User Manual: Combiner KVM Switches (K424F, K424F-C)

User Manual

Models covered in this user manual:

K424F: Secure 4-port Dual-Head DVI Combiner KVM Switch w/audio & DPP

K424F-C: RC Secure 4-port Dual-Head DVI Combiner KVM Switch w/audio & DPP

Rev: 3.0

HighSecLabs
Highest Security Solutions Ltd.

Table of Content

Record of Revisions

Rev	Date	Description of changes
1.0	Nov 11, 2010	Initial release
1.1	Nov 20, 2011	Internal review for CC evaluation
2.1	Dec 30, 2011	Released for customers
2.2	Feb 4, 2012	Added security procedures text
2.3	April 19, 2012	Added support for composite device
2.4	April 3 2015	Updates
3.0	Dec 7,2017	Updated models, graphics and anti-tempering description

Introduction

Thank you for purchasing this HSL Secure Combiner KVM Switch.

There are many cases where one user needs to work simultaneously with several computers. The Secure KVM Combiner is designed to provide users with native windowing environment across isolated networks.

The HSL Secure KVM Combiner switch uses advanced video processing technology to draw a high resolution dynamic "mosaic" of images generated by different computer sources. Built-in video sources isolation forces unidirectional flow of data through the USB and video ports. The product was designed and certified according to NIAP standards.

This User Manual provides all the details you'll need to install and operate your new Switch, in addition to troubleshooting guidance—in the unlikely event of a problem.

Package Contents

Inside product packaging you will find the following:

- HSL Secure KVM Product
- DC Power Supply
- 5-button Mouse
- User Guidance Documentation

Important Security Note:

If you are aware of potential security vulnerability while installing or operating this product, we encourage you to contact us immediately in one of the following ways:

- Web form: http://www.highseclabs.com/support/case/
- Email: security@highseclabs.com
- Tel: +972-4-9591191 or +972-4-9591192

Important: This product is equipped with always-on active anti-tampering system. Any attempt to open the product enclosure will activate the anti-tamper triggers and render the unit inoperable and warranty void.

Security Features

HSL Secure KVM Switch is the most advanced and secure commercially available KVM Switch available today. This product is a derivative of high security KVM product used in newest NATO nuclear submarines. Below is a summary of some of the security features incorporated into the product.

Unidirectional Data Paths

Optical diodes used to enforce unidirectional data flow from the peripheral devices to computers preventing potential leakage paths between computers even in the severe threat of two infected computers attacking the KVM.

No Shared Resources

This KVM Switch designed to securely operate even when peripheral devices are vulnerable to signaling attacks. This KVM Switch does not allow computer access to any shared resource and does not share controllable power sources.

Dedicated Processors for Emulation

The Switch features a dedicated processor per computer port to emulate peripheral devices. This keeps each computer running on different security levels physically separated and secure at all times, and prevents any unintended data leakage between computers.

Non-Reprogrammable Firmware

The Switch features custom firmware that is not reprogrammable, preventing the ability to remotely attack the KVM control logic.

EDID Emulation and Firewall

HSL Secure KVM Switch blocks the computer access to the shared display by using isolated EDID emulators. This arrangement together with the internal EDID firewall protects from KVM attacks targeting the external memory effect of the shared display.

USB Ports Protection

Console USB ports are protected from the use of storage and other unsafe USB devices through strong filtering (independent of computer protection means). Unqualified devices are rejected when connected to the Switch. Only mouse and keyboard data are passed through.

Heavy-duty Steel Enclosure

HSL Secure KVM Switches uses thick steel components to protect the product from physical tampering and to minimize radiated electromagnetic emissions that can be snooped or intercepted.

Active Always-On Anti-Tamper

Active chassis anti-tamper system prevents the KVM electronic circuitry from being accessed and tampered with by permanently disabling the product once tampering is detected.

Holographic Tamper-Evident Labels

Four serially numbered holographic security tamper-evident labels are placed on the enclosure surface to provide a visual indication if the Switch has been opened or compromised.

High Inter-Channel Analog Isolation

HSL Secure KVM Switches offers exceptionally high isolation between computer channels to prevent analog leakages across the KVM.

Dedicated Peripheral Port

HSL patented Dedicated Peripheral Ports enables secure use of CAC or smart-card readers leveraging security.

Common Criteria Listing

The Switch is listed by the Common Criteria organization.

Main Features

The HSL Secure KVM Switch was designed with the user in mind for today's IT environment. Below is a summary of some of the features incorporated into the Product.

Video Support

- DVI models support DVI-I displays as well as VGA and HDMI via compatible cables.

Dual Display and Resolutions Supported

Products supports dual display and video resolutions of up to HD (1920 X 1200 pixels).

Real-time and real quality video

Pixel-by-pixel video image. No quality loss, latency, reduced colors, dropped frames or artifacts. Fastest digital video processing technology available in any KVM today. Less than 30 millisecond latency.

Easy customization

Administrator mode enables easy customization of channels, colors, cursors, task-bar, background etc. User programmable buttons enable quick setting of user defined screen arrangements.

Audio Support

The HSL Secure KVM Combiner supports audio out switching. Microphone switching is not supported to prevent analog leakages through audio ports.

Advanced Scaling Function

The HSL Secure KVM Combiner has an advanced scaling function allowing the user to scale the video source 2x and 4x smaller to assure good view and superb work experience. User can now fit 4 full HD sources on a single HD screen by scaling each source and all in real time with no data loss.

Scale and Tile Modes

Allowing users to focus on a main source while viewing the other sources or tile all of the sources equally

DPP port

Dedicated peripheral port enables to connect CAC and smart card readers to product. Product is designed with complete isolation between DPP data, such as user authentication smart card reader data, and all other product traffic.

Equipment Requirements

Cables

It is highly recommended to use HSL Cable Kits for product to ensure optimal security and performance.

One Cable Kit is required per connected computer.

Operating Systems

Product is compatible with devices running on the following operating systems:

• Microsoft® Windows®

• Red Hat®, Ubuntu® and other Linux® platforms

• Mac OS® X v10.3 and higher.

USB Keyboard console port

The product console USB keyboard port is compatible with Standard USB keyboards.

Notes:

a. For security reasons products do not support wireless keyboards. In any case do not connect wireless keyboard to product.
b. Non-standard keyboards, such as keyboards with integrated USB hubs and other USB-integrated devices, may not be fully supported due to security policy. If they are supported, only classical keyboard (HID) operation will be functional. It is recommended to use standard USB keyboards.

USB Mouse console port

The product console USB mouse port is compatible with standard USB mice.

Notes:

a. Console USB keyboard and mouse ports are switchable, i.e. you can connect keyboard to mouse port and vice versa. However, for optimal operation it is recommended to connect USB keyboard to console USB keyboard port and USB mouse to console USB mouse port.
b. Console USB mouse port supports Standard KVM Extender composite device having a keyboard/mouse functions.
c. For security reasons products do not support wireless mice. In any case do not connect wireless mouse to product.

PS/2 Mouse and Keyboard console ports

The product console PS/2 keyboard and mouse ports are compatible with standard PS/2 keyboards and mice.

Video Support

- Combiners supports DVI-I displays as well as VGA and HDMI via compatible cables.

Resolutions Supported

- DVI Dual-link supports resolution up to 2560 x 1600.
- DVI Single-link supports resolution up to 1920x1200.

User Audio Devices

Product is compatible with the following types of user audio devices:

- Stereo headphones;
- Amplified stereo speakers.

Note: In any case do not connect a microphone to product audio output port including headsets.

DPP Port

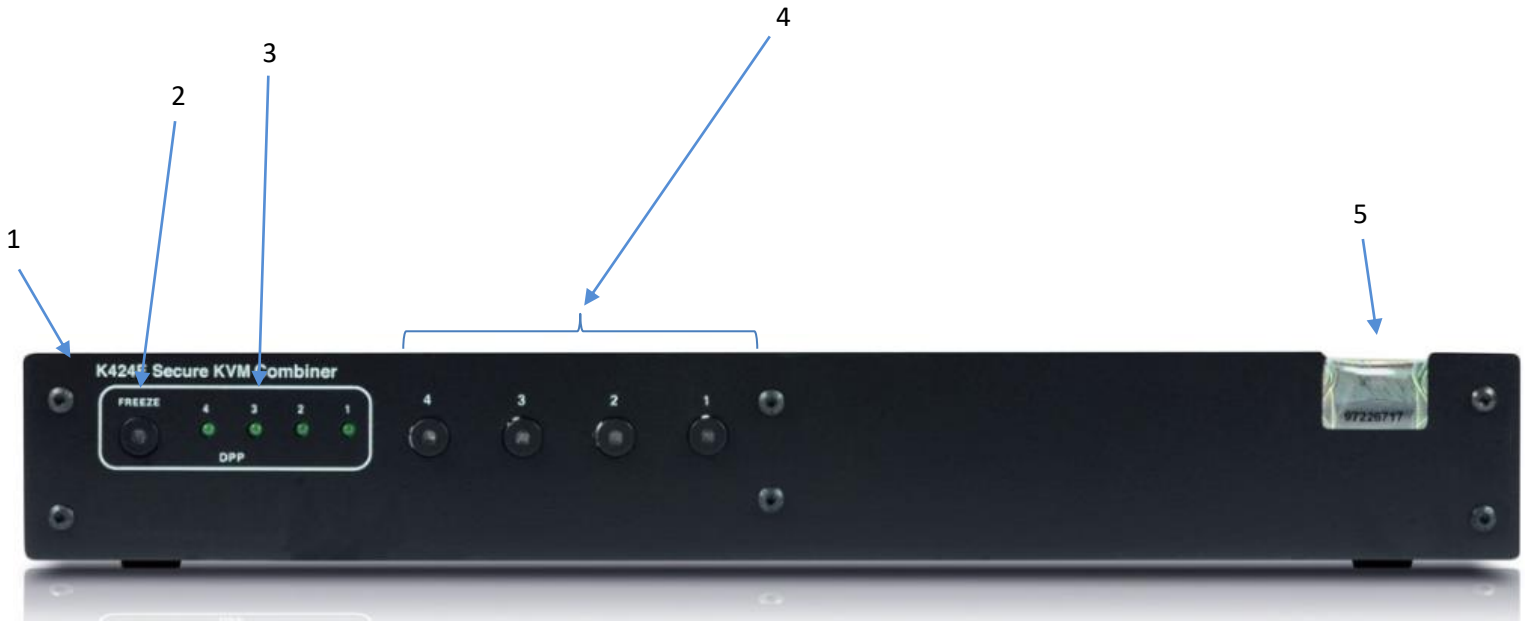
The product operates with authorized USB devices plugged into the console DPP Port, such as USB smart-card reader or Common Access Card (CAC) reader.

Safety Precautions

Please read the following safety precautions carefully before using the product:

- Before cleaning, disconnect the product from DC power.
- Be sure not to expose the product to excessive humidity.
- Be sure to install the product on a clean secure surface.
- Do not place the DC power cord in a path of foot traffic.
- If the product is not used for a long period of time, remove the product's wall-mount power supply from the mains jack.
- If one of the following situations occurs, get the product checked by a qualified service technician:
  - The product's power supply is overheated, damaged, broken, causes smoke or shortens the mains power socket.
  - Liquid penetrates the product's case.
  - The product is exposed to excessive moisture or water.
  - The product is not working well even after carefully following the instructions in this user's manual.
  - The product has been dropped or is physically damaged.
  - The product has obvious signs of breakage or loose internal parts.
- The product should be stored and used only in temperature and humidity controlled environments as defined in the product's environmental specifications.
- The wall-mount power supply used with this product should be the model supplied by the manufacturer or an approved equivalent provided by HSL or an authorized service provider. The use of improper power source will void product warranty.

Front Panel Features



1 – Sheet metal enclosure

2 – DPP (Dedicated Peripheral Port) Status LED ("Freeze")

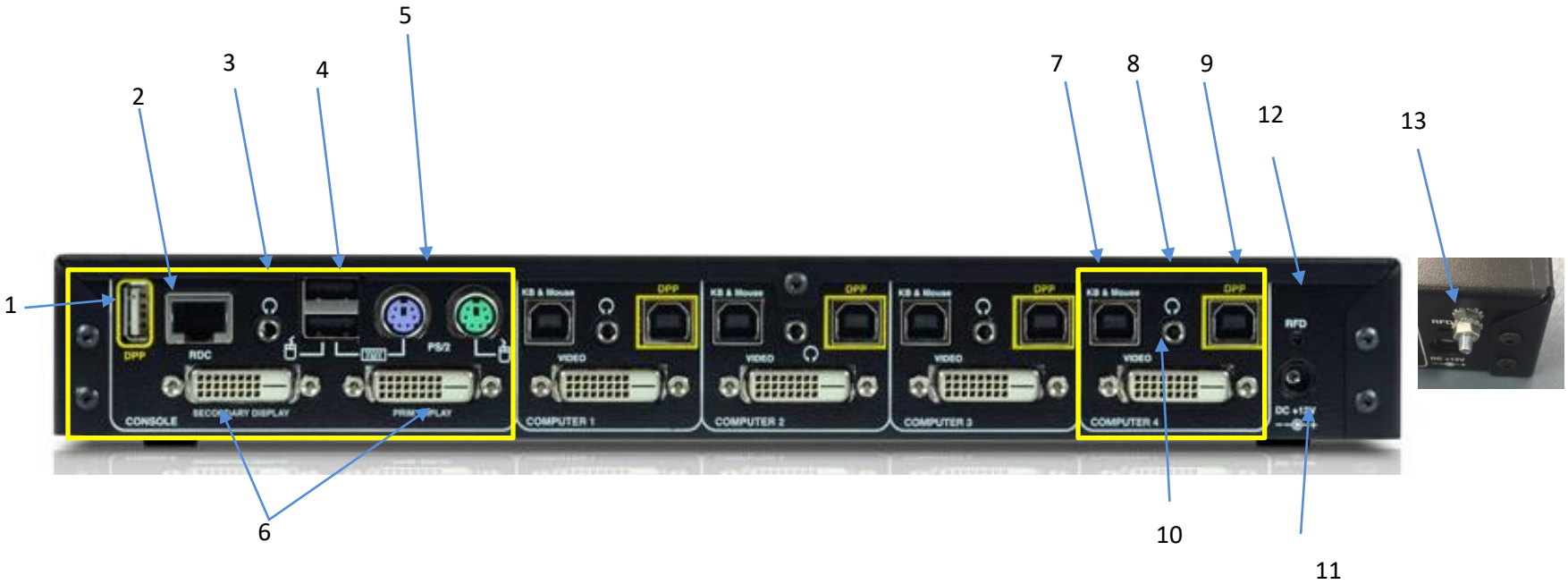
3 – DPP channel select LEDs

4 – Channel Select push-buttons and LEDs

5 – Holographic Tamper Evident Labels

Rear Panel Features

Model shown K424F



Console Area

1 – DPP (Dedicated Peripheral Port) console USB jack

2 – RDC remote control port RJ-45 (for future use)

3 – Audio console output 3.5 mm stereo jack

4 - USB Keyboard & Mouse jacks

5 – PS/2 Keyboard & Mouse jacks (Mini-DIN)

6 – Console 2 X DVI-D video input jacks & diagnostic LEDs

Computer Area

7 – Computer USB Keyboard & Mouse jack

8 – Computer audio input jack 3.5mm stereo

9 – Computer DPP USB jack

10 – Computer DVI-D video input jack

General

11 – DC Power input jack – barrel type

12 – Restore Factory Default

13 – For 424F-C only – GND screw

Tamper Evident Labels

HSL Secure KVM Switch uses 4 holographic tamper evident labels to provide visual indications in case of enclosure intrusion attempt. These labels indicate white dots or the text “VOID” once removed. When opening product packaging inspect the 4 tampering evident labels.

If for any reason one or more tamper-evident label is missing, appears disrupted, or looks different than the example shown here, please call HSL Technical Support and avoid using that product.

HSL Holographic Tampering Evident Label

Active Anti-Tampering System

HSL Secure KVM Switch is equipped with always-on active anti-tampering system. If mechanical intrusion is detected by this system, the Switch will be permanently disabled and LED will cycle between channels.

If product indication tampered state (LEDs cycles between channels) - please call HSL Technical Support and avoid using that product.

Product Specifications

Enclosure	Heavy-duty extruded aluminum enclosure with metal faceplate
Power Requirements	12V DC, 5A (maximum) power adapter with center-pin-positive polarity
AC Input	100 to 240VAC
No. of Secure Channels	4
No. of Computers Supported	4
Displays Supported	
	K404F: 1 x single-link DVI-D display; HDMI interface supported with adapter
	K424F:
	2 x single-link DVI-D display; HDMI interface supported with adapter
Output Display Resolutions Supported	Up to 1920x1200 pixels
Input video resolution	Up to 1920x1200
Input Windows Size	800 x 600 (4:3) SVGA; or
	1280 x 1024 (5:4) SXGA; or
	1920 x 1080 (16:9) HD1080; or
	1920 x 1200 (16:10) WUXGA.
Console Keyboard Input	USB Type-A female connector or PS/2 Mini-DIN 6 pin female connector
Console Mouse Input	USB Type-A female connector or PS/2 Mini-DIN 6 pin female connector
Console DPP Input	USB Type A
Console Display Port	1 DVI-D female connector (K404F)
	2 DVI-D female connector (K424F)
Console Audio out	3.5mm stereo jack
PC Keyboard/Mouse Ports	USB Type-B jack
PC CAC Ports	USB Type-B jack
PC Audio Input	3.5mm stereo jack
PC Video Input Port	DVI-D Single-link female
Port Selectors push-buttons	4
LED Indicators	4
User Functions	

- Toggling between normal mode and system modes by mouse side buttons click (5-Buttons mouse).
- Windows can be moved and resized.
- Cascading button arranges all 4 windows one on top of the other.
- Tile button arranges all 4 windows in a mosaic.
- Help button presents on-screen basic usage guidance.
- Vertical and horizontal scroll bars to enable user control of viewable window.
- Minimize window to task-bar.

	• Colored Task-bar and window border indicating channel. • Mouse wheel cyclic toggling between active windows in system mode. • Double click to maximize a window to a full screen. • Legacy mode – toggling between windows by keyboard Control + Function keys [Optional]. • 3 User defined preset buttons to save or load user settings. • Disable channel function.
Administrator mode	
	• Selectable system cursor pointers. • Selectable window border widths. • Selectable window border colors. • Selectable task-bar sizes. • Selectable video output resolutions [model specific – see table above].
Operating Temp	32° to 104° F (0° to 40° C)
Storage Temp	-4° to 140° F (-20° to 60° C)
Humidity	0-80% RH, non-condensing
Security Accreditation	NIAP Common Criteria
Product design life-cycle	10 years per

Before Installation

Unpacking the Product

Before opening the product packaging, inspect the packaging condition to assure that product was not damaged during delivery.

When opening the package, inspect that the product Tamper Evident Labels are intact.

Where to locate the Product?

The enclosure of the product is designed for desktop or under the table configurations. An optional Mount Kit is available.

Product must be located in a secure and well protected environment to prevent potential attacker access.

Consider the following when deciding where to place product:

- Product front panel must be visible to the user at all times.
- The location of the computers in relation to the product and the length of available cables (typically 1.8 m)

Warning: Avoid placing cables near fluorescent lights, air-conditioning equipment, RF equipment or machines that create electrical noise (e.g., vacuum cleaners).

Display selection considerations

Proper selection of user display is critical for the success of any Combiner KVM deployment. The information provided here represents the information gained during evaluation and deployment projects.

• Avoid using old CRT displays.

• Some projects invested significant resources in the overall project design and implementation but neglected the display and peripherals. Users may reject the new system if proper display not used with the system. As large LCD cost going down daily, it become easier and cheaper to retrofit the user desktop completely during these projects.

• Proper size of the display is critical. To enable simultaneous work with several windows LCD panels larger than 22” diagonal are recommended.

• Try to use the larger LCD size possible (taking the user workstation / table size into consideration).

• Check if the display adjusts automatically to resolution changes. This feature is essential to support window maximization.

• Native resolution of the display should match output resolutions supported by the Secure Combiner KVM.

• Display should support DVI input. HDMI can be used with proper DVI to HDMI cable or adapter. In this case check audio out channels cannot be routed through HDMI.

• It is recommended to involve the users in the display selection process during evaluation and initial deployments.

• Consult support with specific display models and technical specifications.

• DVI-I to VGA converters cannot be used with the Secure Combiner KVM as it does not support analog video.

• Note that when using a Dual-link DVI display with the 104X product the KVM to display cable and KVM cables must be Dual-link as well.

Dual Display Model K424F

• K424F uses two displays. It is preferable that both displays will be the same type and model.

• Displays must be landscape oriented and installed side by side in close proximity to one another. Primary on the left and secondary on the right side.

• Displays must be either 1920 x 1080 or 1920 x 1200 native resolution.

Installation

Connecting devices to product console

Product requires connection of all devices and computers prior to powering it up.

Note: some devices such as user display would not be recognized if connected after product is already powered up.

See figures above for connector locations.

- Connect user display/s. Mark which display is coupled with which computer. It is also recommended to mark which computer is coupled with which channel.
- Connect user keyboard and mouse to console keyboard and mouse ports.
- Connect headphones/speakers to console audio out port (optional).
- If the computer uses a smart card reader/USB device, connect the smart card reader/USB device to the console DPP port (optional, model pending).

Notes:

1. Console USB mouse and keyboard ports are switchable, i.e. you can connect keyboard to mouse port. However, for optimal operation it is recommended to connect USB keyboard to console USB keyboard port and USB mouse to console USB mouse port.
2. For security reasons products do not support wireless keyboards. In any case do not connect wireless keyboard to product.
3. Non-standard keyboards, such as keyboards with integrated USB hubs and other USB-integrated devices, may not be fully supported due to security policy. If they are supported, only classical keyboard (HID) operation will be functional. It is recommended to use standard USB keyboards.
4. Console USB mouse port supports Standard KVM Extender composite device having a keyboard/mouse functions.

2. Connecting the Computers

- Using USB cables, connect each computer to the USB type B port in "computer interface ports" area on product.
- If computer uses audio output, e.g. speakers/headphones, connect audio cable from its audio output port to the corresponding audio input port on product.
- If the computer uses a smart card reader/USB device, connect a USB cable between the DPP-enabled computer and the corresponding DPP port on product.

Note:

1. If the number of product channels is larger than the number of sources used, make sure the computers are connected in a row starting from computer #1. For example, if there are 3 channels used, connect computers to channels #1, #2 and then #3.
2. The USB cable must be connected directly to a free USB port on the computer, with no USB hubs or other devices in between.

3. Power up

- Connect DC power supply.
- Power up user display/s. Select through display setup menu the appropriate video input if applicable.
- Power up the connected computers.
- Power up the product.

When you power up your computers, the product emulates display, mouse and keyboard on each port and allows your computers to boot normally. You should be able to move the mouse cursor on the primary display connected to computer #1.

Check to see that the keyboard and mouse are working properly on each computer.

Repeat this check with all occupied ports to verify that all computers are connected and responding correctly.

If you encounter an error, check your cable connections for that computer and reboot. If the problem persists, please refer to the Troubleshooting section in this User Manual.

DPP Installation

In case computer and product support DPP functionality, such as user authentication smart card reader, do the following:

1. Connect USB device, such as smart card reader, to **DPP port** on **product console**
2. Connect **DPP input port** on product to any free **USB port on computer** using a USB cable.
   Note: Do not connect the USB cable if DPP functionality is not needed for that computer.

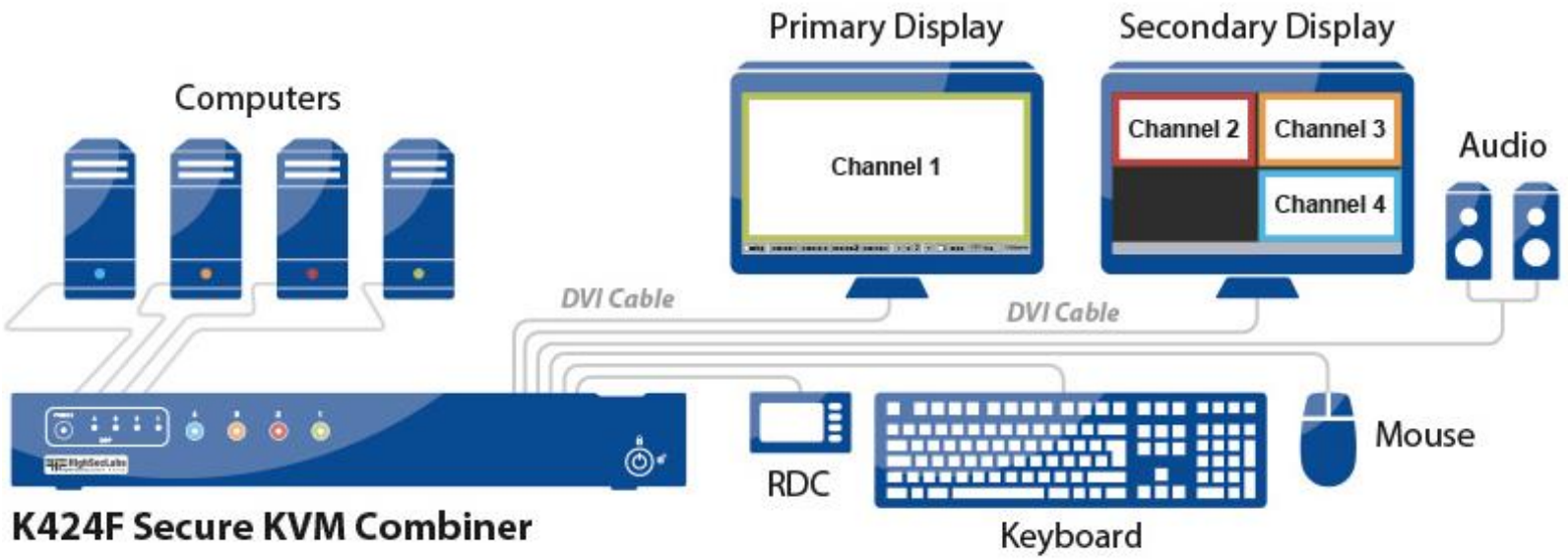
If only some of the computers use DPP functionality, such as user authentication, make sure that **computer #1** is connected to the USB device. If needed, switch channels/computer mapping to create this configuration.

When product is powered ON and connected USB device is qualified and ready for use, the DPP status LED ("Freeze") will illuminate steady green.

If the USB device is detected but not authorized, as not being a Smart Card or CAC reader, it will be rejected for security reasons. This will be indicated by DPP status LED illuminating steady red.

Note: If during installation as a result of bad output resolution (resolution not supported by display) the video image on the user display is lost it is possible to recover the device through the use of Restore Factory Defaults switch (see item 17 in page 12). Pressing this switch momentarily will return the Secure Combiner KVM to the original production settings including lowest output resolution. For information on how to reset the device to factory defaults see the Troubleshooting section of this manual.

Typical system diagram



Administrator Setup

Now that the Secure Combiner KVM is connected and powered-on it is a good opportunity to setup some operational settings.
To enter administrator setup mode the administrator key should be inserted into the front panel keylock and rotated in clockwise direction. Once in administrator clicks on setup icon at the bottom left side of the screen, the Main Admin Setup windows appears and can be accessed. Details about administrator setup windows:

- Main Admin Menu – Enables selection of System setup window or channel specific window using mouse.

- Channel menu – Enables selection of channel input resolution (4 options) and border color from 16 color options.

- System menu – Enable system level settings. Administrator can select:
  - Display output resolution from 2/6/8 options;
  - Border width from 6 options;
  - Taskbar size from 2 options; and
  - System cursor type from 4 options.

Note: Rotation of the key lock to Administrator setup mode also affect: the following:
1. User preset buttons will become inactive.
2. All three user presets will be erased.
This is normal system behavior that designed to avoid configuration conflicts.

Note about input resolution setting: Selection of input resolution that does not match the attached PC will result unreadable image at that window. This may be fixed by entering administrator mode and change input resolution setting or by changing host resolution.
Notes about display resolution setting:
- The Secure Combiner KVM channel resolution, selected from the channel menu, determines the size of the channel window. It will not affect the actual resolution projected by the connected PC.
- The Secure Combiner KVM is capable of scaling the image in two possible factors: 2x and 4x allowing the user to fit more information on the same display size.
- Selection of resolution higher or lower than resolution range of connected display may result image loss! In this case you can change display to different type or restore factory defaults.
- To restore factory default settings – use a paper clip or another sharp object and press momentarily the recessed RFD switch located at the rear side above the DC power jack.
- See table in page 14 for supported output resolutions per model.
Once completed to set the required settings, the administrator key should be rotated back to the locked position and key must be removed to enable normal product operation.

After Installation Checklist
Once completed to set requires settings – check the final device product configuration with all connected computers operating:
1. Check that each window is connected to the proper PC and have the required border color.
2. Check that each window is coupled to the proper keyboard and mouse (no cables are crossed between channels).
3. Check that each window is coupled to the proper DPP input.

4. Check that each window is coupled to the proper audio output (if applicable).
5. Check that all video cable thumb screws are secured.
6. Check that administrator key was removed from the device.

Dual Display Channel #1 Input resolution setting window

Installation is similar to a single display with the following changes:

1. Displays must be either 1920 x 1080 or 1920 x 1200 native resolution. Do not use higher resolution as the image will be shown as a smaller window or will be rescaled (resulting a degradation in the displayed video quality.
2. It is recommended that both displays will be identical type and model.
3. Displays should be oriented in landscape.
4. Left side display must be connected to the primary console display output jack (the right side jack when looking from the rear).
5. Conversion to VGA monitor is not recommended.

Operation

Now that you have connected your console and computers to the Switch, it is ready for use. Default channel after power up is channel #1 as indicated by channel select LED #1 illumination. You can select which computer you wish to control by one of the following methods:

Default Channel

After product boots up, the default active channel will be channel #1. This will be indicated by white color illumination of push-button #1.

Product Mapping to Sources

Product mapping to sources is indicated by stickers/labels specifying which channel is mapped to which computer.

Front Panel Push-Buttons

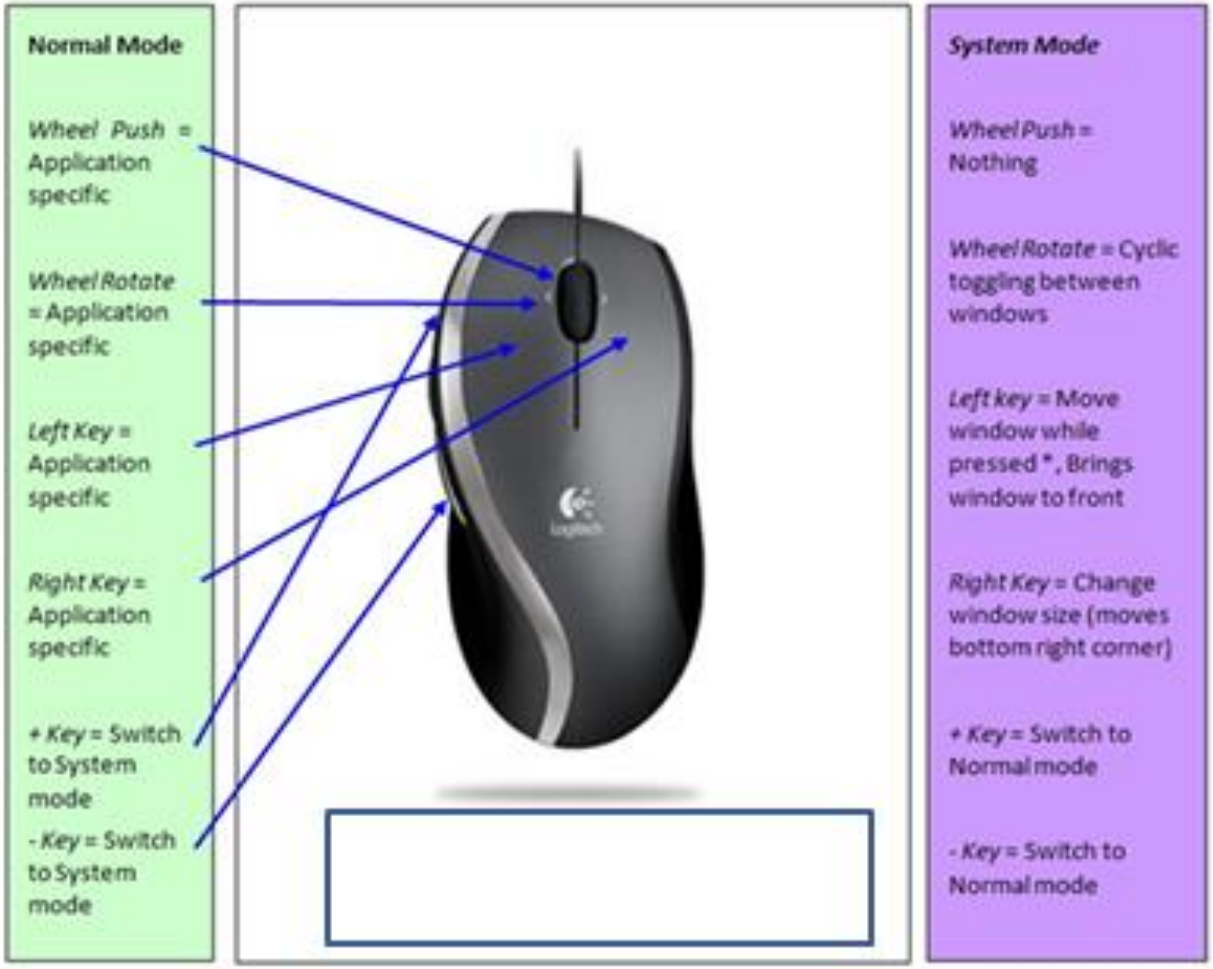
Following power up, the default channel is #1.

The user can select any other channel by pressing the appropriate front panel push button.

The mouse cursor will be positioned at the center of the selected computer display.

Device control is done using the 5-buttons mouse and display interaction. The use of 5-buttons mouse enables the user to fully use all standard wheel mouse buttons for application specific tasks and still operate Secure Combiner KVM specific functions using the 2 extra side buttons.

The user may easily toggle between normal and system mode by pressing one of the +/- side buttons.


Normal Mode
Wheel Push = Application specific
Wheel Rotate = Application specific
Left Key = Application specific
Right Key = Application specific
+ Key = Switch to System mode
- Key = Switch to System mode
System Mode
Wheel Push = Nothing
Wheel Rotate = Cyclic toggling between windows
Left key = Move window while pressed *, Brings window to front
Right Key = Change window size (moves bottom right corner)
+ Key = Switch to Normal mode
- Key = Switch to Normal mode

DPP Operation

The product is equipped with DPP port enabling connectivity to external USB-devices such as smartcard reader.

Summary of rules that apply to DPP switching:

It is assumed that a "connected channel" is when:

1. Product is powered ON
2. The USB device connected to product console is qualified and ready for use, as indicated by the DPP status LED illuminating steady green.
3. The channel DPP port on product is connected via USB cable to a USB port on computer.

- When the USB device connected to the DPP console port is qualified, the DPP status LED on the front panel would illuminate steady green.
    - When connecting a USB device that is rejected for security reasons to the product's DPP port, the DPP LED will illuminate steady red and USB device will be inoperable. In such case the USB device must be replaced with a qualified device, either USB smart card or CAC reader.
- Since channel #1 is the default active channel after power up and in case only some of the channels operate with a USB device, it is recommended to make sure computer #1 is connected to USB device.
- Once the user switches channels, for example to channel #3, DPP functionality will move to computer #3 and be indicated by channel #3 DPP LED turning steady green.
- In case user switches to a channel that is not connected to a USB device, the DPP function will remain with the last channel that had DPP connection.

Normal Mode

The Secure Combiner KVM enables simultaneous interaction with 2-4 different computers using a single or dual display, keyboard and mouse. When the user interacts with an application at a specific window - that channel is active and the mouse and keyboard affecting only that channel. The top left corner of the active channel window is white as an indication. In Normal mode there is always one channel which is considered to be active. Mouse, keyboard and audio are mapped to the active channel.

The user may move to a different channel by:

1. Switching first to system mode. While in system mode the cursor will change to the selected system mode cursor and will enable free movement throughout the display area. Once in system mode the user may point at another window and use the +/- to make it active.

2. Using front panel push-buttons to select a different channel.

When the Secure Combiner KVM is in Normal Mode:

• Mouse cursor of the active computer (channel) is controlled by the console mouse.

• Mouse cursor symbol is generated / controlled by the computer operating system / application.

• Mouse movement is limited to the active window area.

• All mouse buttons (and wheel) will function based on the computer assigned specific role (not affected by the KVM) (the mouse side buttons are used to exist normal mode and switch to system mode).

• Keyboard is mapped to the active window computer.

• Audio output will only be heard from active computer.

• Active window will always be on top of all other windows.

• Task bar not shown on user display, buttons are not accessible.

• Pressing + / - (on the side of the mouse) mouse buttons will toggle the Secure KVM to System Mode.

• When using a PS/2 (which does not have the side buttons) pressing both right and left buttons at the same time will also toggle the KVM to System Mode.

System Mode

The mouse +/- side buttons triggers cyclic toggling between modes. System mode can be easily identified by the appearance of the title bar / task bar at the bottom of the display.

The Secure Combiner KVM system mode enables the user to manage his/her combined desktop and customize it for the job being done. This mode also enables the user to move between windows and to minimize/ maximize windows as needed.

In system mode there is also an active channel, indicated by a white top left corner but the mouse is controlled by the Secure Combiner KVM and not mapped to the active channel.

When the Secure Combiner KVM is in System Mode:

• Mouse cursor is controlled by the system mouse.

• Mouse cursor is generated / controlled by the Combiner KVM.

• Mouse movement is unlimited in all display area.

• Keyboard is routed to the active window (active window is always in front).

• Audio output is switched from the active window PC.

• Task bar visible and buttons are accessible.

• Pressing + / - mouse buttons will change to Normal Mode and the active window will be the window where the system cursor was last positioned.

• Left clicking on a window will bring it to the front and make it the active window.

• Pressing left mouse button and holding – will drag the window under it.

• Double clicking on a window will maximize that window to full screen.

• Right click on the bottom right corner of a window and dragging will allow changing the window size (limited by the size set under the channel menu).

• Pressing both right and left keys on an active window will allow moving the picture inside the window (only applicable of the source resolution is larger the window size).

• Pressing and holding the +/- side mouse buttons and moving the mouse wheel will rescale the window (change the size of the input picture). This will be further explained in the scaling part of this manual.

Change of Active Window

When in system mode there is always one window which is considered as the active window. The active window top left corner will be marked in white (as appose to black in all other windows) and its icon on the task bar will show as pressed.

Active Window is the window which the keyboard, audio and CAC device mapped to. In normal mode the mouse will also be mapped to this window.

Switching between active windows (when in system mode) is simply done by right clicking on another window with the mouse curser. Another option is pushing the front panel push buttons.

Another option to switch between active windows in system mode is by using the wheel in the mouse. Windows will move to the front at a cyclic sequence.

Moving Between Windows in Normal Mode

When in normal mode moving between windows can be done either by switching to system mode (by pressing the mouse side buttons), pointing at the new window and switching back to normal mode (by pressing the mouse side buttons again). Another option is to use the front panel push buttons.

Dragging a Window

In order to move a window user should first switch to system mode by pressing + or – mouse side buttons. In system mode, hold the left mouse button when the system cursor located on the desired window and the window will move. Release left mouse button to drop window in place.

Notes: Window movement to the left side is limited by the display boundary.

Window movement to the right side is unlimited (window may be pushed out of the display viewable area).

Window Resizing

In order to resize a window the user should first switch to system mode by pressing + or – mouse side buttons. In system mode, the user should drag the mouse while holding the right mouse button when the system cursor located on the bottom right corner of the desired window. Release right mouse button to freeze window size.

Note: Window size is limited by the size set for the window under the channel menu.

Window Internal Scroll

When window size is smaller than input image size it might be required to “move” the image inside the window. This is done by pointing at the window, pressing both mouse buttons at the same time and moving the mouse. Release the mouse buttons to freeze the position of the window.

Help button

The “?” button located at the task bar (see figure below) show mouse functionality bitmap with mouse functions.

Maximizing a window to full screen mode

To maximize a window to its full size – enter System Mode by pressing + or – mouse side buttons then bring the system cursor to the window that should be maximized and then double click on that window.

The selected window will maximize to its native input resolution. No other windows or bars will be displayed.

To leave maximize mode – change back to system mode (by pressing the mouse side buttons) and re arrange windows as needed. Changing to system mode will

Deactivating / activating channels

The user can remove from the Secure Combiner KVM display inactive channels. In order to deactivate a channel the user should enter system mode and then move the system cursor to the desired channel button at the task bar and double-click on it. Red X should appear on that channel (see figure below).

In some cases the user may want to deactivate a live channel for operational reasons. The Secure Combiner KVM will display instead on that channel a background color.

Repeating this process will cancel this status and reactivate that channel.

Once a channel had been deactivated it would not participate in cyclic toggling between windows and will not be displayed in anyway.

Dual display operation [K424F]

Maximizing a window

When in system mode, double-clicking on a window will maximize that window to full screen. If the window is shown on both displays it will maximizes at the display where a larger portion of that window lying at. For example: if 60% of the window is at the primary display – it will maximize at the primary. When it is maximizing – the other 40% of that window will disappear from the secondary display. The second monitor will still display the same windows as before accessing the full screen mode. Any other windows on the display to which the window was maximized will be hidden behind the maximized window.

In dual display mode, the tile function will place channels 1 and 3 windows on the primary display and channels 2 and 4 windows at the secondary display.

The Secure Combiner KVM includes a scaling function. The scaling function allows the user to reduce the size the source image without losing information, enabling him to see more of the sources on limited screen space. Scaling is done by an advance scaling algorithm.

Tile Feature

The tile feature is accessed from System Mode by clicking on the Tile button located on the task bar. By pressing tile the windows will arrange in tile mode but will automatically be scaled by 1:2x factor. For example, if the input source resolution is 1920 x 1080 the image displayed in the source window will be 960 x 540. The size of the window is, as always, determined by the output resolution (will be a quarter of the available screen area). Tile is actual a preset of system mode and once in tile mode all system mode functions are available.

Scale a specific Window

From System mode it is possible to scale a specific window simply by pointing on the active window, pressing the mouse side buttons and moving the mouse wheel.

This will toggle the scaling of the active window between 1:2x, 1:4x and no scaling keeping the actual window frame size fixed.

It is also possible to scale a window (both from system and normal modes by using the CTRL | CTRL | +/- key combination where pressing + will reduce the scaling (from 1:4X to 1:2X and from 1:2X to no scaling) and the – will increase the scaling (from no scaling to 1:2X and from 1:2X to 1:4X).

Scale Feature

By pressing the Scale button on the System Mode task bar the screen will be re-arranged as follow:

The active window centered (not scaled) and the other windows will move to the right side and scaled 1:4x.

It is still possible in this mode to use all standard System Mode functions to switch active between windows.

Also, once in scale mode moving the mouse wheel will toggle between windows making a different source the central display.

Using the front panel push buttons will change the active window without repositioning the windows.

Single Display Viewing Options

Tile Mode

Shows the output of four computers in equally sized panes.

	Touch Screen	Keyboard	Mouse
To switch to Tile mode	Touch "Tile" on taskbar	**CTRL | CTRL | Q**	click "Tile" on the taskbar
Move pane in Tile mode	Tap upper left corner of a specific pane to move it 	N/A	Press and hold Left-Click Mouse button to move pane
Resize pane in Tile mode	Tap the lower right corner of a specific pane and drag to resize. Note: the content will not resize with pane. To fit content use **CTRL | CTRL | W.** 	**CTRL | CTRL | W:** Fit content to resized pane	Press and hold Right-Click Mouse button to resize pane.

	Touch Screen	Keyboard	Mouse
Scale pane in Tile mode	Tap the midpoint of the vertical or horizontal pane borders and drag to scale. The window and the content will resize.  	**CTRL | CTRL | "-":** Reduce Scaling **CTRL | CTRL | "+":** Increase Scaling	Press and hold Side mouse button + Scroll wheel to reduce/ increase scaling. For Fast scaling use mouse Side button & Scroll wheel while holding pressed Left CTRL button

Scale Mode

shows the output of four computers, displaying one large primary pane at 75%, and three smaller panes scaled to 25% of display area.

	Touch Screen	Keyboard	Mouse
To switch to Scale mode	Tap "Scale" on taskbar	**CTRL | CTRL | S**	click "Scale" on taskbar

Full-Screen

enlarges the active pane to full screen.

	Touch Screen	Keyboard	Mouse
Enlarge pane to full screen	In Tile mode tap 4 times on pane to switch to Full screen mode. Tap again 4 times to switch back to Tile mode	**CTRL | CTRL | F**: Full Screen **CTRL | CTRL | Z**: Goes back to last layout before switching pane to Full Screen	Double Left-Click Mouse button in System mode

Note: When in Full screen, switch back to Tile or Scale to show the other panes.

Dual Display Viewing Options

When connecting combiner to two displays you may work in "Extend" or "Duplicate" mode.

"Duplicate" shows the same image on both displays. "Extend" mode expands working area showing the image on both displays.

"Extend" in Scale Mode

"Extend" in Tile Mode

"Duplicate" in Scale Mode

"Duplicate" in Tile Mode

Note: These modes can be applied with any of the resolutions listed. If none of these modes "Extend" or "Duplicate" is defined in the System Setup Menu, the image will be displayed on one of the displays and the other one will remain blank, as with working with a single display.

Summary of Actions

Action	Touch screen	Keyboard	Mouse
Define Custom Presets in System mode	N/A	**CTRL | CTRL | F1-F4** **Note: CTRL | CTRL | F4** sets the custom preset for Tile mode. **CTRL | CTRL | Q** will always show the default Tile mode with 4 equally sized panes in display	N/A
Toggle between System Mode and User Mode	Hold uppermost right corner of display for 4 seconds	Move to System mode: **CTRL | CTRL | O ,** Move to User mode: **CTRL | CTRL | U**	Press Side Mouse Button
Move between sources (1 to 4) – change active pane **Note:** sources can also be switched by using the Combiner front panel push buttons	Tap pane to select and interact with a specific pane In Scale mode Tap any of the small panes on the right to make them primary	**CTRL | CTRL | Channel # (1-4)**	In System mode select 1-4 buttons in bottom grey menu In User mode press on any of the panes In Tile mode use Scroll Wheel Mouse button
Move to Tile	In Scale mode click 4 times on primary pane to move to Tile mode	**CTRL | CTRL | Q**	In System mode Select Tile button in bottom grey menu
Move to Scale	In Tile mode hold lower right corner of display for 4 seconds to move to Scale mode	**CTRL | CTRL | S**	In System mode Select Scale button in bottom grey menu
Scale panes	Touch the midpoint of the vertical or horizontal pane borders and hold while scaling. The window and the content will resize.	**CTRL | CTRL | "-"** : Reduce Scaling **CTRL | CTRL | "+"** : Increase Scaling	Press and hold Side mouse button + Scroll wheel to reduce/increase scaling. For Fast scaling use mouse Side button & Scroll wheel while holding pressed Left CTRL button
Move/drag panes	In Tile mode touch the upper left corner of a specific pane to move it	N/A	Left-Click Mouse button

Action	Touch screen	Keyboard	Mouse
Resize pane	In Tile mode touch the lower right corner of a specific pane to resize window without fitting the content. To fit content use CTRL | CTRL | W	**CTRL | CTRL | W**: Fit the desktop to the resized pane	Press and hold Right-Click Mouse button to resize pane. Maybe only part of the desktop will be displayed (see mouse actions for further resize options).
Enlarge pane to full screen	In Tile mode tap 4 times on pane to move to Full screen mode In Full screen mode tap 4 times to move to Tile mode	**CTRL | CTRL | F**: Full Screen **CTRL | CTRL | Z**: Goes back to last layout before enlarging pane to Full Screen	Double Left-Click Mouse button in System mode
Connecting Secondary Display in Duplicate Mode	N/A	**CTRL | CTRL | F11 | L**	N/A
Controlling Content and Order of Displays in Extend Mode	N/A	**CTRL | CTRL | F11 | J | J –** Primary display is presented on both displays **CTRL | CTRL | F11 | K | K** - Secondary display is presented on both displays **CTRL | CTRL | F11 | K | J –** Switch positions between Primary and Secondary displays. **CTRL | CTRL | F11 | J | K** - Switch positions back between Primary and Secondary displays. **Note**: • J stands for Primary display. • K stands for Secondary display.	N/A
Presentation Mode -define a channel that will always appear in Full Screen once selected	N/A	**CTRL | CTRL | P** to enter mode **CTRL | CTRL | X** (X=Channel # 1-4), for example channel #1. Channel 1 will be displayed in full screen **CTRL | CTRL | Channel # other than X**, e.g. channel #2, will move back to Tile Mode **CTRL | CTRL | N** To move out of Presentation Mode	N/A
Operate applications in a specific active pane in User mode	Normal touch screen behavior	Normal keyboard behavior	Normal mouse behavior

Troubleshooting Guide

Important Security Note:

If you are aware of potential security vulnerability while installing or operating this product, we encourage you to contact us immediately in one of the following ways:

- Web form: http://www.highseclabs.com/support/case/
- Email: security@highseclabs.com
- Tel: +972-4-9591191 or +972-4-9591192

Important: If the unit's enclosure appears disrupted or if all channel-select LEDs flash continuously, please remove product from service immediately and contact HSL Technical Support at http://www.highseclabs.com/support/case/

Important: This product is equipped with always-on active anti-tampering system. Any attempt to open the product enclosure will activate the anti-tamper triggers and render the unit inoperable and warranty void.

General

Problem: No power - No video output, none of the front panel LEDs are illuminating.

Solutions:

- Check AC cable connection to make sure product receives power properly. Replace cable if needed. If problem persists, contact your system administrator or our technical support.

Problem: Product enclosure appears disrupted or all channel-select LEDs flash continuously.

Solution: The product may have been tampered with. Please remove product from service immediately and contact Technical Support.

Keyboard

Problem: Mouse and keyboard are not working (two channels)

Solutions:

- Check that computer USB and video cables are not crossed i.e. computer #1 video is connected to channel #1 while USB keyboard and mouse cables are connected to channel #2.

Problem: Keyboard does not work (all channels)

Solutions:

- Check that the keyboard you are using is properly connected to product.
- Check that the USB cable between the product and computer is properly connected.
- Try connecting keyboard to a different USB port on computer.
- Make sure the keyboard works when directly connected to computer, i.e. the HID USB driver is installed on computer; this may require computer reboot.
- It is recommended to use standard USB keyboards and not a keyboard with an integrated USB hub or other USB-integrated devices.
- If the computer is coming out of standby mode, allow up to one minute to regain mouse function.
- Try a different keyboard.
- Do not use a wireless keyboard.

Mouse

Problem: Mouse cursor does not switch from primary to secondary display.

Solutions: Driver supporting multiple displays was not installed or not installed properly on computer. Reinstall driver.

Problem: Mouse and keyboard are not working (two channels)

Solutions:

- Check that computer USB and video cables are not crossed i.e. computer #1 video is connected to channel #1 while USB keyboard and mouse cables are connected to channel #2.

Problem: Mouse does not work (all channels)

Solutions:

- Check that the mouse you are using is properly connected to product.
- Check that USB cable between the product and computer is properly connected.
- Try connecting mouse to a different USB port on computer.
- Make sure the mouse works when directly connected to computer, i.e. the HID USB driver is installed on computer; this may require computer reboot.
- It is recommended to use standard USB mice.
- If the computer is coming out of standby mode, allow up to one minute to regain mouse function.
- Try a different mouse.
- Do not use a wireless mouse.

Problem: both keyboard and mouse are not working (one channel**)**
Solution: Use computer Device Manager Utility to see product and solve problem.

Video

Problem: No video image in user display (all channels)

Solutions:

- Check that displays are properly powered.
- Check that video cable is properly secured at both sides.
- Check at the displays' on-screen menu that sources selected match the cables connected to displays.
- Check if display video mode is the same as computer's video mode (e.g. DVI and DVI, etc.).
- Check that displays' diagnostic LED is steady green – if not, change displays, change displays' cables or call technical support.

Problem: No video image in user display (specific channel)

Solutions:

- Reboot product first, then disconnect and reconnect the video cable and reboot the computer.
- Check that the video cable connecting computer and product is properly secured at both sides.
- Check that computer video output is sent to the connected video connector (if computer supports multiple displays).
- Check that computer resolution matches connected display capabilities.
- Connect the display/s directly to the computer to confirm that video output is available and that a good image is shown.

Problem: Bad video image quality (some or all channels)

Solutions:

- Check that all video cables are properly connected to product, computer, and display.
- Check that cables are original cables supplied by HSL.
- With everything connected, power-cycle the product to reset the video. Make sure the Video Diagnostic LED is solid green.
- Check that the displays that you are using support the resolution and refresh-rate setting on computer.
- Lower the video resolution of your computer.
- Connect displays directly to computer showing bad video image to see if problem persists.

DPP

Problem: DPP is not working (two channels)

Solutions:

- Check that computer USB and video cables are not crossed i.e. computer #1 video is connected to channel #1 while USB device is connected to channel #2.

Problem: DPP is not working (all channels)

Solutions:

- Check that the USB device is properly connected to product console.
- Check that the DPP status LED is steady green. If DPP status LED is illuminated steady red the device is rejected or non-qualified for security reasons. To resolve please connect a USB smart card or CAC reader or contact your system administrator.

Problem: DPP is not working (one channel only)

Solutions:

- Check that device is working properly when connected directly to computer.
- Check that there is a USB cable connected between the computer and the relevant DPP input port on product.

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