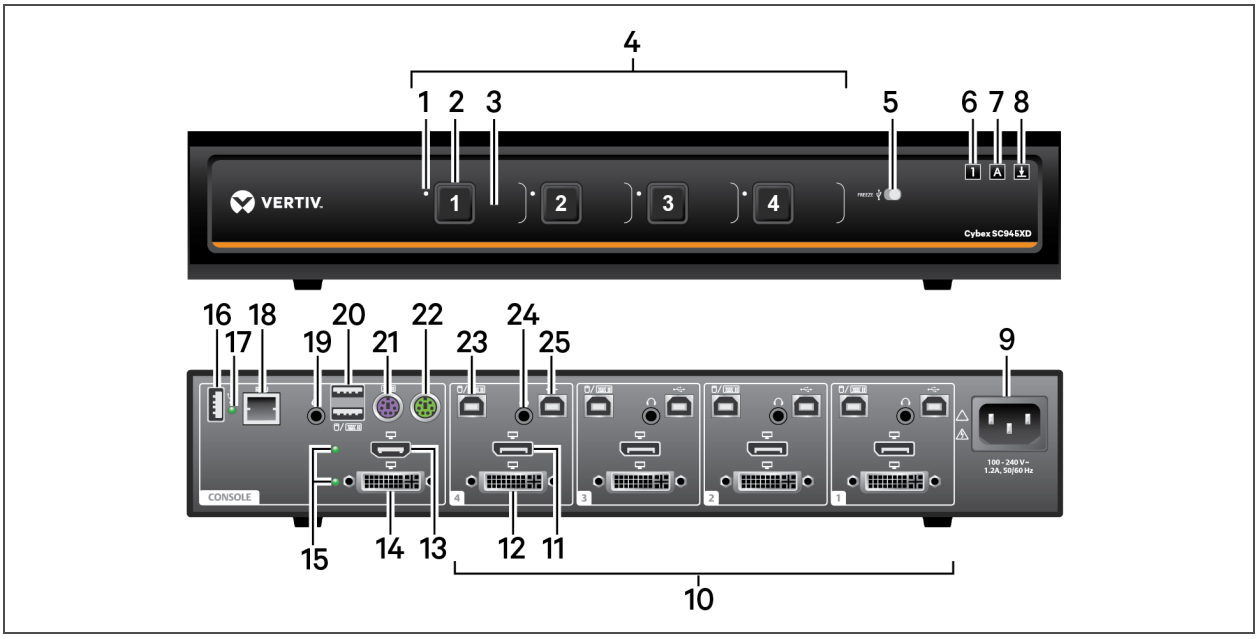


Table 2.9 SC 945XD KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED DPP channel indicator	14	CONSOLE DVI-I video port
2	LED channel selector	15	Status LEDs
3	Channel label	16	CONSOLE DPP USB Type-A port
4	PC port selectors	17	CONSOLE DPP LED connection indicator
5	DPP freeze button	18	CONSOLE Remote Control Unit (RCU) port
6	Num lock indicator	19	CONSOLE audio jack (3.5 mm stereo)
7	Caps lock indicator	20	CONSOLE keyboard/mouse USB Type-A port
8	Scroll lock indicator	21	CONSOLE keyboard PS/2 mini-DIN 6-pin port
9	AC power inlet	22	CONSOLE mouse PS/2 mini-DIN 6-pin port
10	PC ports	23	PC keyboard/mouse USB Type-B port
11	PC DisplayPort video port	24	PC audio jack (3.5 mm stereo)
12	PC DVI-I video port	25	PC DPP USB Type-B port
13	CONSOLE HDMI video port		

Figure 2.10 SC 945XP KVM Switch

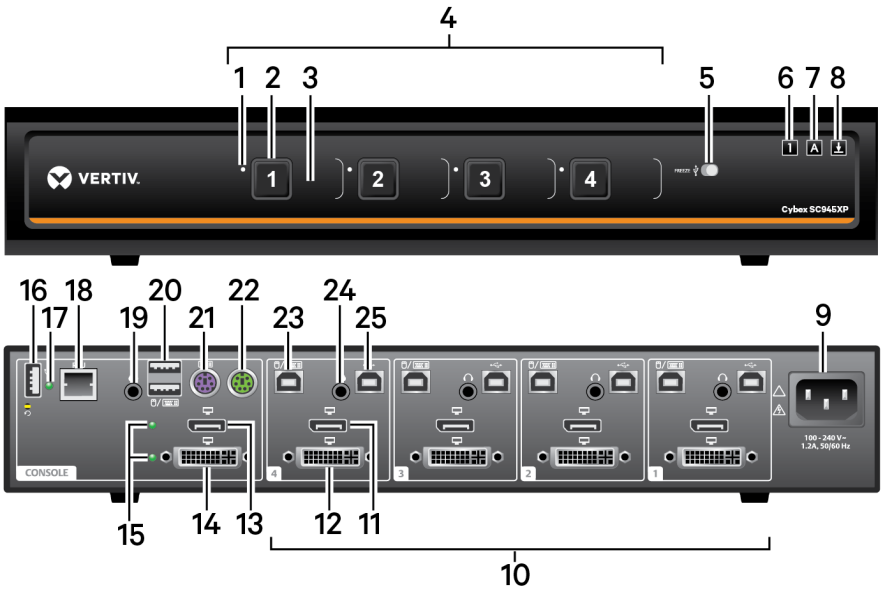


Table 2.10 SC 945XP KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED DPP channel indicator	14	CONSOLE DVI-I video port
2	LED channel selector	15	Status LEDs
3	Channel label	16	CONSOLE DPP USB Type-A port
4	PC port selectors	17	CONSOLE DPP LED connection indicator
5	DPP freeze button	18	CONSOLE Remote Control Unit (RCU) port
6	Num lock indicator	19	CONSOLE audio jack (3.5 mm stereo)
7	Caps lock indicator	20	CONSOLE keyboard/mouse USB Type-A port
8	Scroll lock indicator	21	CONSOLE keyboard PS/2 mini-DIN 6-pin port
9	AC power inlet	22	CONSOLE mouse PS/2 mini-DIN 6-pin port
10	PC ports	23	PC keyboard/mouse USB Type-B port
11	PC DisplayPort video port	24	PC audio jack (3.5 mm stereo)
12	PC DVI-I video port	25	PC DPP USB Type-B port
13	CONSOLE DisplayPort video port		

Figure 2.11 SC 985DP KVM Switch

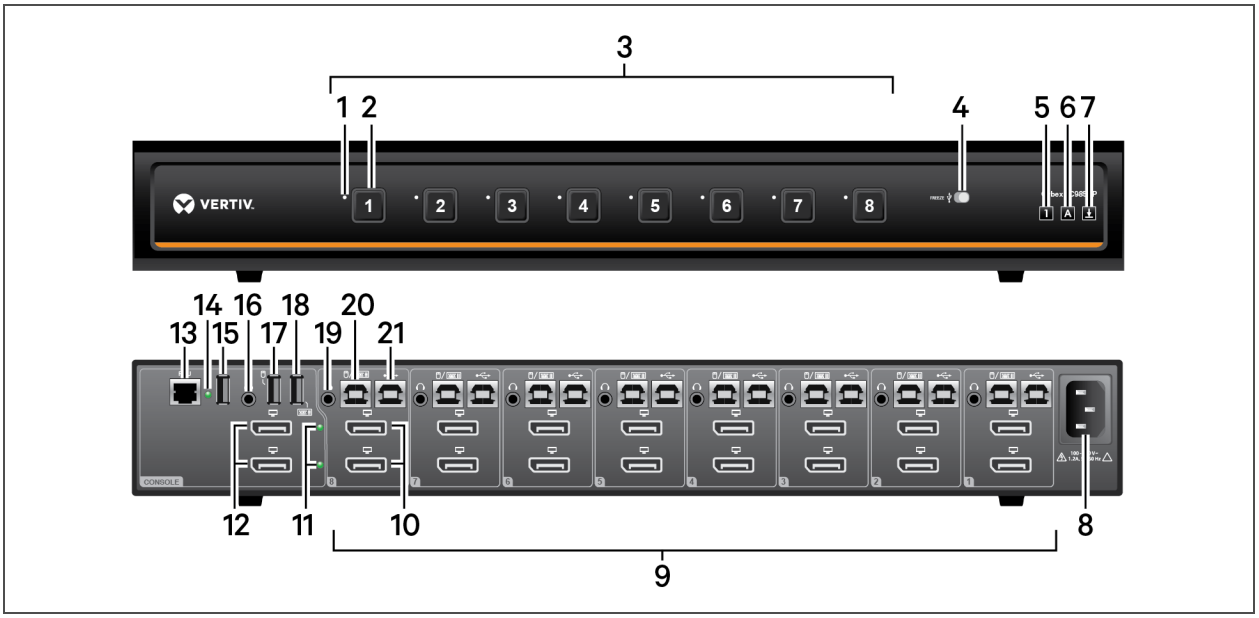


Table 2.11 SC 985DP KVM Switch Description

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	LED DPP channel indicator	12	CONSOLE DisplayPort video ports
2	LED channel selector	13	CONSOLE Remote Control Unit (RCU) port
3	PC port selectors	14	CONSOLE DPP LED connection indicator
4	DPP freeze button	15	CONSOLE DPP USB Type-A port
5	Num lock indicator	16	CONSOLE audio jack (3.5 mm stereo)
6	Caps lock indicator	17	CONSOLE mouse USB Type-A port
7	Scroll lock indicator	18	CONSOLE keyboard USB Type-A port
8	AC power inlet	19	PC audio jack (3.5 mm stereo)
9	PC ports	20	PC keyboard/mouse USB Type-B port
10	PC DisplayPort video ports	21	PC DPP USB Type-B port
11	Status LEDs		

2.1.1 Switching between computers

After turning on the switch, the default channel is channel one. You can select which computer to operate using the front panel push-buttons. The LED number illuminates to indicate which computer is currently selected. Allow approximately one second for the video signal to sync after switching computers.

After selecting a new channel, the mouse cursor is positioned in the center of the selected computer display. When you select a new channel, the mapping for the keyboard, mouse, audio and USB device also changes to the specified channel.

To switch between computers:

Select the computer by pressing the corresponding front panel push-button on the front of the switch.

2.1.2 Dedicated Peripheral Port (DPP)

The DPP feature allows secure use of authentication devices such as a CAC or smartcard reader. See the Vertiv Cybex™ SC/SCM Switching System Additional Operations and Configuration Technical Bulletin for detailed DPP configuration procedures.

The host detection function of the DPP enables you to switch between ports without disconnecting the user authentication session, known as DPP freeze. When locked, switching channels does not affect processes performed by the USB device connected to the locked channel. If only one computer is using the DPP function, ensure that it is connected to channel 1.

The DPP status LED is illuminated after a qualified USB device is connected to the switch and ready for use. If the USB device is not qualified or is rejected from the switch's DPP port, the DPP status LED flashes and the USB device is inoperable. If the USB device is not detected by the port, the DPP status LED does not illuminate and the USB device is inoperable.

NOTE: Do not connect a cable to the DPP if an authentication device is not needed. The switch will automatically detect a cable and attempt to program the DPP selection logic. If you are connecting to the DPP, your device must be fully compliant with a standard USB 1.1 or USB 2.0 and turned on.

Using DPP freeze

If you need to retain authentication information on one channel after switching to another, you can freeze the DPP of the first channel.

To freeze the DPP channel:

1. Select the DPP channel you want to freeze.
2. On the front panel, enable the DPP freeze button and verify the channel indicator illuminates on the selected channel and on the freeze button.

NOTE: If you are on a channel that has a DPP enabled and you switch to a channel that is not using a DPP, then you will lose the connection and the ability to freeze the information. You must switch back to a DPP-enabled channel to reactivate the feature.

2.1.3 KM multi-monitor support

The switches are configured to support one monitor per channel. The switch configuration must match the physical positioning of the display units. When configuring the switch, you can select from the setup presets or you can create a custom configuration file. To create a configuration file, see KM Configuration on page 19.

When Virtual Display Technology (VDT) switching is enabled, you can set up a multiple monitor configuration and seamlessly switch between displays by moving the mouse cursor to the desired display.

To use the multiple monitor feature, you must download and install the KM Multi-Monitor Driver from the Software Downloads section on the Vertiv website on each of the applicable computers.

VDT switching

By default, the switch is configured to use the relative mouse setting, which confines mouse cursor movement to the screen of the selected computer. With this setting, you must use the front panel channel selection buttons to switch between computers.

Alternatively, the switch can be configured to use the absolute mouse setting, which allows you to move between isolated computer systems by moving the mouse cursor across display borders. When the mouse cursor scrolls beyond the screen border from one computer to another, the keyboard, mouse, audio and USB device mapping switch accordingly. You can enable the absolute or relative mouse settings by pressing a keyboard shortcut on the connected keyboard. See Keyboard Shortcuts on page 18 for a list of the keystroke combinations.

You can use the preset keys to configure the KM to support more than one monitor per channel. The following images detail the different preset monitor configurations.

NOTE: In the configurations, gray indicates a single computer and black indicates a multi-monitor display. P indicates the primary display and S indicates the secondary display in a multi-monitor display configuration.

Figure 2.12 Two-Port KM Presets

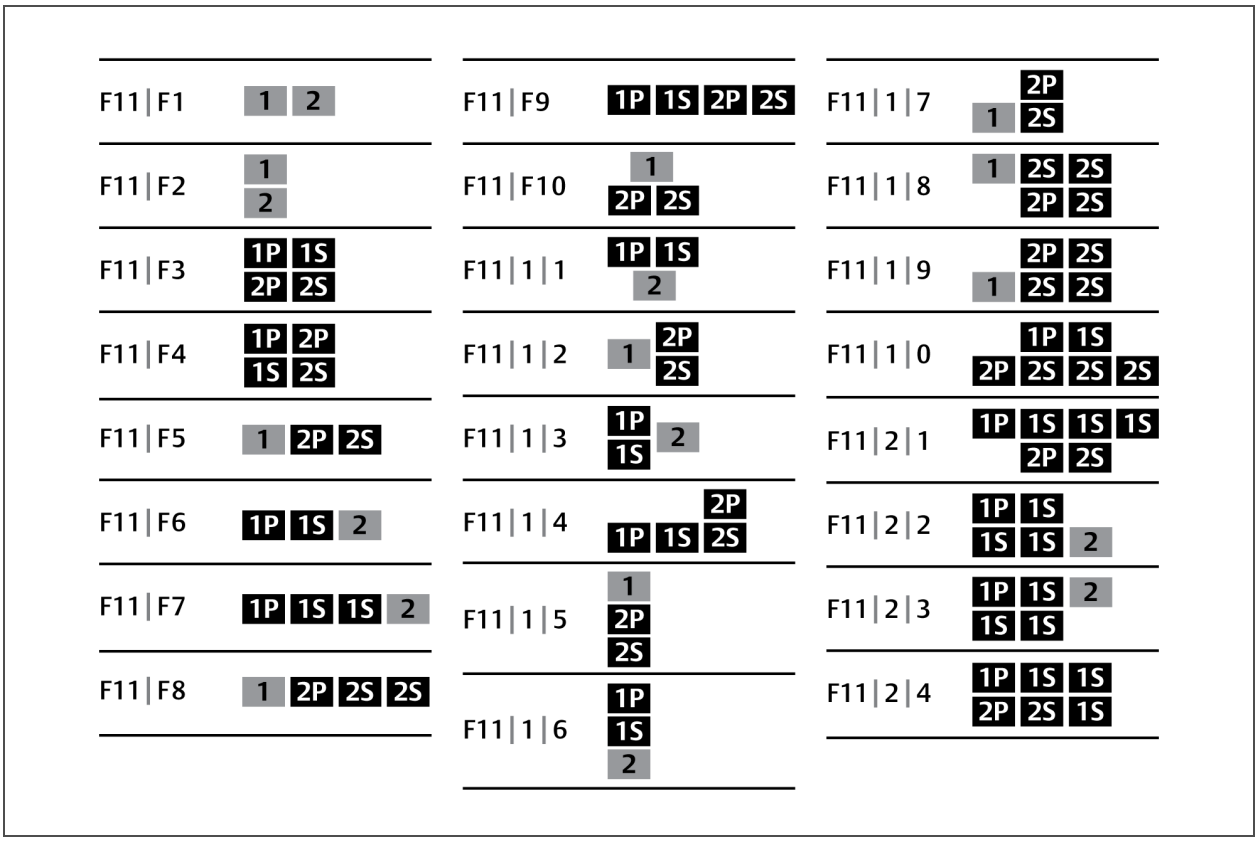


Figure 2.13 Four-Port KM Presets

F11 | F1	1 2 / 3 4
F11 | F2	1 2 3 4
F11 | F3	1P 1S / 3P 3S
F11 | F4	1P 3P / 1S 3S
F11 | F5	1 2 3P 3S
F11 | F6	1 2P 2S 4
F11 | F7	1P 1S 3 4
F11 | F8	1P 1S 3P 3S
F11 | F9	1 2 3
F11 | F10	1 / 2 3 4
F11 | 1 | 1	1 / 2 / 3
F11 | 1 | 2	1 / 2 3
F11 | 1 | 3	1 / 2 3
F11 | 1 | 4	1 2 / 3
F11 | 1 | 5	1 2 / 3
F11 | 1 | 6	1 / 2 3 4
F11 | 1 | 7	1 / 2 3 4
F11 | 1 | 8	2 3 4 / 1
F11 | 1 | 9	1 2 / 3P 3S
F11 | 1 | 0	3P 3S / 1 2
F11 | 2 | 1	1 3P / 2 3S
F11 | 2 | 2	3P 1 / 3S 2
F11 | 2 | 3	2 3 4 / 1P 1S
F11 | 2 | 4	1 2P 2S 3
F11 | 2 | 5	1 / 2
F11 | 2 | 6	1 2
F11 | 2 | 7	1 2 / 3
F11 | 2 | 8	3 / 1 2
F11 | 2 | 9	2 / 1 3
F11 | 2 | 0	3 2 / 1
F11 | 3 | 1	1P / 1S 2P 2S 3

2.2 Keyboard and Mouse Settings

2.2.1 Keyboard settings

All secure switches block communication from the computers to the keyboard to prevent potential data leaks. You can enable Caps Lock, Scroll Lock or Num Lock from a connected keyboard; however, the connected keyboard status indicators do not illuminate to indicate the settings are enabled. The Caps lock, Scroll lock and Num lock LEDs on the switch illuminate to indicate the settings are enabled on a specific channel. Switching channels changes the status of the LEDs if different settings are enabled on each computer.

2.2.2 Mouse settings

When VDT is enabled, you can freeze mouse functionality on a selected channel to prevent inadvertently switching channels if the mouse approaches the screen border. The prevent transition feature allows you to use the mouse to move objects such as windows and icons on a screen without unintentionally dragging the object to another display. When the prevent transition feature is enabled and the left mouse button is depressed, you can move objects only within the active display.

Using keyboard shortcuts, you can freeze or unfreeze the mouse on a selected channel, or increase or decrease the speed of the mouse. See Keyboard Shortcuts on page 18 for a list of the keystroke combinations.

NOTE: The default mouse speed is set to 5 on a 1 to 10 speed scale.

2.2.3 Filtered USB port (fUSB)

Some models are equipped with a filtered USB port that only accepts authorized USB devices. When an authorized USB device is connected to the fUSB port, the status LED on the front panel illuminates green. When an un-authorized USB device is connected to the fUSB console port, the status LED on the front panel illuminates red. When switching between channels, the USB device connected to the fUSB port automatically switches. When switching to a channel that has no fUSB connection, the port remains mapped to the last channel that had a fUSB channel. To assign the fUSB port to a specific computer, press the freeze USB button. Freeze USB prevents the fUSB from switching even when the keyboard, video, mouse and audio peripherals switch between computers.

2.2.4 Interchangeable KVM to KM functionality

In KVM mode one display, keyboard, mouse, USB and audio peripheral set is shared between all computers. In KM mode, each computer is connected to a separate display while the keyboard and mouse are shared.

To change from KVM to KM mode:

1. Disconnect the display from the KVM console port.
2. Connect each computer directly to a separate display while keeping the keyboard, mouse, USB and audio peripherals connected to the KVM.
3. Change the mouse mode by typing L Ctrl | L Ctrl | F11 | c.

To change from KM to KVM mode:

1. Connect the display to the KVM console port.
2. Connect each computer to the corresponding KVM computer video port.
3. Change the mouse mode by typing L Ctrl | L Ctrl | F11 | b.

2.3 Keyboard Shortcuts

Keyboard shortcuts can be used to execute switch commands, load monitor presets and adjust mouse settings. Keyboard shortcut functionality varies depending on the firmware version and the switch model.

The style for sequential or concurrent keyboard shortcuts is typically Ctrl + Ctrl + F11. The following table deviates from the style by eliminating the plus symbol between keystrokes. Unless otherwise noted, the key combinations should be pressed sequentially and an L preceding Ctrl indicates the left control key while an R preceding Ctrl indicates the right control key.

The following table details keyboard shortcut options.

Table 2.12 KM Keyboard Shortcuts

KEY COMBINATION	DESCRIPTION
L Ctrl L Ctrl F11 B	Relative mouse mode
L Ctrl L Ctrl F11 C	Absolute mouse mode
L Ctrl L Ctrl F	Video follow mouse (disable/enable)
L Ctrl L Ctrl F11 R	System reset to factory default
L Ctrl R Ctrl B	Current channel DE is relative only
L Ctrl R Ctrl C	Current channel DE is default
L Ctrl Shift [1]	Mouse will be in absolute mouse mode until released
L Ctrl R Ctrl X	Exit terminal mode
L Ctrl R Ctrl T	Enter terminal mode
L Ctrl L Ctrl F11 F [2]	Disable switching by mouse
L Ctrl L Ctrl F11 U [2]	Enable switching by mouse
L Ctrl L Ctrl F11 + [2]	Increase mouse speed
L Ctrl L Ctrl F11 - [2]	Decrease mouse speed
L Ctrl L Ctrl F11 [x]	Select KM preset [x}
L Ctrl L Ctrl F11 l (lowercase L)	Load custom KM preset
L Ctrl L Ctrl F11 F12	Select custom KM preset

[1] You must press and hold this keyboard shortcut to execute the command.

[2] This command is only available when the switch is in KM mode.

2.4 KM Configuration

The KM configuration utility is a web-based tool that allows system administrators to define custom monitor setups in a KM configuration file. The file is saved with the .kmc extension. When configuring a KM switch using a KM configuration file, you must be logged in to the switch as administrator.

The KM configuration utility allows administrators to define the number of monitors connected to each computer. Monitors can vary in size and resolution, and can be arranged in multiple layouts. You must download and install the KM configuration utility from the Software Downloads section on the Vertiv web site.

The KM configuration utility operates only with Microsoft® Windows®. Before downloading and installing the KM configuration utility, ensure at least Microsoft® Windows® XP is installed on the computers to be connected. The following browsers support the KM configuration utility:

- Google Chrome 20.0 or higher
- Microsoft® Internet Explorer®
- Mozilla® Firefox®

Before creating a KM configuration file, verify the number of computers and monitors to be connected to the KM switch and the monitors' sizes and resolutions.

2.4.1 Creating a KM configuration file

A KM configuration file is referred to in the KM configuration utility interface as a KM configuration project. Each customized setup requires its own project. You can create projects using the KM configuration utility project wizard. After completing the steps in the wizard, the KM configuration file is generated and downloaded to the computer.

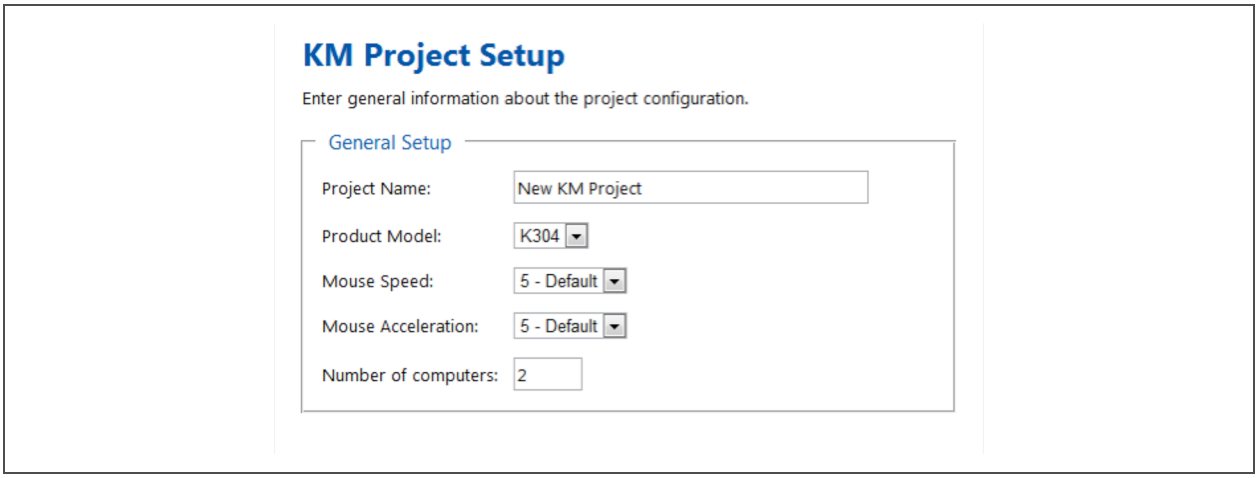
The following table lists guidelines for entering project file information.

CONFIGURATION FIELD	DESCRIPTION
Project Name	Name of the custom monitor configuration.
Product Model	Model of the KM switch.
Mouse Speed	Default mouse cursor speed for all systems. Changes in the mouse cursor speed value on each computer do not affect the KM switch's mouse cursor speed.
Mouse Acceleration	Rate at which the mouse cursor speed increases. Changes in the mouse cursor acceleration value on each computer do not affect the KM switch's mouse cursor acceleration.
Number of Computers	Total number of computers to be connected to the KM switch for a particular configuration.

To create a new KM configuration project:

1. Log in to the KM switch as administrator, launch the KM configuration utility and click *New Project*.
2. Enter the project name and number of computers into the fields on the KM project setup window.
3. Select the product model, mouse speed and mouse acceleration from the drop-down menus and click *Next Step*.

Figure 2.14 KM Project Setup Window



4. Enter a detailed product description that explains the configuration and click *Next Step*.
5. For each computer, select the number of monitors from the drop-down menu, enter each monitor's size and resolution and then click *Next Step*.

NOTE: Multiple monitor configurations require additional steps. See Multiple monitor setup on page 24 for more information.

NOTE: If a monitor is set to portrait orientation, enter the native resolution accordingly. For example, a monitor with 1680 x 1050 native resolution would have a 1050 x 1680 resolution in portrait orientation.

Figure 2.15 Computer Setup Window

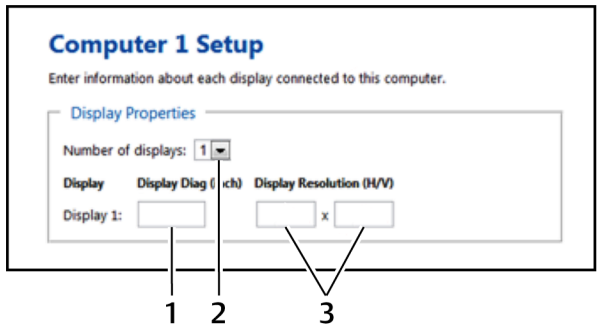


Table 2.13 Computer Setup Window

ITEM	DESCRIPTION
1	Monitor size
2	Number of displays
3	Native monitor resolution

6. Configure the location of the monitors by dragging and dropping the monitors into position. See Configuration examples on page 21 for acceptable multiple monitor setups.
7. Click *Complete Setup* to generate and download the configuration file.

Configuration examples

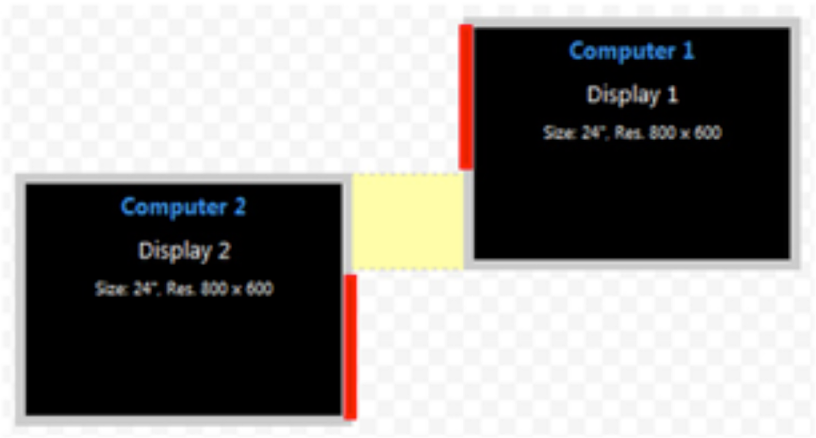
Each monitor is labeled with its computer number and monitor number in the KM configuration utility. The monitors can be touching or separated by distance based on the geometry settings required.

After the monitors are placed into a layout, a bridge between the two monitors is shown in yellow to indicate the mouse cursor area for switching monitors. Clicking the yellow area removes it from the configuration and you will not be able to switch between the monitors using the mouse cursor.

Example 1

The monitor configuration in example 1 establishes a mouse cursor bridge between the bottom left corner of display 1 and the top right corner of display 2. The mouse cursor bridge is indicated by the yellow area and it is the only area where the mouse switching between the two monitors is enabled. When the mouse cursor switches from display 1 to display 2, the active computer switches from computer 1 to computer 2, respectively. The red lines indicate areas where mouse cursor switching is disabled.

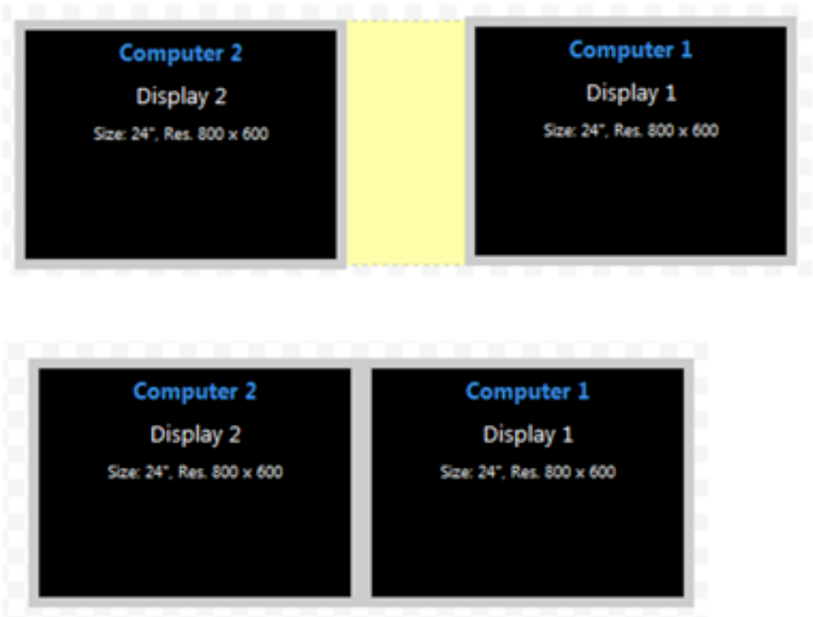
Figure 2.16 Example 1 Physical Layout



Example 2

Both monitor configurations in example two enable you to switch between display 1 on the left and display 2 on the right. Using the mouse cursor to switch from display 1 to display 2 also switches you from computer 1 to computer 2.

Figure 2.17 Example 2 Physical Layout

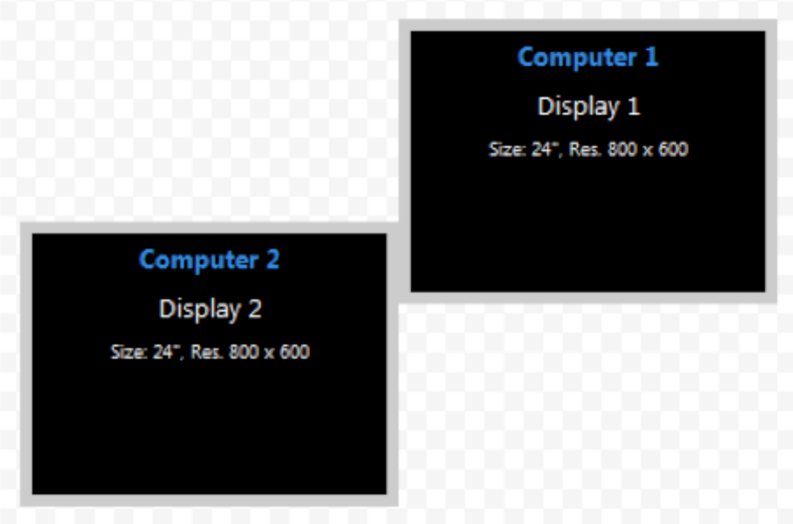


Example 3

Example 3 depicts a multiple monitor configuration with the monitors connected at the corners. Example 3A is an invalid configuration because display 1 and display 2 do not share an overlapping area where the mouse cursor can cross. Example 3B is valid since the two monitors overlap to create an area where the mouse cursor can cross.

Figure 2.18 Example 3A Invalid Physical Layout

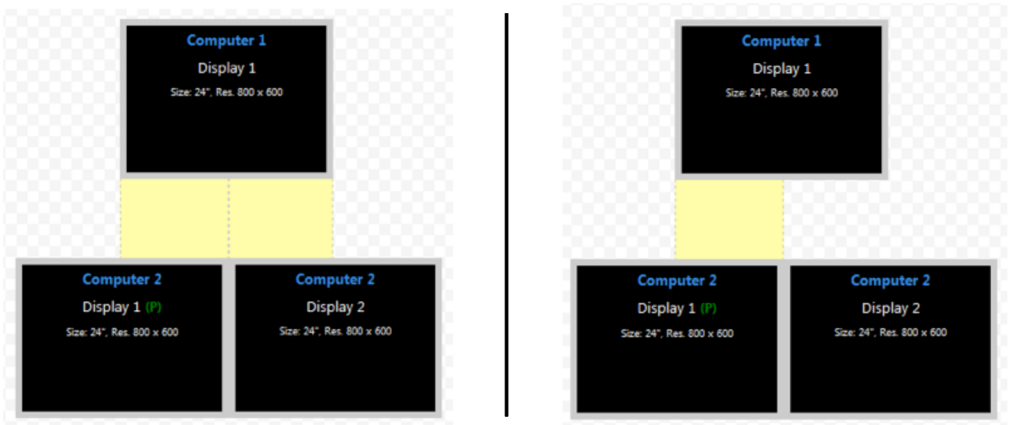
Figure 2.19 Example 3B Valid Physical Layout



Example 4

In example 4, the physical placement of the monitors can be configured multiple ways. In the first layout, computer 2 has two connected monitors and mouse cursor switching is enabled between computer 1 and both computer 2 monitors. In the second layout, mouse cursor switching is enabled only between computer 1 and display 1 for computer 2.

Figure 2.20 Example 4 Physical Layouts



Multiple monitor setup

In a multiple monitor configuration, the KM configuration file and the Microsoft® extended desktop settings control switching between the monitors. When setting up a multiple monitor configuration, you must enter the Microsoft® virtual desktop parameters to ensure a smooth and proportional transition among all connected monitors.

All monitors connected to the same computer must be configured next to one another with no distance between the monitors.

To set up a multiple monitor configuration:

1. From the Start menu, click *Control Panel*, then click *Appearance and Personalization - Display - Adjust Resolution*.
2. In the KM configuration utility Display Properties window, enter the size and resolution information for the primary and secondary monitors as indicated in the Microsoft® extended desktop settings.
3. Enter the vertical and horizontal coordinates for monitors.

The following figure and table list the monitor property fields to be completed when configuring multiple monitors.

Figure 2.21 Entering Data for a Multiple Monitor Configuration

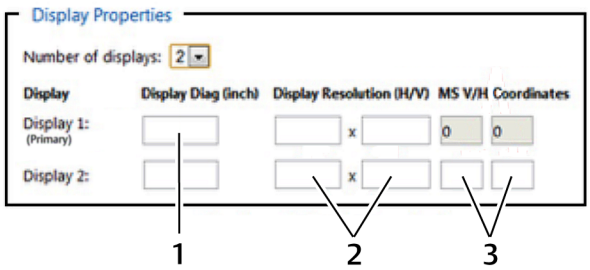


Table 2.14 Multiple Monitor Configuration Properties

ITEM	DESCRIPTION
1	Monitor size
2	Native monitor resolution
3	Monitor coordinates per the Microsoft® extended desktop settings

2.4.2 Loading a KM configuration file

Before you can upload the KM configuration file, you must have the following:

- Loading driver mapping file - An .inf file that maps Microsoft® drivers to be used by the switch in administrator mode.
- USB programming cable - The cable required to load configurations onto the switch and is connected to the switch's USB mouse port.

NOTE: The cable will not work if connected to any port other than the USB mouse port.

- Administrator credentials - You must be logged in as administrator to load the KM configuration file onto the switch.

To load the KM configuration file:

1. Ensure power to the switch is turned on and a valid keyboard is connected to the switch's keyboard port.
2. Launch administrator mode by pressing L CTRL + R CTRL + T while in terminal mode.
3. Select *KM Configuration Option* and log in as administrator.
4. Connect one end of the USB programming cable to the mouse port on the switch and connect the other end to the computer that has the KM configuration file, the loading utility and the .inf mapping file.
5. Open the loading utility and verify that the switch is recognized.
6. Click *Select a new configuration file* and select the KM configuration file to be loaded.
7. Click *Update KM* and restart the switch.

The following figure and table list the items shown on the KM configuration utility load interface.

Figure 2.22 KM Configuration Utility Load Interface

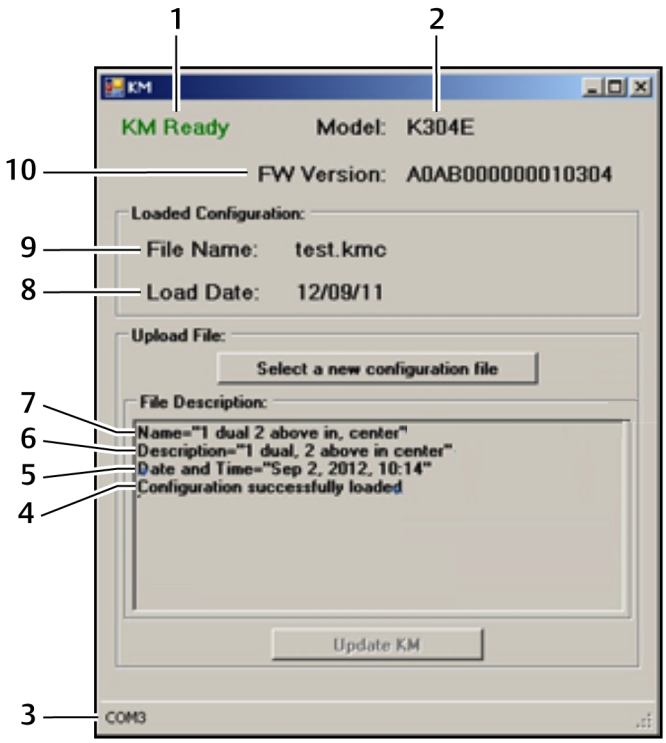


Table 2.15 KM Configuration Utility Load Interface Items

ITEM	DESCRIPTION
1	KM configuration utility status
2	Switch model detected by the KM configuration utility
3	Connected port
4	Configuration file load status
5	Date the configuration file was created
6	Description of the configuration file
7	Configuration filename
8	Load date of the configuration file
9	Filename of the last loaded configuration
10	Switch's firmware version detected by the KM configuration utility

3 TROUBLESHOOTING

When power is turned on to the switch, it performs a self-test to verify normal operation. If the switch fails the self-test procedure, all channel LED buttons flash on and off once and a combination of LEDs illuminate. The various combinations of illuminated LEDs indicate the fault with the switch. After a failed self-test, the switch becomes inoperable until the fault is resolved.

3.1 General

The following table lists general faults, the fault indicators and the actions to resolve each fault.

Table 3.1 General Switch Faults

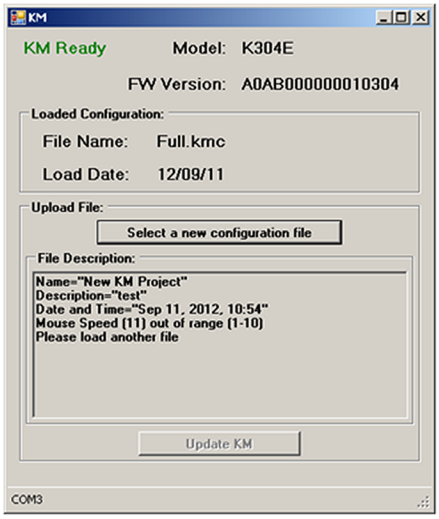
FAULT	INDICATOR	RESOLUTION
The switch did not pass the self-test.	All channel LED buttons flash on and off once and a combination of LEDs illuminate to indicate the fault.	Turn power off and on to the switch.
The switch is not receiving power.	The displays do not show video output and none of the front panel LEDs illuminate.	Ensure the power cable is intact and connected to the switch and to the power source. If the cable is damaged, replace it.
The switch enclosure is compromised.	The tamper-evident seals indicate intrusion, the switch is inoperable and all channel LED buttons flash continuously.	Immediately remove the switch from service and contact Technical Support.
Remote desktop control is connected and rendering the channel select buttons is inoperable.	The switch does not respond when the channel select buttons are pressed.	Disconnect from remote desktop control, or control the KVM through remote desktop control or keyboard shortcuts.

3.2 KM Configuration File

The two most common errors that occur when loading the KM configuration file include:

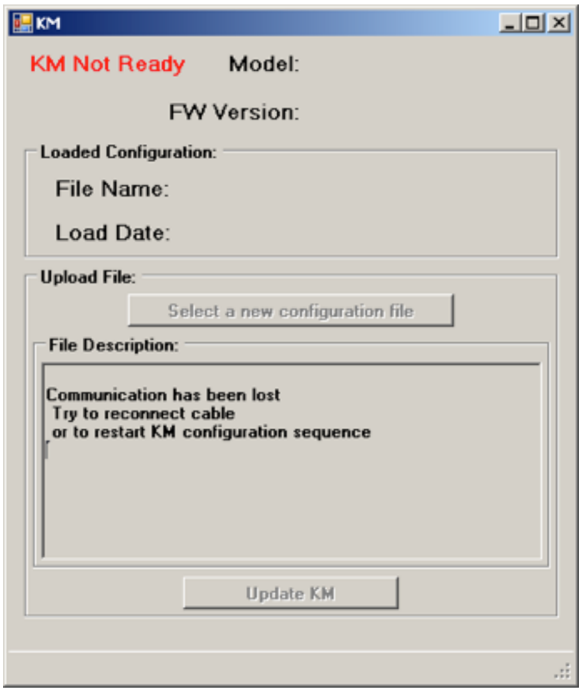
- Incorrectly formatted configuration file - When you load an incorrectly formatted file, the KM configuration utility load interface indicates the issue in the File Description section and prompts you to load another file. Ensure the files you load are created with the KM configuration utility and have not been manually modified.

Figure 3.1 KM Configuration Utility Load Interface with Configuration File Error



- Invalid communication connection to the switch - When communication between the switch and the utility is lost or fails, the KM configuration utility load interface status is KM Not Ready. Ensure that you use a USB programming cable to connect the switch to the computer that runs the configuration utility and the cable is connected to the switch's USB mouse port. Also verify that the loading driver mapping file is installed on the computer. If the connection continues to fail, restart the switch and relaunch administrator mode.

Figure 3.2 KM Configuration Utility Load Interface with Failed Connection Error



3.3 Video

The following table lists video faults, the fault indicators and the action to resolve each fault.

Table 3.2 Video Faults

FAULT	INDICATOR	RESOLUTION
The connected video display is not qualified.	The video diagnostic LED flashes green and the display is inoperable.	Turn off and disconnect the non-qualified display and connect and turn power on to a qualified display.
The displays or the computers are not connected to the switch properly or the connecting cables or ports are damaged.	The displays do not show video output on any channel and the display diagnostic LED does not appear solid green.	Ensure the displays are properly connected to the switch and the displays and connecting cables are not damaged. Replace damaged cables. If the displays or connecting cables are damaged, replace the damaged parts. If the issue persists, check the displays' on-screen menu to ensure the correct source is selected and verify the video mode and computer's video mode are the same. If the problem persists and the LED does not illuminate solid green, change the entire display unit or contact Technical Support.
A specific computer is not connected to the switch properly or the connecting cable or port is damaged.	The display does not show video output for a specific channel.	Ensure the connecting cable between the computer and the switch is secured and not damaged. Replace damaged cables. Ensure the displays are compatible with the computer resolution and refresh rate settings. Verify the video output is available and an image is shown when the display unit is connected directly to the computer. If the problem persists, turn power off and on to the switch, reboot the computer, replace the display unit or contact Technical Support.
The displays or computers are not connected to the switch properly or the connecting cables are not compatible with the displays.	Some or all channels are experiencing poor video image quality and the display diagnostic LED does not appear solid green.	Ensure the displays are properly connected to the switch and the displays and connecting cables are compatible with the displays and not damaged. Replace damaged cables. Video cable length should not exceed 15 feet. Ensure the displays are compatible with the computer resolution and refresh rate settings. Lower the video resolution of the computer. Verify the video output is available and an image is shown when the display unit is connected directly to the computer. If the problem persists, turn power off and on to the switch, reboot the computers and displays, replace the video displays or contact Technical Support.

3.4 Keyboard

The following table lists keyboard faults, the fault indicators and the action to resolve each fault.

Table 3.3 Keyboard Faults

FAULT	INDICATOR	RESOLUTION
The keyboard is not connected to the switch properly or the keyboard cable or port is damaged.	The keyboard does not work on any channels.	Ensure the keyboard is properly connected to the switch and the USB cable between the keyboard and the switch is not damaged. If the issue persists, connect the keyboard to a different port or use a different standard, non-wireless, qualified keyboard. Ensure the driver for the keyboard is installed on the computer. **NOTE: If the computer is returning from standby mode, allow up to one minute for the computer to regain keyboard functionality.**
The keyboard, mouse and video cables are connected to two different computers.	The keyboard and mouse are not working on two channels.	Ensure the keyboard/mouse and video cables are connected to the correct ports on the switch. For example, the keyboard and mouse cable and the video cable for computer 1 should be connected to ports specifically designated for computer 1.
The computer does not recognize the connected keyboard.	The keyboard does not work on one channel.	Use the computer's Device Manager wizard to troubleshoot and resolve the issue.
The connected keyboard is not qualified or not connected to the switch properly	The keyboard is non-functional on any channel and you are unable to produce keystrokes on the screen when using the keyboard.	Ensure the keyboard is properly connected to the switch and the USB cable between the keyboard and the switch is not damaged. If damaged, replace the cable. Ensure the keyboard is a qualified device. If not, disconnect the non-qualified keyboard and connect a qualified keyboard. Verify that the keyboard works connected directly to the computer or when connected to a different USB port. If the problem persists, turn power off and on to the switch, reboot the computer, and replace the keyboard unit or contact Technical Support.
Caps lock, Scroll lock and Num lock LEDs do not illuminate on the keyboard.	When the Caps lock, Scroll lock or Num lock keys are pressed, the corresponding keyboard LEDs do not illuminate.	This is a normal behavior. All secure switches block communication from the computers to the keyboard to prevent potential data leaks. To determine if Caps lock, Scroll lock or Num lock are enabled on a specific computer, press the channel select button on the switch and observe the Caps lock, Scroll lock and Num lock LEDs on the switch.
The connected keyboard is not compatible with the switch.	Certain keyboard functions are inoperable once connected to the switch.	Determine if the connected keyboard is compatible with the switch. Some non-standard keyboard functions are disabled by the switch for security purposes. Contact Technical Support for compatibility information.

3.5 Mouse

The following table lists mouse faults, the fault indicators and the action to resolve each fault.

Table 3.4 Device Faults

FAULT	INDICATOR	RESOLUTION
The connected mouse is not qualified.	The mouse is non-functional and the mouse cursor is frozen on the screen. You are unable to use the mouse to move the mouse cursor.	Disconnect the non-qualified mouse and connect a qualified mouse.
The mouse is not plugged into the correct port.	The mouse does not work on any channels but the keyboard works.	Verify that the mouse is plugged into the mouse port and the connecting cable is not damaged. Plug the mouse into the mouse port if it is connected to a non-mouse port and replace the cable if it is damaged.
The mouse is not connected to the switch properly or the mouse cable or port is damaged.	The mouse does not work on any channels.	Ensure the mouse is properly connected to the switch and the USB cable between the mouse and the switch is not damaged. If the issue persists, connect the mouse to a different port or use a different standard, non-wireless, qualified mouse. Ensure the driver for the mouse is installed on the computer. **NOTE: If the computer is returning from standby mode, allow up to one minute for the computer to regain mouse functionality.**
The computer does not recognize the connected mouse.	The mouse does not work on one channel.	Use the computer's Device Manager wizard to troubleshoot and resolve the issue.

3.6 DPP

The following table lists DPP device faults, the fault indicators and the action to resolve each fault.

Table 3.5 Device Faults

FAULT	INDICATOR	RESOLUTION
The connected USB device is not qualified.	DPP LED flashes green and the USB device is inoperable.	Disconnect the non-qualified USB device and connect a qualified USB device.
The USB device is not working properly or the connecting cable between the computer and the DPP input port on the switch is damaged or missing.	DPP USB device is not working on a channel.	Ensure the USB device is working properly when connected directly to the computer and ensure that the USB cable connecting the computer and the DPP input port on the switch is not damaged or missing.
The USB device and video cables are connected to two different computers.	DPP USB device is not working on two channels.	Ensure the USB device and video cables are connected to the correct ports on the switch. For example, the USB device cable and the video cable for computer 1 should be connected to ports specifically designated for computer 1.
The USB device is not working properly or not connected to the computer.	DPP USB device is not working on all channels.	Ensure the USB device is working properly and connected directly to the computer. Ensure there is a USB connected cable between the computer and the relevant DPP.

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4 APPENDICES

Appendix A: Technical Specifications

The appendix contains technical specification tables for all the products covered in this document.

Table A.1 DisplayPort 1.2 (4K UHD 3840 x 2160 @ 30 Hz)

Computers	SC 800 Single-Head		SC 900 Dual-Head	
	Audio/USB	Audio/USB/DPP	Audio/USB	Audio/USB/DPP
2	Cybex SC 820DP	-	Cybex SC 920DP	-
4	Cybex SC 840DP	Cybex SC 845DP	Cybex SC 940DP	Cybex SC 945DP
8	-	Cybex SC 885DP	-	Cybex SC 985DP

Table A.2 DisplayPort 1.2 Computer & HDMI 1.4 Console (4K UHD 3840 x 2160 @ 30 Hz)

Computers	SC 800 Single-Head		SC 900 Dual-Head	
	Audio/USB	Audio/USB/DPP	Audio/USB	Audio/USB/DPP
2	Cybex SC 820D	-	Cybex SC 920D	-
4	Cybex SC 840D	Cybex SC 845D	Cybex SC 940D	Cybex SC 945D

Table A.3 HDMI 1.4 (4K UHD 3840 X 2160 @30 HZ)

Computers	SC 800 Single-Head		SC 900 Dual-Head	
	Audio/USB	Audio/USB/DPP	Audio/USB	Audio/USB/DPP
2	Cybex SC 820H	-	Cybex SC 920H	-
4	Cybex SC 840H	Cybex SC 845H	Cybex SC 940H	Cybex SC 945H

Table A.4 Single/Dual Link DVI-I (2560 x 1600)

Computers	SC 800 Single-Head		SC 900 Dual-Head	
	Audio/USB	Audio/USB/DPP	Audio/USB	Audio/USB/DPP
2	Cybex SC 820	-	Cybex SC 920	-
4	Cybex SC 840	Cybex SC 845	Cybex SC 940	Cybex SC 945
8	-	Cybex SC 885	-	Cybex SC 985

Table A.5 Single/Dual Link DVI-I (2560 x 1600) & DisplayPort 1.2 (4K UHD 3840 x 2160 @ 30 Hz) Computers

Console Display Type	Dual DVI & DP 1.2 Monitors		Dual Dual-link DVI-I & HDMI 1.4 Monitors	
Computers	Audio/USB	Audio/USB/DPP	Audio/USB	Audio/USB/DPP
2	Cybex SC 920XP	-	Cybex SC 920XD	-
4	-	Cybex SC 945XP	-	Cybex SC 945XD

Table A.6 Secure Keyboard and Mouse Switches (no video)

Computers	Audio/USB	Audio/USB/DPP
2	Cybex SCKM 120	Cybex SCKM 125
4	-	Cybex SCKM 145

Table A.7 Dimensions and Weights

Computers	Width (in/mm)	Depth (in/mm)	SC 800 Single-Head		SC 900 Dual-Head	
			Height (in/mm)	Weight (lb/kg)	Height (in/mm)	Weight (lb/kg)
2	7.0 / 178	2.4 / 61	1.7 / 43	1.0 / 0.5	2.2 / 56	1.5 / 0.7
4	13.7 / 348	5.0 / 127	1.7 / 43	3.0 / 1.5	2.2 / 56	3.7 / 1.9
8	17.3 / 439	7.3 / 185	1.7 / 43	5.4 / 2.5	2.2 / 56	6.8 / 3.1

Table A.8 Environmental Conditions

Series	Operating Temperature	Humidity	Storage Temperature
All Series	32° to 104°F 0° to 40°C	0-80% RH, non-condensing	-4° to 140°F -20° to 60°C

Table A.9 Electrical Power

Computers	Power	AC Input Voltage
2	12V DC 1.5A External Power Adaptor	
4	35W Max Internal Power Supply	100 to 240V AC 50/60 Hz
8	45W Max Internal Power Supply	

Table A.10 Console Peripherals

Computers	Keyboard/Mouse
2	USB Type-A
4	USB Type-A & PS/2
8	USB Type-A & PS/2

Table A.11 Cable Options

Series	Video Type	Cable Length (ft/m)	SC 800 Single-Head		SC 900 Dual-Head	
			Audio/USB	Audio/USB/DPP	Audio/USB	Audio/USB/DPP
SCxxx	DVI-I	6 / 1.8	CBL0150	CBL0146	CBL0152	CBL0148
		10 / 3.0	CBL0151	CBL0147	CBL0153	CBL0149
SCxxxH	HDMI	6 / 1.8	CBL0110	CBL0112	CBL0114	CBL0116
		10 / 3.0	CBL0111	CBL0113	CBL0115	CBL0117
SCxxxD & SCxxxDP	DisplayPort	6 / 1.8	CBL0102	CBL0104	CBL0106	CBL0108
SCxxx & SCxxxH	HDMI-to-DVI-D	6 / 1.8	CBL0162	CBL0164	CBL0166	CBL0168

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