Models:

SC42PHU-4 – Secure 4 to 2 Port DP/HDMI to HDMI KVM Combiner with fUSB and analog audio, NIAP PP 4.0 certified
SC82PH-4 – Secure 8 to 2 Port DP/HDMI to DP/HDMI KVM Combiner, NIAP PP 4.0 certified
SC162PH-4 – Secure 16 to 2 Port DP/HDMI to DP/HDMI KVM Combiner, NIAP PP 4.0 certified
SC42PHU-N – Commercial 4 to 2 Port DP/HDMI to HDMI KVM Combiner
SC82PHU-N – Commercial 8 to 2 Port DP/HDMI to DP/HDMI KVM Combiner
SC42PH-M – Secure 4 to 2 port DP/HDMI to HDMI KVM Combiner with analog audio, Israeli certification
SC82PH-M – Secure 8 to 2 port DP/HDMI to DP/HDMI KVM Combiner, Israeli certification
SC162PH-M – Secure 16 to 2 port DP/HDMI to DP/HDMI KVM Combiner, Israeli certification
SC42PHU-4R – Secure 4-Port DP/HDMI to DP/HDMI Rugged KVM Combiner, NIAP PP4.0 Certified

TABLE OF CONTENTS

Introduction 2
Highlights 3
DP/HDMI Combo Connector 4
Keyboard Hotkeys 4
Keyboard Hotkey Terms 5
On-Screen Display 5
KVM Combiner Specifications 6

Installation 7
Before Installation 7
Tamper-Evident Label 7
Package Contents 8
Cable Installation 9
Initial Setup 16

Operation 17
Basic Use of the KVM Combiner 17
Mouse Navigation Options 20
Channel Display Options 21
Auto-Scaling 23
Presets 24
Additional View Modes 25
Advanced Settings 26
Keyboard Hotkeys 27
Numeric Pad Hotkeys 28
On-Screen Display Operation 30
Video Settings 31
Channel Settings 35
USB Settings 37
Audio Settings 39
Advanced Operations 40
System Info 41

Appendix 42
Set Predefined Layout 42
Control Device Settings 44
API Commands 45
API String Structure for Kramer, Extron, Crestron Controlling Devices 48

INTRODUCTION

High Sec Labs' Keyboard/Video/Mouse (KVM) Combiner* enables simultaneous viewing and interacting with multiple computers presented on the same display, using a single set of keyboard, video, mouse, USB, and audio peripherals. It is a unique product that combines the functions of a scaler, multi-viewer, KVM switch, and video wall controller, all in one product. HSL's family of Secure and Commercial KVM Combiners are ideal for operations centers, data centers, and any other environment where users interact with several computers at the same time, increasing productivity and efficiency while reducing the unnecessary clutter and confusion of using multiple sets of peripherals.

HSL's Secure KVM Combiners allow seamless switching between computers while ensuring they remain isolated from each other, preventing data leaks between computers. The Secure Combiners are certified against NIAP's Common Criteria PP4.0 Protection Profile and are perfect for environments where computers may have differing levels of security classification.

Meanwhile, HSL's Commercial KVM Combiners offer functionality not found on the Secure models, such as microphone support, USB 3.0 support and the ability to copy and paste information from one computer to another. The Commercial Combiners are best suited for setups that have a greater need for interactivity between computers without falling under security restrictions.

This User Manual shows how to install, configure, and operate an HSL KVM Combiner.

* For the rugged combiner, please refer to the SC42PHU-4R's Quick Installation Guide, Data Sheet and the Interface Control Drawing for further information . The operation of the SC42PHU-4R is identical to that of the SC42PHU-4, as described in this manual.

Highlights

- **View and control multiple computers simultaneously:** Display and work with up to 16 computers at the same time. Cascade Combiners to view and control up to 256 (16x16) computers on a single or dual display.
- **4K support:** For high quality viewing, the KVM Combiner supports 4K resolution at both the source and the output.
- **Upscale and downscale capabilities:** Scale any source to 4K or downscale any source from 4K to lower resolutions. Seamlessly support different resolutions on the same display at the same time, using the HSL smart scaler.
- **Seamless mouse switching:** Switch the mouse and keyboard between different sources easily by dragging the mouse from channel to channel. The mouse can be switched only to channels that are on display, making it an ideal operations center solution.
- **Touch screen support:** Natively support touch screen on all displays and sources through the mouse and keyboard ports.

Features Exclusive to Secure models

- **NIAP Certified:** HSL's secure "-4" KVM Combiners are certified to the latest NIAP protection profile, PP4.0 PSD.
- **Share peripherals across different security domains:** Share peripherals between computers that belong to different security levels, while keeping the highest possible data separation security.
- **Prevent information leaks:** Prevent threats derived from sharing and switching of vulnerable, untrusted, or unauthorized peripheral devices. Block peripheral exploits, information leaks, eavesdropping, signal transmissions, and computer malware. Alert and prevent hardware and firmware tampering, by enforcing multi-layered security mechanisms.
- **Filter USB Peripherals (In 4-port models):** Block unauthorized USB devices while allowing secure switching of smart card and biometric authentication devices between computers. Whitelist and blacklist specific USB devices based on VID/ PID characteristics.

Features Exclusive to Commercial Models

- **Copy and Paste:** Transfer text and files between computers connected to the Combiner, using the Combiner as the intermediary (no network connection is required). Includes USB stick support.
- **Microphone Support:** Natively support microphones on all computers.
- **USB 3.0 Support:** Connect computers and peripherals using USB 3.0.
- **Channel Select with Keyboard Shortcuts:** Switch between channels using predefined keyboard shortcuts.

Note: This feature is also supported on the "-M" secure models.

DP/HDMI Combo Connector

To ensure easy and intuitive interoperability with different sources, the HSL KVM Combiner includes a special type of video input connector: the DP/HDMI Combo Connector. The connector supports both HDMI and Display Port Video interfaces and allows connections to either type of cable.

DP\HDMI Connector

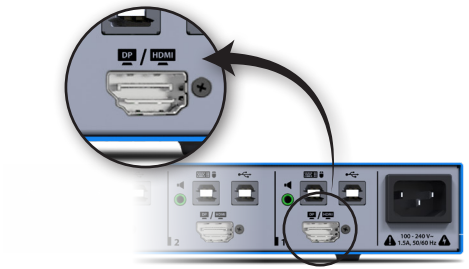
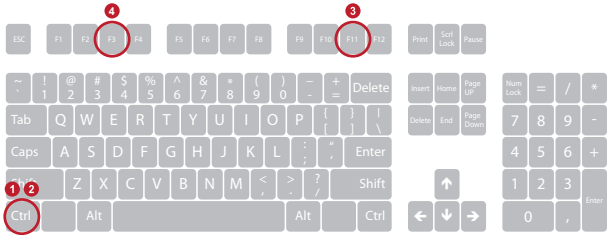


Figure 3: *DP/HDMI Combo Connector*

Keyboard Hotkeys

The interface to operate the HSL KVM Combiner uses keyboard hotkeys that can be entered at any time. These hotkeys are based on a QWERTY keyboard layout. For example, to enter the key combination **Ctrl | Ctrl | F11 | F3**, press the keys seen below, regardless of the keyboard layout used:



Keyboard Hotkey Terms

- **|** Separates keys pressed in sequential order. For example, to save a preset as Preset **F3**, the key combination is two presses of the **Ctrl** key, one press of the **F11** key, and one press of the **F3** key, so the combination is shown as **Ctrl | Ctrl | F11 | F3**.
- **+** Press two buttons simultaneously. For example, to temporarily switch to Absolute Mouse Navigation, press and hold **LCtrl + LShift**.
- **[1...]** A range of selectable numbers, such as channels. For example, to save a Preset on the Combiner, enter the combination **Ctrl | Ctrl | F11 | [F1...F10]**.

Notes:

- Always use the left Control key **LCtrl** unless otherwise specified.
- Do not use the numeric pad for number keys, unless otherwise specified.
- All hotkey combinations are configured using a QWERTY keyboard. When using a non-QWERTY keyboard, use the key location corresponding to the QWERTY layout. For example, on an AZERTY keyboard where the **a** key is in the location of the **q** key on a QWERTY keyboard, the hotkey **Ctrl | Ctrl | q** would be entered as **Ctrl | Ctrl | a**.

On-Screen Display

In addition to using keyboard hotkeys, HSL's KVM Combiner is equipped with an On-Screen Display (OSD) interface for easy configuration of options including video settings, audio settings, and USB interfaces. The OSD can be opened at any time by entering **LCtrl | LCtrl | o** or **LCtrl | LAlt | o**.

Detailed instructions on how to operate the OSD can be found in the section **On-Screen Display Operation**.

KVM Combiner Specifications

Part Number	SC42PHU-4 / SC42PH-M*	SC82PH-4 / SC82PH-M*	SC162PH-4 / SC162PH-M*	SC42PHU-N	SC82PHU-N
Security Level	Secure	Secure	Secure	Commercial	Commercial
No. of Sources	4	8	16	4	8
Console Ports					
Displays	2 x HDMI	2 x DP/HDMI	2 x DP/HDMI	2 x HDMI	2 x DP/HDMI
Max Output Resolution	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160
Mouse and Keyboard	USB Type A	USB Type A	USB Type A	USB Type A	USB Type A
Audio Jack	3.5 mm jack	-	-	3.5 mm jack	3.5mm jack
Microphone Jack	-	-	-	3.5 mm jack	-
USB Port	SC42PHU-4 - USB Type A SC42PH-M - None	-	-	4 x USB 3.0 Type A	USB 2.0 Type A
Computer Ports					
Displays	4 x DP/HDMI	DP/HDMI	DP/HDMI	1 x DP/HDMI	1 x DP/HDMI
Max Input Resolution	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160	Supporting UHD4k Resolutions up to 3840x2160
Mouse and Keyboard	USB Type B	USB Type B	USB Type B	USB 3.0 Type B	USB 3.0 Type B
Audio Jack	3.5 mm jack	-	-	3.5 mm jack	3.5mm jack
Microphone Jack	-	-	-	3.5 mm jack	-
USB Port	USB Type B	-	-	USB 3.0 Type B	-
Physical					
Dimensions	342 x 148 x 42mm / 13.16 x 5.83 x 1.65in	442.5 x 299.7 x 43.6 mm / 17.42 x 11.8 x 1.72 in	442.5 x 299.7 x 43.6 mm / 17.42 x 11.8 x 1.72 in	342 x 148 x 42 mm / 13.16 x 5.83 x 1.65 in	439 x 250 x 58 mm / 17.28 x 9.84 x 2.28 in
Weight	4.61kg / 10.16lb	3.73 kg / 8.22 lb	7.00 kg / 15.43 lb	1.61 kg / 3.55 lb	3.7 kg / 8.16 lb
Power					
Power Requirements	35W Max	35W Max	35W Max	35W Max	35W Max
AC Input	100V to 240V AC	100V to 240V AC	100V to 240V AC	100V to 240V AC	100V to 240V AC
Power Type	Internal	Internal	2 x Internal (Redundant)	Internal	Internal
Security					
Compliance	Certified for NIAP Common Criteria PP4.0 PSD	Certified for NIAP Common Criteria PP4.0 PSD	Certified for NIAP Common Criteria PP4.0 PSD	-	-

* -M models have an identical architecture as -4 models, but are certified to Israeli standards instead of NIAP.

Before Installation

Before opening the product's sealed packaging, inspect the seal's condition to verify that the product was not accessed or tampered with during delivery. If the packaging seal looks suspicious, contact HSL support and do not use the product.

Tamper-Evident Label

The KVM Combiner uses a holographic tamper-evident label to provide visual indications in case of enclosure intrusion attempts. These labels display white dots or the text "VOID", once removed. When opening the product's packaging, inspect the tampering evident label.

Once the KVM Combiner is removed from its packaging materials, carefully inspect the tamper-evident label to verify that the product is properly sealed. If the label is damaged or missing, contact HSL support and do not use the product.

Figure 2: *Tamper-Evident Label*

Package Contents

Once the packaging for the KVM Combiner Switch is opened, inspect the contents of the package to make sure all components are included.

Model	Description	Qty
SC42PHU-4 / SC42PH-M	SC42PHU-4 Secure 4 to 2 Port DP/HDMI to HDMI KVM Combiner with fUSB and analog audio	1
	RJ14 to DB9 (Female, RS-232) Cable	1
	C13 Female to C14 Male Power Cable	1
	Plug Adapters Kit - UK/USA/AU/EU to ERC230/C13	1
	FH10NN-4 USB HID filter	1
SC82PH-4 / SC82PH-M	SC82PH-4 Secure 8 to 2 Port DP/HDMI to DP/HDMI KVM Combiner	1
	RJ14 to RJ14Cable	1
	RJ14 to DB9 (Female, RS-232) Cable	1
	C13 Female to C14 Male Power Cable	1
	Plug Adapters Kit - UK/USA/AU/EU to ERC230/C13	1
	FH10NN-4 USB HID filter	1
	K10NEW-ML HSL Secure Keyboard	1
	8/16-Port Combiner Rack Mount Kit	1
SC162PH-4 / SC162PH-M	SC162PH-4 Secure 16 to 2 Port DP/HDMI to DP/HDMI Secure KVM Combiner	1
	RJ14 to RJ14Cable	1
	RJ14 to DB9 (Female, RS-232) Cable	1
	C13 Female to C14 Male Power Cable	1
	Plug Adapters Kit - UK/USA/AU/EU to ERC230/C13	1
	FH10NN-4 USB HID filter	1
	K10NEW-ML HSL Secure Keyboard	1
	8/16-Port Combiner Rack Mount Kit	1
	8-Button KVM Remote Control	2

Model	Description	Qty
SC42PHU-N	SC42PHU-N Commercial 4 to 2 Port DP/HDMI to HDMI KVM Combiner	1
	RJ14 to DB9 (Female, RS-232) Cable	1
	C13 Female to C14 Male Power Cable	1
	Plug Adapters Kit - UK/USA/AU/EU to ERC230/C13	1
	FH10NN-4 USB HID filter	1
SC82PHU-N	SC82PHU-N Commercial 8 to 2 Port DP/HDMI to DP/HDMI KVM Combiner	1
	RJ14 to DB9 (Female, RS-232) Cable	1
	C13 Female to C14 Male Power Cable	1
	Plug Adapters Kit - UK/USA/AU/EU to ERC230/C13	1
	FH10NN-4 USB HID filter	1
	K10NEW-ML HSL Secure Keyboard	1
	8/16-Port Combiner Rack Mount Kit	1

Cable Installation

Connect the Console Port Peripherals

- Connect the video displays to the Combiner primary and secondary display ports.

Note: It is highly recommended to use identical primary and secondary display models. EDID information is taken from the primary console display port (#1) and sent to all connected computers. When using non-identical displays, connect the lower resolution display to the primary console display port.

- Connect keyboard, mouse, and audio peripherals to the Combiner console ports. These are shared securely* between all sources.

Note: The Combiner's mouse and keyboard USB A ports only support USB HID keyboards and mice. These ports will not support non-standard keyboards, keyboards with USB hubs or other USB-integrated devices, or other USB devices apart from keyboards and mice.

- **SC42PHU-4 Only:** To support user authentication across multiple isolated sources, connect a smartcard/biometric reader such as HSL's Multi-Domain Reader to the Combiner's console fUSB* secure port.

* Secure models only

Connect the Source Port Peripherals

- For each source, connect the video, keyboard, mouse, USB, and audio cables to the Combiner's corresponding source ports.

INSTALLATION

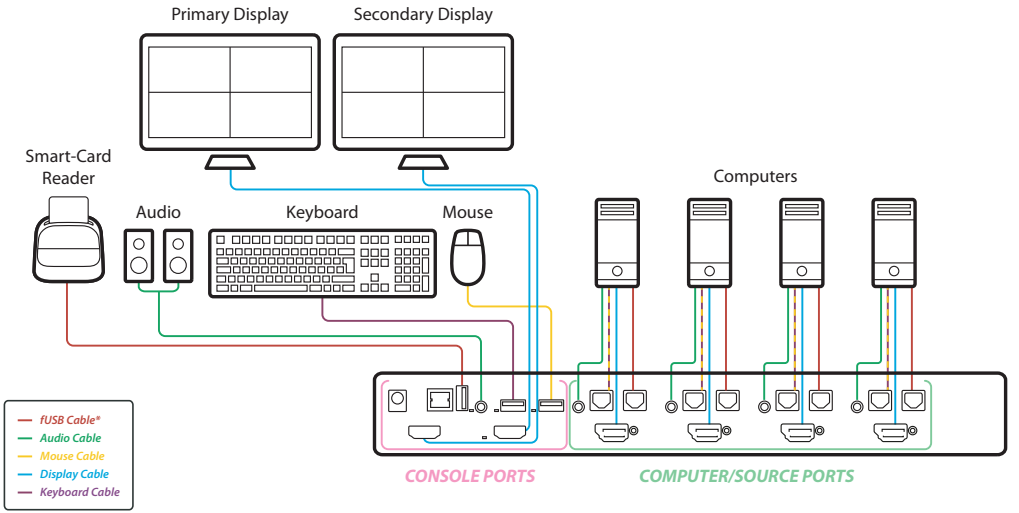


Figure 3: *Secure 4-Port Cable Installation*

* USB cable on commercial units

INSTALLATION

1	Power Port	**5**	Source DP/HDMI Port	**9**	Console fUSB A Port
2	Source fUSB B Port	**6**	Console Mouse USB A Port	**10**	Console Remote Control Unit (RCU) RJ14 Port
3	Source Keyboard/Mouse USB B Port	**7**	Console Keyboard USB A Port	**11**	Console Primary DP/HDMI Port
4	Source Audio Jack	**8**	Console Audio Jack	**12**	Console Secondary DP/HDMI Port

Figure 5: *Secure 4-Port Combiner Back View*

INSTALLATION

1	Power Port	**6**	Source DP/HDMI Port	**11**	Console Remote Control Unit (RCU) RJ14 Port
2	Source USB B Port	**7**	Console Mouse USB 3.0 Ports	**12**	Console Primary DP/HDMI Port
3	Source Audio Jack	**8**	Console Mouse/Keyboard USB A Port	**13**	Console Secondary DP/HDMI Port
4	Source Microphone Jack	**9**	Console Audio Jack		
5	Source Keyboard/Mouse USB B Port	**10**	Console Microphone Jack		

Figure 6: *Commercial 4-Port Combiner Back View*

INSTALLATION

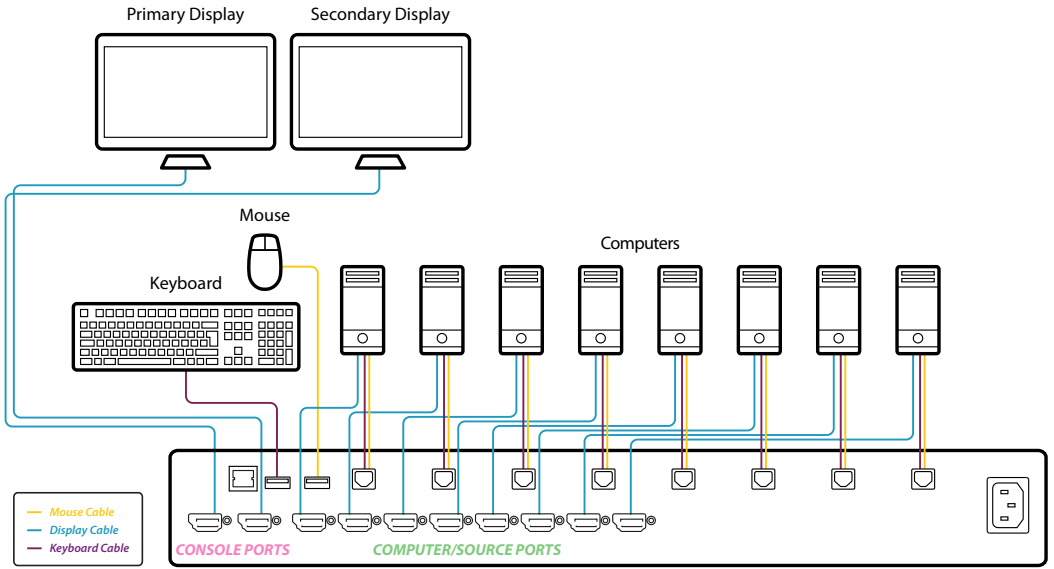


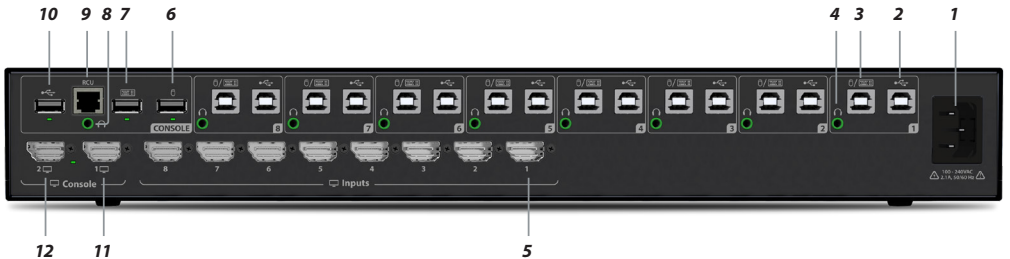
Figure 7: *8/16-Port Cable Installation*

INSTALLATION

1 Power Port
2 Source Mouse/Keyboard USB B Port
3 Source DP/HDMI Port
4 Console Mouse USB A Ports
5 Console Keyboard USB A Port
6 Console Remote Control Unit (RCU) RJ14 Port
7 Console Primary DP/HDMI Port
8 Console Secondary DP/HDMI Port

Figure 8: *Secure 8-Port Combiner Back View*

INSTALLATION



1	Power Port	**5**	Source DP/HDMI Port	**9**	Console Remote Control Unit (RCU) RJ14 Port
2	Source USB B Port	**6**	Console Mouse USB A Port	**10**	Console USB A Port
3	Source Mouse/Keyboard USB B Port	**7**	Console Keyboard USB A Port	**11**	Console Primary DP/HDMI Port
4	Source Audio Jack	**8**	Console Audio Jack	**12**	Console Secondary DP/HDMI Port

Figure 9: *Commercial 8-Port Combiner Back View*

Initial Setup

Upon booting up for the first time, the KVM Combiner is configured by default to a single display at 4K 30HZ and presents all input channels in Tile Mode.

Note: if the display used does not support 4K, a message may appear saying the image cannot be displayed.

To change the output resolution, enter the key combination **Ctrl | Ctrl | F11 | d | [1…8]**, where the resolutions are:

1. 2048x2048
2. 3840x1080
3. 2560x1440
4. 2560x1600
5. 1920x1080
6. 1920x1200
7. 3440x1440
8. 3840x2160

Note: On some legacy versions of the firmware, the listed order of resolution options is reversed, where Option 1 is 3840x1260, Option 2 is 3440x1440, etc.

The output resolution can also be changed in the On-Screen Display, which can be opened with the key combination **LCtrl | RCtrl | o**. Detailed instructions on operating the OSD can be found in the section **On-Screen Display Operation**.

Basic Use of the KVM Combiner

The HSL KVM Combiner enables viewing and interacting with up to 16 computer sources simultaneously. The Combiner emulates each source as a selectable channel, which is presented as a viewable and scalable window. There is always an active channel to which the keyboard and mouse are linked. Inactive channels are displayed but not interactable until selected.

Figure 10: *Front Panel of the SC42PHU-N Commercial 4-Port KVM Combiner*

Front Panel Buttons

The SC42PHU-4, SC82PH-4, SC42PHU-N, SC82PHU-N, SC42PH-M, and SC82PH-M KVM Combiners can switch channels by pressing the buttons along the front panel. By default, pressing one of the numbered buttons will switch to the corresponding channel.

In addition, the SC42PHU-4, SC42PHU-N, and SC82PHU-N KVM Combiners can freeze the audio and fUSB ports of a chosen channel. This allows for listening to audio or using a USB device connected to a specific channel while operating on another.

Touchscreen Support

The HSL KVM Combiner natively supports touchscreen functionality, allowing channel windows to be rearranged and resized via touch.

OPERATION

Keyboard Hotkeys

The KVM Combiner has a wide variety of functions that can be controlled by entering keyboard hotkeys.

Most Frequently Used Hotkeys

Action	Keyboard	Mouse
Enter Operator Mode	**Ctrl | Ctrl | o**	Click side mouse buttons or press mouse wheel
Enter User Mode	**Ctrl | Ctrl | u**	Click side mouse buttons or press mouse wheel
Enter Tile View	**Ctrl | Ctrl | q**	(Operator mode) Click "Tile" on the operation taskbar
Enter Scale View	**Ctrl | Ctrl | s**	
Enter Absolute Mouse Navigation	**Ctrl | Ctrl | F11 | c**	
Enter Relative Mouse Navigation	**Ctrl | Ctrl | F11 | b**	
Enlarge a source to full screen	**Ctrl | Ctrl | f**	(Operator Mode) Double-click a channel window
Go back to last layout before enlarging to full screen	**Ctrl | Ctrl | z**	
Activate a custom preset	**Ctrl | Ctrl | [F1…F8]**	
Save a custom preset to key [F1...F8]	**Ctrl | Ctrl | F11 | INS | [F1…F8]**	
Open OSD (On-Screen Display)	**LCtrl | RCtrl | o or LCtrl | LAlt | o**	
Select next/previous channel		(Operator Mode) Scroll up or down on mouse wheel
Select Channel 1-10 (Commercial Models Only)	**Ctrl | Ctrl | [1...0]**	
Select Channel 11-16 (Commercial Models Only)	**Ctrl | Ctrl | [F1...F6]**	

OPERATION

User Mode and Operator Mode

The KVM Combiner has two primary modes:

- **User Mode:** allows interaction and inputs within an active channel.
- **Operator Mode:** allows configuration, scaling, and layout of the channel windows.

By default, the KVM Combiner boots to Operator Mode. This mode can be identified by the appearance of a large system cursor:

In Operator Mode, mouse movement controls the Combiner mouse, but keystrokes still go to the active channel.

To switch to User Mode, enter the key combination **Ctrl | Ctrl | u**. To switch back to Operator Mode, enter **Ctrl | Ctrl | o**.

As an alternative to the keyboard hotkeys, press the mouse wheel to switch between User and Operator mode. In User Mode, the mouse cursor will be smaller than in Operator Mode and will be able to interact with objects in the active channel. Operator Mode enables selecting channels easily by using the left mouse button and switching to User Mode. While in Operator Mode, scrolling up with the mouse wheel selects the next channel, and scrolling down selects the previous channel.

Operator Mode can also be accessed with a touchscreen. If the touchscreen is in Scale View, switch to Operator Mode by tapping the enlarged window 4 times. If the touchscreen is in Tile View, tap and hold the upper-right corner of the screen for 4 seconds.

Open On-Screen Display

To open the OSD, enter the key combination **LCtrl | RCtrl | o** or **LCtrl | LAlt | o**. The OSD is shown on the bottom left corner of the display.

Channel Select (Commercial and "-M" Models Only)

To select a channel, enter the key combination **Ctrl | Ctrl | [1...0] / [F1…F6]**, where **[1...0]** represent Channels 1-10, and **[F1...F6]** represent Channels 11-16.

For example, to select Channel 3, enter **Ctrl | Ctrl | 3**. To select Channel 13 (16-port model only), enter **Ctrl | Ctrl | F3**.

Once a channel is selected, the keyboard is linked to that channel. This enables sending regular keyboard commands and keystrokes to the active computer.

Note: On Secure models, channels can only be selected by using the mouse or pressing the front panel buttons.

Copy and Paste (Commercial Models Only)

HSL's Commercial KVM Combiners can transfer text or files between connected Windows computers by using the HSL Copy and Paste Tool. To do this, download and install the latest version of the Tool on all connected computers. The Copy and Paste Tool can be found here: https://highseclabs.com/solutions/copypaste/

To enable Copy and Paste, open Notepad on the desired source PC. Then, enter Terminal Mode on the Combiner by entering **LCtrl | RCtrl | t**. Once Terminal Mode is opened, enter **LCtrl | RCtrl | q**.

Note: The Combiner will not provide indication that Copy & Paste has been enabled. To confirm it is enabled, open the Device Manager on the source PC and confirm that a new COM port has been created.

This procedure must be performed on each individual source PC on which Copy and Paste is to be enabled.

For further information regarding Terminal Mode, consult the HSL Administrator Guide, which can be found here: https://highseclabs.com/downloads/

Mouse Navigation Options

Absolute Mouse and Relative Mouse

The Combiner has two options for navigating with a mouse while in User Mode:

- **Relative (REL) Mouse:** Relative Mouse Mode confines mouse movement to the selected source's channel. While REL Mouse is active, switching between channels can be done by using the buttons on the Combiner's front panel or by selecting channels in Operator Mode. REL Mouse is the default mode upon booting up, and can also be enabled by entering the key combination **LCtrl | LCtrl | F11 | b**.
- **Absolute (ABS) Mouse:** Absolute Mouse Mode uses Virtual Display Technology (VDT) to switch seamlessly between sources, simply by moving the cursor across the borders between channels. Depending on the chosen configuration of displays, the VDT mouse cursor movement axis can be either horizontal (where the cursor moves across screens arranged left-to-right) or vertical (where the cursor moves across screens arranged top-to-bottom). ABS Mouse can be toggled by entering **Ctrl | Ctrl | F11 | c**, or temporarily enabled from Relative Mouse Mode by holding **LCtrl + LShift**.
  - **ABS Mouse Safety Trigger (Secure Models):** Hold down the **LCtrl** key to switch between channels while in ABS Mode. This prevents uncontrolled switching between source computers.

Note: When switching between Absolute Mouse and Relative Mouse, the mouse may become unusable for a few seconds.

Mouse Parking

By default, when switching from User Mode to Operator Mode, the User Mode cursor is replaced by the Operator Mode cursor. With Mouse Parking enabled, the User Mode cursor remains 'parked' in place on the active channel, while the Operator Mode cursor moves freely. After switching back to User Mode, the User Mode cursor will be able to move from the place it had been parked. To enable or disable Mouse Parking, enter **Ctrl | Ctrl | F11 | h**.

Channel Display Options

Resize Channels | *Resize Channels and Content Simultaneously* | *Drag and Rearrange Channels*

HSL's KVM Combiner provides great flexibility in channel positioning and different view modes. Virtually any channel setup is possible! This section explains how to increase or decrease a channel window's size, move it across the display, and choose how the channel's content scales.

The Combiner has two primary view modes:

- **Tile View:** all channel windows are arranged in an evenly spaced tile formation. To switch to Tile View, enter **Ctrl | Ctrl | q**.
- **Scale View:** channel windows can be rearranged, resized, and rescaled as desired. To switch to Scale View, enter **Ctrl | Ctrl | s**.

Resize or Rearrange a Channel

While in Operator Mode, channel windows can be moved, resized, and rearranged into any desired configuration.

- To reposition a channel window, press and hold the left mouse button to drag the window to a desired location. If using a touchscreen, switch to Operator Mode, then press and hold the upper-left corner of the channel window and drag it to the desired location.
- To hide a channel, enter the key combination **Ctrl | Ctrl | F11 | INS | o | <m>**, where **<m>** is the channel number. Entering the combination again will restore the channel.
- To change the size of a channel window, press and hold the right mouse button on the lower-right corner of the window. To fit the image to the newly resized channel window, enter the key combination **Ctrl | Ctrl | [w/y]**. Entering **[w]** will resize the channel's content to fit the window while maintaining its aspect ratio, while entering **[y]** will resize the content without maintaining its aspect ratio. If using a touchscreen, switch to Operator Mode, then tap and hold the lower-right corner of a window, and drag to the desired size.

OPERATION

- To resize a channel window and the displayed content within it simultaneously, select a channel, press and hold the size mouse button, and scroll the mouse wheel to increase or decrease the window and its content. For faster scaling, hold the **Ctrl** key. If using a touchscreen, switch to Operator Mode, then tap and hold the midpoint of a window's vertical or horizontal border and drag to resize.
- Scaling a channel can also be done pixel-by-pixel using the keyboard. Enter the keyboard combination **Ctrl | Ctrl | +** to increase the scale by 1 pixel and enter **Ctrl | Ctrl | -** to decrease by 1 pixel.
  - Use the **+** and **-** keys on the QWERTY keyboard, not on the numeric pad.
  - Because this adjustment is so minute, using the mouse or touchscreen to resize is recommended.

Auto-Scaling

The Combiner can be configured to automatically scale a channel's content when resizing it, so that the displayed content fits into the channel window.

- To auto-scale while keeping the content's aspect ratio, enter **Ctrl | Ctrl | F11 | w | w**.
- To auto-scale without keeping the content's aspect ratio, enter **Ctrl | Ctrl | F11 | w**.
- To disable auto-scaling, enter **Ctrl | Ctrl | F11 | w | n**.

Action	Keyboard	Mouse	Touchscreen
Resize channel		Click to select a channel. Place the mouse cursor at the channel window's lower right corner. Press and hold the right mouse button and drag to resize.	Tap and hold the lower-right corner of a channel window and drag to resize.
Fit channel content to newly resized window while keeping aspect ratio	**Ctrl | Ctrl | w**		
Fit channel content to newly resized window without keeping aspect ratio	**Ctrl | Ctrl | y**		
Resize channel window and content simultaneously	(Reduce Scaling) **Ctrl | Ctrl | -** (Increase Scaling) **Ctrl | Ctrl | +** **Note:** use the **[-]** and **[+]** keys on the QWERTY keyboard, not the numeric pad	Click to select a channel. Press and hold the side mouse button & scroll the mouse wheel to reduce/ increase scaling. For fast scaling, hold **LCtrl**.	Tap and hold the midpoint of a channel window's vertical or horizontal border and drag to resize.
Auto-scale channel while keeping aspect ratio	**Ctrl | Ctrl | F11 | w | w**		
Auto-scale channel without keeping aspect ratio	**Ctrl | Ctrl | F11 | w**		
Disable Auto-scaling	**Ctrl | Ctrl | F11 | w | n**		
Drag channel		Click to select a channel. Press and hold the left mouse button to drag the channel window.	Tap and hold the upper-left corner of a channel window and drag.
Hide channel	**Ctrl | Ctrl | F11 | INS | o | <m>** <m>= Channel Number		

Presets

It is possible to create and save user-defined presets that enable quick switching between different view modes. To create a preset, customize the display with the desired view. Once ready, save the preset by entering **Ctrl | Ctrl | F11 | INS | [F1...F8]**. A previously saved preset can be activated by entering **Ctrl | Ctrl | [F1...F8]** or **Ctrl | Ctrl | F11 | [F1...F8]** if using a 16-port model.

By default, the Combiner will boot to a single display in Tile View, but it can be configured to boot to a selected preset by using the On-Screen Display.

Action	Keyboard
Save a custom preset to key [F1...F8]	**Ctrl | Ctrl | F11 | INS | [F1…F8]**
Activate a custom preset	4-port/8-port: **Ctrl | Ctrl | [F1...F8]** 16-port: **Ctrl | Ctrl | F11 | [F1...F8]**

Additional View Modes

Presentation Mode

Presentation Mode is a preset mode that simplifies operation for the untrained user. When Presentation Mode is enabled, the selected channel is automatically enlarged to full screen.

To enable Presentation Mode, enter the key combination **Ctrl | Ctrl | p**.

While in Presentation Mode, selecting the channel that has already been enlarged will instead switch to Quad View. This can be toggled on by entering **Ctrl | Ctrl | F11 | p | 1**, or to remain only on the enlarged channel by entering **Ctrl | Ctrl | F11 | p | 2**.

To disable Presentation Mode, enter **Ctrl | Ctrl | n**.

Direct Mode

Direct Mode is a feature that allows the Combiner to display a channel with near-zero latency (below 10ms). To activate Direct Mode, use the following keyboard combinations:

For 8 Port:

Direct Mode is only possible for Channels 5-8.

To save the channel in Direct Mode, enter **Ctrl | Ctrl | F11 | INS | f | <n> | [5… 8]**, where **<n>** = number of channels and **[5…8]** = Channel [5...8].

To disable Direct Mode in all channels, enter **Ctrl | Ctrl | F11 | INS | f | 0**.

For 16 Port:

Direct Mode is only possible for Channels 13-16.

To save the channel in Direct Mode, enter **Ctrl | Ctrl | F11 | INS | f | <n> | [F3…F6]**, where **<n>** = number of channels and **[F3…F6]** = Channel [13-16].

To disable Direct Mode in all channels, enter **Ctrl | Ctrl | F11 | INS | f | 0.**

Crossed View

Crossed View is a view mode for two displays that reverses which sources are shown on each output. When activated, sources that would normally show on the primary output are shown on the secondary output, and vice versa. To enable Crossed View, enter the key combination **Ctrl | Ctrl | F11 | k | j**. To disable Crossed View, enter **Ctrl | Ctrl | F11 | j | k**.

S3 Command (16-Port models only)

To close the primary screen and only show the secondary screen, use the S3 command. Enter the key combination **Ctrl | Ctrl | F11 | S3**.

Advanced Settings

Pin Channel Layer

By default, the KVM Combiner displays the active channel on top of all the other channels. Pinning a channel will fix it to its current layer, regardless of which channel is active. This is useful for creating layouts such as a picture-in-picture display.

To pin a channel onto its current layer, enter the key combination **Ctrl | Ctrl | F11 | f | <m>**, where **<m>** is the channel number to pin.

For example, to create the configuration below:

Figure 9: *Pinning Channel Layer While in Picture-in-Picture*

In this example, Channel **<m1>** is in front of Channel **<m2>**. By default, when selecting Channel **<m2>**, that channel moves to the front and covers Channel **<m1>**.

Entering **Ctrl | Ctrl | F11 | f | <m1>** pins Channel **<m1>** as the top layer. Even if Channel **<m2>** is active, it will appear behind Channel **<m1>**.

To unpin all channels, enter **Ctrl | Ctrl | F11 | f | r**.

Ctrl Key Toggle

By default, keyboard hotkeys in the Combiner will only recognize the **LCtrl** key as the Ctrl key. The Combiner can be configured to recognize the **RCtrl** key instead. To switch between using **LCtrl** and **RCtrl** as the Ctrl key, enter the key combination **Ctrl | Ctrl | F11 | i**. This can also be selected manually in the OSD.

Keyboard Hotkeys

Action	Keyboard Hotkey
General Operation	
Switch to User Mode	**Ctrl | Ctrl | u**
Switch to Operator Mode	**Ctrl | Ctrl | o**
Open OSD (On-Screen Display)	**LCtrl | RCtrl | o or LCtrl | LAlt | o**
Save a custom preset to key [F1...F8]	**Ctrl | Ctrl | F11 | INS | [F1…F8]**
Load a custom preset	**Ctrl | Ctrl | [F1…F8]**
Toggle LCtrl or RCtrl for keyboard shortcuts	**Ctrl | Ctrl | i**
Change Output Resolution	**Ctrl | Ctrl | F11 | d | [1…8]**
Enable/Disable Shortcut Forwarding	**LCtrl | RCtrl | END**
Reset Combiner to factory defaults	**Ctrl | Ctrl | F11 | r**
Select Channel 1-10 (Commercial Models Only)	**Ctrl | Ctrl | [1...0]**
Select Channel 11-16 (Commercial Models Only)	**Ctrl | Ctrl | [F1...F6]**
Activate/Deactivate Copy/Paste (Commercial Models Only)	**LCtrl | RCtrl | q**
Channel Display Options	
Maximize Channel	**Ctrl | Ctrl | f**
Undo Maximize (only accepted immediately after)	**Ctrl | Ctrl | z**

Action	Keyboard Hotkey
Switch to Tile View	**Ctrl | Ctrl | q**
Switch to Scale View	**Ctrl | Ctrl | s**
Fit channel content to window while keeping aspect ratio	**Ctrl | Ctrl | w**
Fit channel content to window without keeping aspect ratio	**Ctrl | Ctrl | y**
Auto-scale channel while keeping aspect ratio	**Ctrl | Ctrl | F11 | w | w**
Auto-scale channel without keeping aspect ratio	**Ctrl | Ctrl | F11 | w**
Disable Auto-scaling	**Ctrl | Ctrl | F11 | w | n**
Pin a channel to its current layer	**Ctrl | Ctrl | F11 | f | <m>**
Unpin all pinned channels	**Ctrl | Ctrl | F11 | f | r**
Hide channel	**Ctrl | Ctrl | F11 | INS | o | <m>**
Enter Presentation Mode	**Ctrl | Ctrl | p**
Toggle Maximize/Quad switch in Presentation Mode	**Ctrl | Ctrl | F11 | p | 1**
Toggle Maximize-only in Presentation Mode	**Ctrl | Ctrl | F11 | p | 2**
Exit Presentation Mode	**Ctrl | Ctrl | n**
Enter Direct Mode (8-Port Model)	**Ctrl | Ctrl | F11 | INS | f | <n> | [5...8]**

Action	Keyboard Hotkey
Enter Direct Mode (16-Port Model)	**Ctrl | Ctrl | F11 | INS | f | <n> | [F3…F6]**
Exit Direct Mode	**Ctrl | Ctrl | F11 | INS | f | 0**
Enter Crossed Mode	**Ctrl | Ctrl | F11| k | j**
Exit Crossed Mode	**Ctrl | Ctrl | F11 | j | k**
Close Primary Screen (16-Port Model Only)	**Ctrl | Ctrl | F11 | S3**
Mouse Control Options	
Switch to Relative Mouse Mode	**Ctrl | Ctrl | F11 | b**
Switch to Absolute Mouse Mode	**Ctrl | Ctrl | F11 | c**
Enable/Disable Relative Mouse Input Passing in Absolute Mouse (Commercial Models Only)	**Ctrl | Ctrl | F11 | INS | m**
Enable/Disable Mouse Parking	**Ctrl | Ctrl | F11 | h**

Numeric Pad Hotkeys

For even quicker control, use the shortcuts below, via the numeric pad on the keyboard.

Note: to enable numeric pad shortcuts, enter Operator Mode.

Action	Keyboard Hotkey
Enable/Disable numeric pad shortcuts	**F11 | INS | k | [e/d]**
Layout with <n> channels	**ENTER | <n> | <m1….>**
Extended mode X1 on left <m2> on right	**DEL | <m1> - <m2> (Del 04 05)**
Clone mode +<m1>	**+ <m1> (for EX. +05)**
Extend mode + "tile"	**-**
Clone mode +"tile"	*****
Maximize channel m1	**/ | <m1>**
Clone mode + channel m1,m2	**0 | <m1> | <m2>**
Extended mode 4 channel	**9 | <m1> | <m2> | <m3> | <m4>**
Clone mode + 3 channel	**Numlock | X01 | X02 | X03**

Note: the 16-port model requires a double-digit port number. (01, 02, etc.)

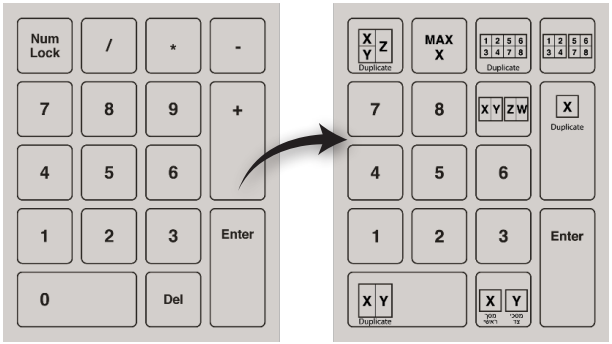
OPERATION

For example, to create a 4-channel layout with an 8-port model using Channels 1, 5, 4, and 3, enter the numeric pad combination **ENTER | <n> | [<m1…>]**, as follows:

ENTER | 4 | 1 | 5 | 4 | 3

If using a 16-port model, the numeric pad combination is **ENTER | 04 | 01 | 05 | 04 | 03**

The channels are displayed in the order entered.



Touchscreen Controls

The following actions can be performed if using a touchscreen.

Action	Scale View	Tile View	Operator Mode
Enter Operator Mode	Tap the enlarged window 4 times	Tap and hold the upper-right corner of the screen for 4 seconds.	
Reposition a Window			Tap and hold the upper-left corner of a window and drag to position.
Resize a Window			Tap and hold the lower-right corner of a window and drag to resize.
Resize a Window and Auto-Scale Content			Tap and hold the midpoint of a window's horizontal or vertical borders and drag to resize.

On-Screen Display Operation

The KVM Combiner's On-Screen Display (OSD) provides options to configure video and audio displays, channel layouts, and USB interfaces.

To enter the OSD, enter the key combination **LCtrl | RCtrl | o** or **LCtrl | LAlt | o**.

Multiple settings can be adjusted across different menus while the OSD is active, but no changes will be saved until selecting the option **Save & Exit**. Exiting the OSD without saving will discard any changes and revert to previous settings.

To exit the OSD without saving any changes, click the **X** in the upper right corner of the menu, or press **Esc**.

Video Settings

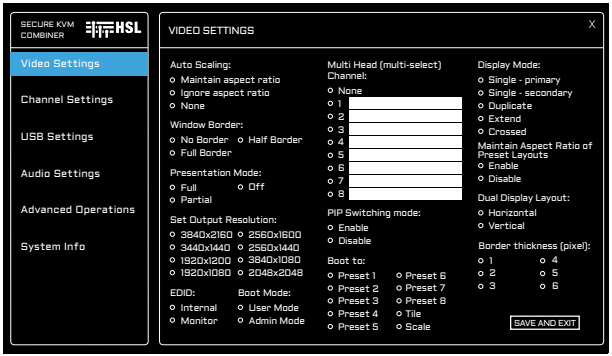


Figure 10: *OSD Video Settings Menu*

Auto Scaling

Auto scaling determines the presentation of the image in each channel.

- **Maintain aspect ratio –** Keep the channel in the same aspect ratio as the original image. The channel may rescale to maintain the aspect ratio.
- **Ignore aspect ratio –** Scale and change the source channel to any desired position and aspect ratio. The image is spread across the entire space it is given.
- **None –** This option allows the channel size to be changed without maintaining the aspect ratio, but the picture will not display across its entire space without entering the keyboard combination **Ctrl | Ctrl | w**.

Window Border

Adjust the thickness of the frame around the channel windows of the KVM Combiner. The frame color can be configured as well to make it easier to identify the different channels.

- **No Border –** No visible border around the channels.
- **Full Border –** Complete frame around each channel.
- **Half Border –** A frame will appear on the top and right side of each channel only.

Presentation Mode

Presentation Mode is a preset mode that simplifies operation.

- **Full –** The chosen channel will go to full screen automatically.
- **Partial –** At channel select, the channel will go to full screen; a second channel select will change the viewing mode to Tile.
- **Off –** Disable Presentation Mode.

Set Output Resolution

Determine the output resolution on both connected displays. This is the equivalent to entering **Ctrl | Ctrl | F11 | d | [1...8]**.

EDID

- **Internal –** The KVM Combiner will provide a pre-defined EDID file compatible with 4K 30HZ resolution to the allowed channels.
- **Monitor –** The EDID from the primary display will be sent to all connected endpoints.

Boot

Determine which mode the KVM will start upon booting up.

- **User Mode –** User Mode is the KVM Combiner's standard working mode, allowing interaction with the active channel's content.
- **Operator Mode –** Operator Mode allows for moving and resizing channels, creating and saving presets, and performing other tasks that will configure the unit for daily operation.

Note: On some legacy versions, "Operator Mode" may appear on the OSD as "Admin Mode."

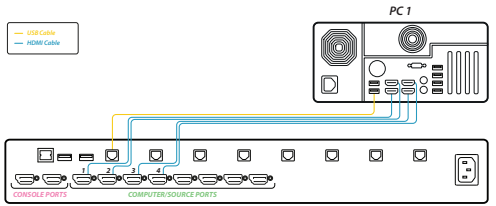
Multi-Head (Multi-Select) Channel

If there is a multi-head PC connected to multiple channels, select the channel corresponding to the USB port connected to the USB. In the text box next to the selected channel, add the other channels with displays connected to the same PC, with each channel number separated by the + key (e.g. "**1+2+3**").

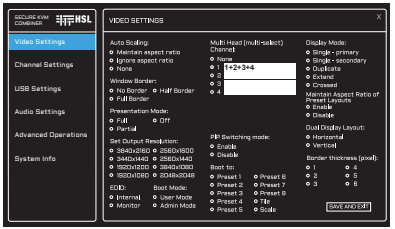
For example, if there is a quad-head PC connected on Channels 1-4, select Channel 1 and in the text box write "**1+2+3+4**."

The USB needs to be connected via Channel 1.

Note: On some legacy versions, multi-head channels will appear as selectable options, but not as text boxes. A legacy 4-port Combiner, for example, will have the option to select Dual-Head displays for Channels 1+2, Channels 3+4, or None.

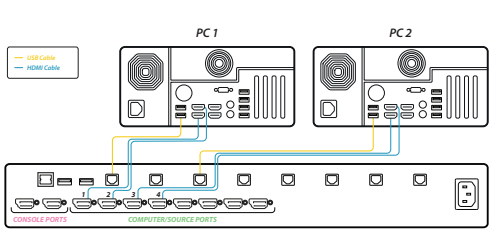


Secure 8-Port KVM Combiner

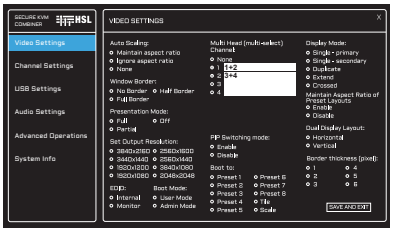


KVM Combiner OSD

Figure 11: *Multi-head configuration with a single source PC*



Secure 8-Port KVM Combiner



KVM Combiner OSD

Figure 12: *Multi-head configuration with two source PCs*

PIP (Picture-in-Picture) Switching Mode

PIP Switching Mode defines how the mouse movement switches channels when the KVM combiner is in PIP mode. PIP mode is a working mode in which a smaller channel is placed on top of a bigger channel in the background.

Enabling PIP Switching Mode (default) allows switching between the 2 sources by dragging the cursor across the borders between channels; when it is disabled, the mouse passes behind the foreground channel window and remains in the background channel.

Boot to:

The Combiner can boot to any one of the 8 user preloaded presets, Tile Mode, or Scale Mode.

Display

Determine the format in which the channels are displayed On-Screen.

- **Single - primary –** All channels are displayed only on the Combiner's primary output screen.
- **Single - secondary –** All channels are displayed only on the Combiner's secondary output screen.
- **Duplicate –** Both screens are active and show the same image.
- **Extend –** Both screens are active and display in Extend Mode, where the primary screen displays the first half of all channels, and the secondary screen displays the second half.
- **Crossed –** Functions identically to Extend Mode, except the secondary screen displays the first half of all channels and the primary screen displays the second half.

Maintain Aspect Ratio of Preset Layouts

Choose to maintain or disable the predefined aspect ratios (Preset layouts are selected by entering **Ctrl | Ctrl | q,** etc.).

Dual Display Layout

Choose between a horizontal (side by side) or vertical (top and bottom) layout for dual display.

Border Thickness

Determine the thickness (in pixels) of the borders around the channel windows (if enabled).

Channel Settings

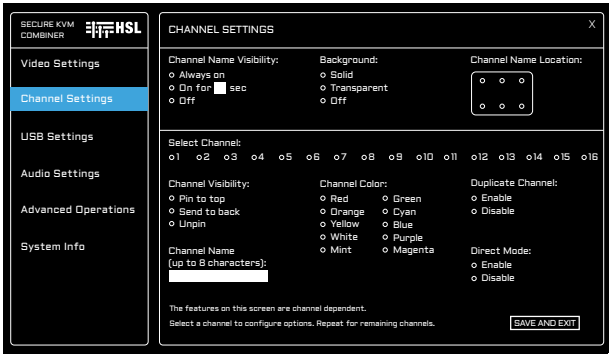


Figure 13: *OSD Channel Settings Menu*

General Settings

The following settings apply across all channels.

Channel Name Visibility

Determine how long the designated name of each channel is visible on the display(s).

- **Always on:** Channel names are always visible
- **On for (x) sec:** Specify how many seconds the channel names are visible
- **Always off:** Channel names are not visible

Background

Determine the visibility of a pill-shaped background that appears behind the channel name to stand out from the channel image.

- **Solid:** The background is shown as a solid color, contrasting the channel name sharply from the channel content.
- **Transparent:** The background is semi-transparent, contrasting the channel name partially from the channel content.
- **Off:** The background is removed, only displaying the channel name.

OPERATION

Channel Name Location

Determine the location of the channel window in which the channel name appears:

- Upper-left corner
- Upper middle
- Upper-right corner
- Lower-left corner
- Lower middle
- Lower-right corner

Selective Settings Per Channel

These settings only apply to a selected channel.

Select Channel

Pick the specific channel to modify.

Channel Visibility

- **Pin to top –** The selected channel will always appear on the top layer in front of all other channels, whether active or not.
- **Send to back –** The selected channel will always appear on the bottom layer behind all other channels, whether active or not.
- **Unpin –** This channel is not pinned to a specific layer.

Note: If two channels are pinned to top, the last one to be set will be on top of the previously set channel.

Channel Name

Enter a custom name for an individual channel by entering the name into the text box. Channel names can be a maximum of 8 characters long, and letters must be in uppercase.

Channel Color

Each channel's frame and background color can be set from a predefined list of colors:

- Red
- Orange
- Yellow
- White
- Mint
- Green
- Cyan
- Blue
- Purple
- Magenta

Duplicate Channel

Duplicate a selected channel, showing it twice on the display.

Note: When using Scale Mode, the duplicated channel will vary based on the active channel.

Direct Mode

Direct Mode reduces a channel's latency to zero. When Direct Mode is enabled, the video will bypass all memory or buffering components and will be presented directly on the display. Only one channel at a time can be displayed in Direct Mode, and it must be displayed at full screen.

USB Settings

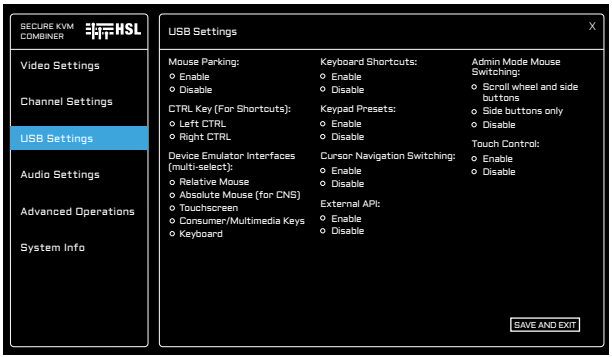


Figure 15: *OSD USB Settings Menu*

Mouse Parking

Enable or disable mouse parking. When enabled, the mouse cursor will be "parked" in the bottom right corner on non-selected (non-active) channels. When disabled, the mouse cursor will not be "parked" but will stay in its last location prior to leaving the channel.

CTRL Key

Choose whether the Control key in keyboard shortcuts is **LCtrl** or **RCtrl** (**LCtrl** by default). For example, to enter Quad Mode while using the **RCtrl** option, enter **RCtrl | RCtrl | q**. To enter Quad Mode using the **LCtrl** option, enter **LCtrl | LCtrl | q**.

Device Emulator Interfaces

Select which types of interfaces can pass to the sources via USB:

- **Relative Mouse –** Enables a regular mouse interface, where the mouse in User Mode stays in the active channel. This is always enabled.
- **Absolute Mouse –** Enables Absolute Mouse mode, where the mouse can switch between channels in User Mode dragging the cursor across channel borders.
- **Touchscreen –** Enables touchscreen controls.
- **Consumer/multimedia keys –** Enables the keyboard to pass special keys like mute, volume etc.
- **Keyboard –** Enables a regular keyboard interface.

The default settings enable Keyboard, Relative Mouse, and Absolute Mouse interfaces.

OPERATION

Keyboard Shortcuts

Enable or disable the use of keyboard shortcuts to switch channels, using the keyboard combination **Ctrl | Ctrl | [1…4] / [1…8] / [1…0] / [F1...F6]**.

The number of available sources depends on the number of ports on the Combiner.

Keypad Presets

Enable or disable the use of premade presets selected using the number pad.

Cursor Navigation

Enable or disable switching between active channels by moving the mouse from one channel to another.

External

Activate or disable the Combiner's API (RS-232) options.

Operator Mode Mouse Switching

Enable using the mouse to switch between Operator Mode and User Mode.

- **Scroll wheel and side buttons –** Switch between modes by pressing the mouse wheel or side buttons.
- **Side buttons only –** Switch between modes using the side buttons only.
- Disable – Switch between modes only by pressing **Ctrl | Ctrl | o** for Operator Mode and **Ctrl | Ctrl | u** for User Mode.

Note: In all the options above, switching modes by entering **Ctrl | Ctrl | o** and **Ctrl | Ctrl | u** is always enabled.

Touch Control

Enable or disable touchscreen controls in Operator mode.

Audio Settings

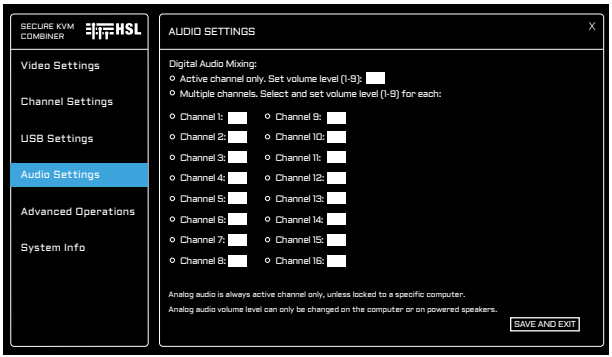


Figure 16: *OSD Audio Settings Menu*

Note: All changes in this section are specific to digital audio, not analog.

A channel's volume level can be adjusted by entering a number between 1 and 9, with 1 being the lowest volume and 9 being the highest.

- **Active channel only –** Play only the audio from the currently active channel.
- **Multiple channels –** Choose which channels will play audio and select the volume for each channel.

Note: Analog audio is always activated on the active channel unless it is locked on a different port. Analog audio volume level can be changed only on the source itself or on the volume set option of external speakers, irrespective of the Combiner.

Advanced Operations

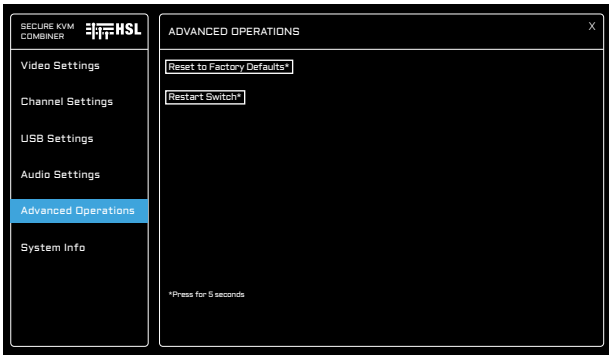


Figure 17: *OSD Secure Advanced Operations Menu*

Reset to factory defaults

Reset the Combiner and change all configurations back to their factory defaults, equivalent to entering **Ctrl | Ctrl | F11 | r**.

Note: This option would erase any presets or layouts previously made.

Restart Switch

Restart the Combiner without changing settings or erasing presets or layouts, equivalent to a power cycle.

System Upgrade (Commercial Models Only)

Update the system's firmware to its latest version.

FPGA/Video Upgrade (Commercial Models Only)

Update the video processor's firmware to its latest version.

System Info

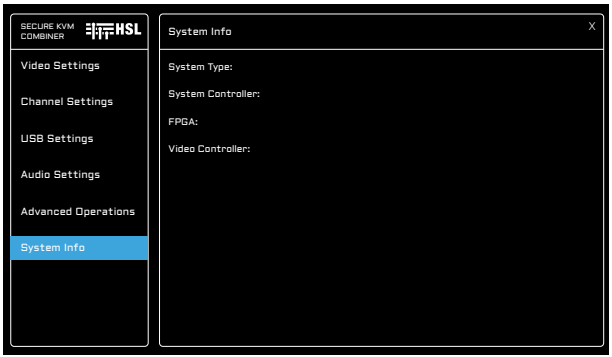


Figure 18: *OSD System Info Menu*

System Type

Specifies if the Combiner is a Secure or Commercial model.

System Controller

Indicates the firmware for the Combiner's volatile memory.

FPGA

Displays the firmware version of the FPGA EDID Generator for the video matrix, controller functionality, and view layouts.

Video Controller

Displays the firmware version of the Combiner's video controller.

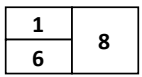
Set Predefined Layout

In addition to manually scaling each channel in Operator Mode, it is also possible to set channels to a predefined layout on the display. The channel windows scale evenly on the display in sequential order.

To set a predefined layout, enter the key combination **Ctrl | Ctrl | F11 | INS | l | [l/r] | <n> | <m1...>**, with the following definitions:

- **[l/r]**: show this layout on the left or right display
- **<n>**: how many channels are shown in this layout
- **<m1...>**: show the selected channels in the order in which they are entered

For example, to show Channel 1, Channel 6, and Channel 8 on the left display, enter **Ctrl | Ctrl | F11 | INS | l | l | 3 | 1 | 6 | 8**. The left display will show this layout:



Set Predefined Layout	
Set Predefined Layout on Left Display	**Ctrl | Ctrl | F11 | INS | l | l | <n> | <m1...>**
Set Predefined Layout on Right Display	**Ctrl | Ctrl | F11 | INS | l | r | <n> | <m1...>**
Toggle Auto Scale on Predefined Layout	**F11 | INS | l | a**

Custom Layout Configuration

In a custom layout configuration, each channel can be positioned in a specific location, with a specific size and scaling factor.

The structure of the command is: **Ctrl | Ctrl | F11 | END | <m> | <o> | <abcd>**, where **<m>** is the selected channel number, **<o>** is the type of operation, and **<abcd>** is the relative location.

Relative location is a 4-digit number representing the percentage of the full size, scaled by 10,000. For example, 5000 means 50.00% of the full displayable area (Note: 25% of an extended screen would be at the middle of the primary screen).

The operation types are:

1. Channel top-left X location
2. Channel top-left Y location
3. X length as a percent of total X width, scaled by 10,000
4. Y length as a percent of total X width, scaled by 10,000
5. X offset (the location of the channel compared to the full display).
6. Y offset (the location of the channel compared to the full display).
7. X scaling in percent, scaled by 10,000.
8. Y scaling in percent, scaled by 10,000

APPENDIX

Example: Ctrl | Ctrl | F11 | END | 2 | 1 | 5000 – sends Channel 2's top-left corner to the middle of the screen, vertically.

Example: Ctrl | Ctrl | F11 | END | 2 | 4 | 4500 – scales Channel 2 to 45% of the total screen width.

Control exact channel location and appearance	
The different operation types are: 1. Channel top left X location 2. Channel top left Y location 3. X length as percent of total X width 4. Y length as percent of total X width 5. X offset (the location of the channel compared to the full image size when larger) 6. Y offset (the location of the channel compared to the full image size when larger) 7. X Scaling in percent 8. Y Scaling in percent	**Ctrl | Ctrl | F11 | END | <m> | <o> | <abcd>** (4 digits) **<m>**= Channel Number **<o>**= Operation Type **<abcd>**= Location (4 digits)
Remote Control Screen Layout Configuration	
Position the X location at half screen	**Ctrl | Ctrl | F11 | END | 1 | 1 | 5000**
Position the Y location at middle of the display	**Ctrl | Ctrl | F11 | END | 1 | 2 | 5000**
Channel X size 50% of the size of the display	**Ctrl | Ctrl | F11 | END | 1 | 3 | 5000**
Channel Y size 50% of the size of the display	**Ctrl | Ctrl | F11 | END | 1 | 4 | 5000**
To perform these functions in Extend mode:	
Position the X location at half screen	**Ctrl | Ctrl | F11 | END | 1 | 1 | 2500**
Position the Y location at middle of the display	**Ctrl | Ctrl | F11 | END | 1 | 2 | 5000**
Channel X size 50% of the size of the display	**Ctrl | Ctrl | F11 | END | 1 | 3 | 2500**
Channel Y size 50% of the size of the display	**Ctrl | Ctrl | F11 | END | 1 | 4 | 5000**

Control Device Settings

The KVM Combiner can be controlled using an external remote control, PC, or any other device with RS-232 capability (referred to hereafter as the Remote Control Unit or RCU).

Connect the Controlling Device to the Combiner

- Connect the RCU to the Combiner via the RJ14 port labeled RCU (see Fig. 8).
  - It may be necessary to connect the devices using a USB to RJ14 cable (Part CUS18RJ, sold separately)
  - The specific method of connecting the RCU to the Combiner may vary depending on the type of device being used. For full instructions on how to connect a controlling device, consult the RS-232 Remote Control Administrator Guide:

https://highseclabs.com/wp-content/uploads/2020/10/HDC18581_HSL_QSG_Remote-RS232-control_1.3.pdf

Remote Control Commands

The buttons on an RCU replicate the buttons on the Combiner's front panel. This is done by entering keepalive commands via a serial terminal program (e.g. PuTTY).

Keepalive events are used by the Combiner to periodically communicate its status to the RCU, using the RS-232 protocol. Entering an RS-232 command program updates the keepalive event. Because these events are related to the buttons on the Combiner's front panel, they are constructed as **#AFP_ALIVE** followed by the command argument corresponding to the selected channel.

For example, to switch to Channel 5 on an 8-port Combiner, enter the command **#AFP_ALIVE FFFFFFEF**.

Note: while using a Remote Control Unit, the Combiner's front panel buttons are deactivated. This is because the Combiner is receiving commands from the RCU instead of the front panel buttons.

To replicate the Combiner's front panel buttons using RS-232, enter the **#AFP_ALIVE** command with the following arguments:

Front Panel Button	Channel ID
Channel 1	**FFFFFFFE**
Channel 2	**FFFFFFFD**
Channel 3	**FFFFFFFB**
Channel 4	**FFFFFFF7**
8/16-Port Models Only	
Channel 5	**FFFFFFEF**
Channel 6	**FFFFFFDF**
Channel 7	**FFFFFFBF**
Channel 8	**FFFFFF7F**

Front Panel Button	Channel ID
16-Port Models Only	
Channel 9	**FFFEFEFF**
Channel 10	**FFFDFDFF**
Channel 11	**FFFBFBFF**
Channel 12	**FFF7F7FF**
Channel 13	**FFEFEFFF**
Channel 14	**FFDFDFFF**
Channel 15	**FFBFBFFF**
Channel 16	**FF7F7FFF**

API Commands

The Combiner uses an Application Program Interface (API) to perform functions such as switching channels, enabling presets, and changing the Combiner's behavior. The API can be accessed via a serial terminal program such as PuTTY.

Action	Keyboard	API
Switch to User Mode	**Ctrl | Ctrl | u**	#ANATL u
Switch to Operator Mode	**Ctrl | Ctrl | o**	#ANATL o
Toggle **LCtrl** or **RCtrl** for keyboard shortcuts	**Ctrl | Ctrl | i**	#ANATL F11 i
Enable/Disable Shortcut Forwarding	**LCtrl | RCtrl | END**	#ANATLR END
Reset to factory defaults	**Ctrl | Ctrl | F11 | r**	#ANATL F11 r
Channel Select (Commercial Models Only)		
Select Channel 1	**Ctrl | Ctrl | 1**	#ANATL 1
Select Channel 2	**Ctrl | Ctrl | 2**	#ANATL 2
Select Channel 3	**Ctrl | Ctrl | 3**	#ANATL 3
Select Channel 4	**Ctrl | Ctrl | 4**	#ANATL 4
Select Channel 5	**Ctrl | Ctrl | 5**	#ANATL 5
Select Channel 6	**Ctrl | Ctrl | 6**	#ANATL 6
Select Channel 7	**Ctrl | Ctrl | 7**	#ANATL 7
Select Channel 8	**Ctrl | Ctrl | 8**	#ANATL 8
Select Preset		
Select Preset F1	**Ctrl | Ctrl | F1**	#ANATL F1
Select Preset F2	**Ctrl | Ctrl | F2**	#ANATL F2
Select Preset F3	**Ctrl | Ctrl | F3**	#ANATL F3
Select Preset F4	**Ctrl | Ctrl | F4**	#ANATL F4
Select Preset F5	**Ctrl | Ctrl | F5**	#ANATL F5
Select Preset F6	**Ctrl | Ctrl | F6**	#ANATL F6
Save a custom preset to key [F1...F8]	**Ctrl | Ctrl | F11 | INS | [F1…F8]**	#ANATL F11 INS [F1...F8]

APPENDIX

Action	Keyboard	API
Mouse Control Options		
Enable Relative Mouse	**Ctrl | Ctrl | F11 | b**	#ANATL F11 b
Enable Absolute Mouse	**Ctrl | Ctrl | F11 | c**	#ANATL F11 c
Temporarily shift to Relative Mouse	**LCtrl + Shift simultaneously**	
Enable/Disable Relative Mouse Input Passing in Absolute Mouse (Commercial Models Only)	**Ctrl | Ctrl | F11 | INS | m**	#ANATL F11 INS m
Enable/Disable Mouse Parking	**Ctrl | Ctrl | F11 | h**	#ANATL F11 h
Channel Display Options		
Maximize channel	**Ctrl | Ctrl | f**	#ANATL f
Undo Maximize (only accepted immediately after)	**Ctrl | Ctrl | z**	#ANATL z
Switch to Tile View	**Ctrl | Ctrl | q**	#ANATL q
Switch to Scale View	**Ctrl | Ctrl | s**	#ANATL s
Set channel size [1...4]	**Ctrl | Ctrl | F11 | <m> | [1...4]**	#ANATL F11 <m> [1...4]
Set channel border width [1...6]	**Ctrl | Ctrl | F11 | u | <m> | [1...6]**	#ANATL F11 u <m> [1...6]
Fit channel content while keeping aspect ratio	**Ctrl | Ctrl | w**	#ANATL w
Fit channel content to window without keeping aspect ratio	**Ctrl | Ctrl | y**	#ANATL y
Auto-Scale channel while keeping aspect ratio	**Ctrl | Ctrl | F11 | w | w**	#ANATL F11 ww
Auto-Scale channel without keeping aspect ratio	**Ctrl | Ctrl | F11 | w**	#ANATL F11 w
Disable Auto-Scaling	**Ctrl | Ctrl | F11 | w | n**	#ANATL F11 wn
Pin a channel to its current layer	**Ctrl | Ctrl | F11 | f | <m>**	#ANATL F11 f<m>
Unpin all pinned channels	**Ctrl | Ctrl | F11 | f | r**	#ANATL F11 fr
Enter Presentation Mode	**Ctrl | Ctrl | p**	#ANATL p
Toggle Maximize/Quad switch in Presentation Mode	**Ctrl | Ctrl | F11 | p | 1**	#ANATL p1
Toggle Maximize-only in Presentation Mode	**Ctrl | Ctrl | F11 | p | 2**	#ANATL p2
Exit Presentation Mode	**Ctrl | Ctrl | n**	#ANATL n
Enter Direct Mode (8-Port Model)	**Ctrl | Ctrl | F11 | INS | f | <n> | [5...8]**	#ANATL F11 INS f<n>[5...8]
Enter Direct Mode (16-Port Model)	**Ctrl | Ctrl | F11 | INS | f | <n> | [F3…F6]**	#ANATL F11 INS f<n>[F3...F6]
Exit Direct Mode	**Ctrl | Ctrl | F11 | INS | f | 0**	#ANATL F11 INS 0

APPENDIX

Action	Keyboard	API
Color Options		
Define Color Red	-	#ANATL F12 cr
Define Color Blue	-	#ANATL F12 cb
Define Color Green	-	#ANATL F12 cg
Define Color Orange	-	#ANATL F12 co
Define Color White	-	#ANATL F12 cw
Define Color Mint	-	#ANATL F12 cm
Define Color Cyan	-	#ANATL F12 cc
Define Color Purple	-	#ANATL F12 cp
Define Color Magenta	-	#ANATL F12 ct
Define Color Yellow	-	#ANATL F12 cy
Control Exact Channel Location and Appearance		
The different operation types are: 1. Channel top left X location 2. Channel top left Y location 3. X length as percent of total X width 4. Y length as percent of total X width 5. X offset (the location of the channel compared to the full image size when larger) 6. Y offset (the location of the channel compared to the full image size when larger) 7. X Scaling in percent 8. Y Scaling in percent	**Ctrl | Ctrl | F11 | END | <m> | <o> | <abcd> (4 digits)** **<m>= Channel Number** **<o>= Operation Type** **<abcd>= Location (4 digits)**	#ANATL F11 END <m> <o> <abcd> <m>= Channel Number <o>= Operation Type <abcd>= Location (4 digits)
Set Predefined Layout		
Set Predefined Layout on Left Display	**Ctrl | Ctrl | F11 | INS | l | l | <n> | <m1...>**	#ANATL F11 INS l l <n> <m1...>
Set Predefined Layout on Right Display	**Ctrl | Ctrl | F11 | INS | l | r | <n> | <m1...>**	#ANATL F11 INS lr <n> <m1...>
Toggle Auto Scale on Predefined Layout	**F11 | INS | l | a**	#ANATL F11 INS la
Set Keepalive Interval		
Set Frequency of Keepalive Signals in Intervals of 100 milliseconds		#ANATA [1...99]

API String Structure for Kramer, Extron, Crestron Controlling Devices

Depending on the manufacturer, some controlling devices may require certain characters when entering an API string. The following are API string structures for the most common control devices.

Function	Description	Kramer	Extron	Crestron
Carriage Return	Return text cursor to beginning of line	<cr>	<cr>	\x0d
Line Feed	Move text cursor to new line	<lf>	<lf>	\x0a
Command Start	Begin a new command	-	-	#
Space	Separate multiple strings	-	-	\x

Examples:

The following examples all enter a command into the keepalive sequence for an 8-Port Combiner's front panel "AFP_ALIVE" to switch to Channel 1 "**FFFFFFFE**," ending with a carriage return.

- Kramer or Extron: **#AFP_ALIVE FFFFFFFE <cr>**

Crestron: **##AFP_ALIVE FFFFFFFE\x0d** For further information on programming a controlling device, consult the Programmable Remote Control User Manual.

Highseclabs.com

For more information about HSL's solutions, please contact:

HighSecLabs, Inc.
905 James Record Road STE A,
Huntsville AL, 35824

HSL Support
256-203-3036
https://highseclabs.com/contact/

Sales
Sales@highseclabs.com