Presentation
Switchers
digital presentation systems

Users Guide

PS190

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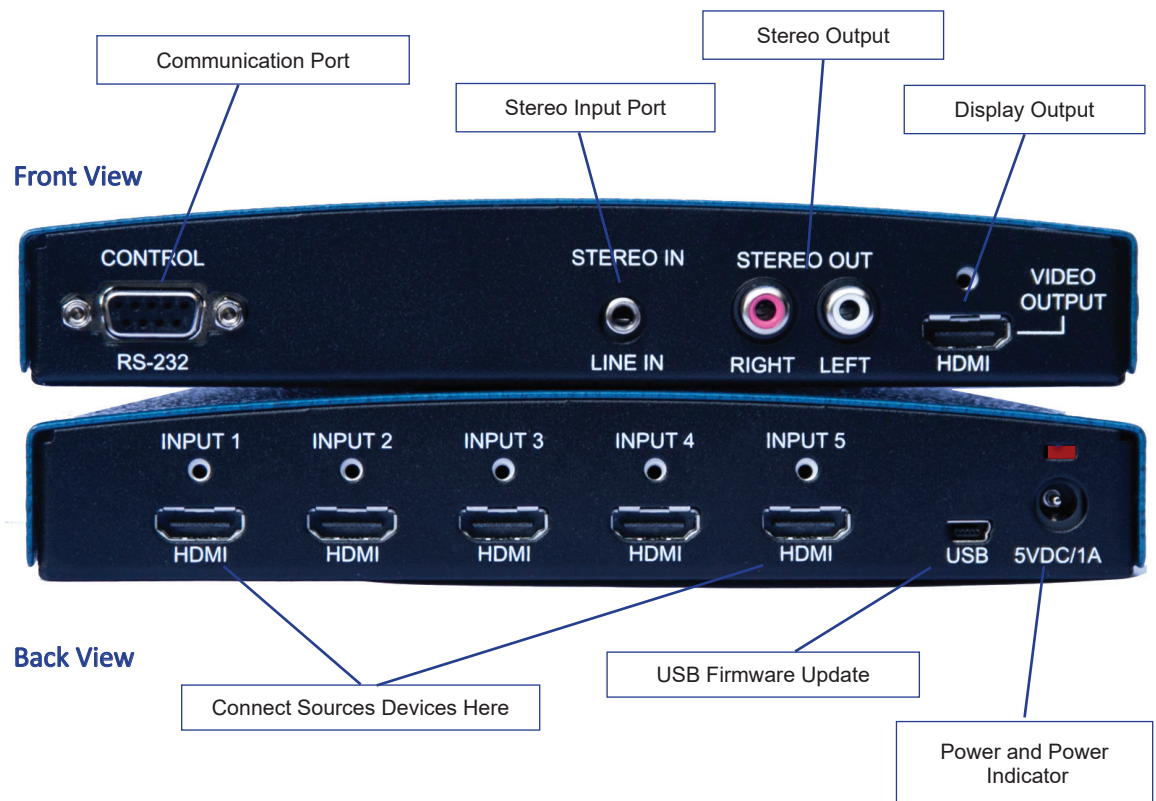# Contents

Introduction

Introducing the PS190 - 5 X 1 HDMI Auto-Switcher with Integrated Audio Mixer, Injector, & Stereo Output

The PS190 allows 5 HDMI sources to share one display or projector with resolutions up to UHDTV (3840x2160). The 3.5mm stereo input port allows line level microphone or mobile device to be mixed with audio extracted from the selected HDMI input then re-injected into the HDMI stream. An RCA stereo output provides a pre-amplified output for local speakers if the volume from the display is inadequate or if ADA assisted listening equipment is required. The system's auto-sense, auto-switch feature combined with the automatic integrated display power on and off makes this solution extremely easy to use. For installs that require Crestron, AMX, or other 3rd party control systems, an RS-232 connector is provided for power, source selection, and volume control.

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Connecting Input Devices

Input or source devices are connected on the back side of the PS190 using the HDMI connectors labeled "Input 1" through "Input 5". See image call-out on Page 4 of this manual.

Compatible Input Devices

PS190 compatible devices must support the HDMI signal format. These physical devices may be any of the following:

- A native HDMI device
- A DVI-D or DVI-I device using a DVI to HDMI cable
- A DisplayPort device using a DisplayPort to HDMI cable
- A MDL mobile device using a MDL to HDMI cable

The PS190 also supports indirect connections. The input device may be connected to a connectivity box such as Extron® Cable Cubby™ or Altinex® Tilt 'N Plug™ first before being connected to the PS190.

HDMI Extenders

The input may also be indirectly connected using an HDMI extender. By default, the PS190 keeps its display information (EDID) local to each input. There is very little delay from the time an input device asks for the display information to the time the information is sent. A device connected to an extender may "time-out" waiting for a response from the display device. If a time-out occurs, the input device will not send its content. It is important to use high quality extenders so any delay caused by the extender technology is minimized and time-outs are less likely to occur.

The PS190 has a "pass through" mode that passes all display information requests directly to the display. If this feature is enabled and the system is configured with extenders on the input and output ports of the PS190 it is possible to have time-outs on certain input devices.

Connecting the Display

Displays (or other output devices) are connected on front side of the PS190 on the HDMI connector labeled "Video Output". See image call-out on Page 4 of this manual.

Compatible Displays

PS190 is compatible with native HDMI, DVI, or DisplayPort displays.

Image Resolutions

The PS190 supports resolutions up to UHDTV (3840 x 2160 @ 30Hz [4:2:2] or 60Hz [4:2:0]), all HDTV resolutions, and VESA monitor resolutions up to 1920 x 1200.

Stereo Audio (Line) Input

Connect the audio from a mobile device or wireless microphone system (line level) to the 3.5mm stereo jack of the PS190. See image call-out on Page 4, "Stereo In".

The audio from this connector is automatically mixed and sent to the HDMI display and stereo output. Gain adjustments are available through the RS-232 interface.
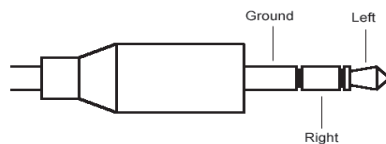
Stereo Audio Output

If external speakers are required, connect an RCA cable from the PS190 "Stereo Out" connectors to your amplifier or powered speakers. See image call-out on Page 4, "Stereo In".

The stereo output is a mix of program audio (audio extracted from the selected HDMI input) and stereo audio line input (3.5mm jack). The default mix and level should be adequate for most installations. However, gain and volume level adjustments are available through the RS-232 interface.

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RS-232 Communication Interface

The PS190 uses an RS-232 serial interface to change attributes and behavior of the PS190. The communication parameters are as follows: 115200 baud, 8 bit, no parity, and 1 stop bit. The baud rate is fixed and unchangeable. Pins 2 (Rx), 3 (Tx), and 5 (GND) are used.

STRAIGHT THROUGH
SERIAL CABLE

RS-232 Port Pinout	
Computer	PS190
Pin 2	Pin 2
Pin 3	Pin 3
Pin 5	Pin 5

RS-232 Communication Settings	
Baud Rate	115,200 Fixed
Packet Size	8 Bit
Parity	None
Stop Bit	1

See Page 10 for more detailed discussions on RS-232 commands and/or review the *PS190 Programming Guide*.

Power

Using the AC to DC power supply shipped with the PS190, connect the round connector to the PS190. The Power Indicator LED will illuminate above of the DC/5V location to indicate that power is being received.

Basic Operation

In most situations, the PS190 performs exceptionally right out of the box. Simply hook up the input devices and display in any order, power up the system. The PS190 will begin in an auto-sense, auto-switching mode with audio output and display control enabled. Keep in mind that features can be turned on and off using the RS-232 interface. See Page 10 for more information.

Two key features of the PS190 are related to automation: auto-switching and display management.

Auto-Sense, Auto-Switching

Auto-sense, automatic switching (ASW) is a very powerful feature of the PS190 and will be explained further to best understand how it can be utilized. ASW is enabled by default and can be disabled using the RS-232 interface.

The PS190 is very sensitive. When a user connects a device to one of the 5 HDMI input ports, the PS190 responds immediately by routing the video from the newly connected device to the display. If the color space is different than the display, color is automatically converted internally to ensure the highest quality image is displayed at the highest resolution practicable.

If another person connects a computer or mobile device to an HDMI input port, that device will immediately appear on the display. The rule is: The last to connect will always appear on the display.

Should an actively displayed device be disconnected, the PS190 will search from input 1 through input 5 for the first active signal. Once found, the image from that device will appear on the display. From a design standpoint, consider having the home room computer on input 1 and any ancillary or guest connections on inputs 2 through 5.

Automatic Display On/Off

Automatic display on/off (CEC) is another powerful feature of the PS190. CEC is enabled by default but can be disabled using the RS-232 interface.

CEC must be enabled on the display itself for this feature to work with the PS190.

Trade names for CEC are Anynet+ (Samsung), Aquos Link (Sharp), BRAVIA Link and BRAVIA Sync (Sony), HDMI-CEC (Hitachi), E-link (AOC), Kuro Link (Pioneer), INlink (Insignia), CE-Link and Regza Link (Toshiba), RIHD (Remote Interactive over HDMI) (Onkyo), RuncoLink (Runco International), SimpLink (LG), T-Link (ITT), HDAVI Control, EZ-Sync, VIERA Link (Panasonic), EasyLink (Philips), and NetCommand for HDMI (Mitsubishi).

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If a user connects to the PS190, the PS190 will automatically turn the display on. When the last person disconnects, the PS190 will wait 30 seconds of inactivity then turn off the display. In many cases, this feature eliminates the need for television remotes, extends display life, saves power, and simplifies classrooms, conference rooms, and huddle spaces, making them more user friendly.

Changes to the PS190

The PS190's RS-232 interface allows users and integrators the ability to control switching and change the behavior of the PS190. This section will describe the commands that are available and detail their affect on the system.

RS232/DB9 Cable Pin-Out

See Page 7 for the RS-232 cable pin-out configuration.

Upon power up the following image will appear:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$
```

The "$" indicates that the PS190 is ready to receive a command. For a list of the available commands, type "HELP" and hit the return key.

```
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$ HELP
PS190    Published Commands
-------- -------------------------------------------------
HELP     - This page.
ID       - Displays Device Identification
FRUN #   - Freerun Mode (0 = Disable, 1 = Enable)
ASW      - Displays Auto-Switch Feature Status.
ASW #    - Selects Auto-Switch (0=Off, 1=On).
SW       - Displays currently selected input being displayed.
SW #     - Selects input '#' (1-5) to be displayed.
RES      - Displays EDID output resolution.
RES #    - Selects output resolution from table (1-7), 1=1080p
MUTE #   - Mutes Audio Output (0=Unmute, 1=Mute)
VOL      - Displays Volume Level
VOL #    - Set Volume Level (1-100)
+        - Increase Volume by 1 Step (1-100)
-        - Decreases Volume by 1 Step (1-100)
LIN      - Displays Line Input Volume Level (1-100)
LIN #    - Changes Line In Level (1-100)
TRIM     - Displays all TRIM Settings
TRIM # # - Sets Selected Input (#) to TRIM Setting (#)
DBG #    - Sets Devices to Debug Mode
TV #     - Uses CEC to control Display (0=Off, 1=On)
CEC #    - Turns CEC On/Off (0=Off, 1=On)
```

Making a Switch / Selecting an Input to Display

The most basic capability of the PS190 is routing signals from "Input Ports" to the "Output Port". This process is often called "switching". To do this with the PS190, use the SW command:

```
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$ SW 3
SW 3
```

In the example above, the audio and video from the device connected on Input 3 will be routed to the display. Audio from this device will be heard on the display as well as the stereo audio output port.

To obtain the current input, simply type "SW" and a carriage return.

Adjust Volume

To change the volume level on the Stereo Line Output:

```
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Firmware Revision 1.0

$ VOL 85
VOL 85
```

The VOL command above is being changed to 85. The default audio level from the factory is 70 so a level of 85 is raising the volume level substantially.

Incremental volume adjustments can be achieved by typing "+" or "-" without hitting a carriage return.

To mute the audio, type "MUTE 1". "MUTE 0" unmutes.

> The VOL, MUTE, +, and - only affect the Stereo Line Output. Volume levels on the HDMI display can only be changed by adjusting the volume on the display itself.

Input Device Gain Adjustments

Consumer and professional devices often differ in the volume levels. A gain adjustment is used to "trim" devices that are too loud so that all devices have the same relative volume. When switching between the devices there should be no noticable volume difference between each input. All inputs are defaulted to a trim level of 100. To trim one input, use the trim feature to reduce the trim level to something less than 100. Here is an example:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$ TRIM 3 85
TRIM 3 85
$ TRIM
TRIM 1 100
TRIM 2 100
TRIM 3 85
TRIM 4 100
TRIM 5 100
```

In this example, we first change the trim level on Input 3 to be a level of 85. Entering "TRIM" and a carriage return will display the trim levels of all inputs. In this case, we can see that the trim level for Input 3 has be set to 85.

Audio Line Input Mix

To change the relative mix or audio level of the line input in relation to the HDMI extracted audio, use the LIN command. For example:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$ LIN 80
LIN 80
```

In this example, stereo line input's volume level is increased (from the default value of 70) in relation to the audio extracted from the current HDMI input selected. Installations which use this feature for a teacher microphone may want their voice louder.

A LIN value of zero will effectively mute the stereo line input and not affect the loudness of the HDMI input selected.

Type "LIN" and carriage return to obtain the current LIN value.

Change Display Resolution

Most input devices send a request to the display to get it's native resolution. The response from the display arrives in a data packet called the Extended Display Identification Data (EDID). The input device then adjusts it's output resolution to match the resolution of the display.

The PS190 has the ability to intercept the input device's request for display information and respond with a user defined resolution. The command to specify this resolution is the RES command and below is a list of RES settings:

EDID Table Settings	
RES Value	Resolution / Behavior
0	`Pass Through Mode`
1	`1080p      @ 60Hz`
2	`720p       @ 60Hz`
3	`1920 x 1200 @ 60Hz`
4	`1600 x 1200 @ 60Hz`
5	`1280 x 1024 @ 60Hz`
6	`1280 x 768  @ 60Hz`
7	`1024 x 768  @ 60Hz`

Here is an example:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$ RES 2
RES 2
```

In the example above, the EDID is modified to indicate the preferred resolution of this display is 720p. The PS190 will send out a refresh request to all inputs to read the latest display information. Unless resolutions have been overridden by the end user, input devices will automatically change their output resolution to match the new resolution.

To view the current resolution setting, type "RES" and a carriage return.

Auto-Switch On / Off

By default, auto-switch is always enabled. Here is how to control this feature:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$ ASW 0
ASW 0
```

By typing "ASW 0", the auto-switching feature is disabled. From this point, the only way to make a switch is by using the SW command. "ASW 1" will enable the feature.

Type "ASW" and carriage return to view the current state of the auto-switch feature.

Display Control

As stated in more detail on Page 8, the display control feature is used to automatically turn on a display when beginning a presentation, then turn off the display when the presentation concludes.

By default, display control is always enabled. Here is how to control this feature:

```
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Firmware Revision 1.0

$ CEC 0
CEC 0
```

In the example above, typing "CEC 0" and carriage return will turn off the display control feature. "CEC 1" and carriage return will enable the feature.

Type "CEC" and carriage return to obtain the current state of the auto-switch feature.

> Note: This feature requires that CEC is enabled on the display device. See the detailed discussion on Page 8 regarding this feature and manufacturer trade names of CEC.

Display On / Off

Similar to the automatic display control, the PS190 can manually tell the display to turn on and off. Here is an example of how this feature works:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$ TV 0
TV 0
```

In the example above, "TV 0" with a carriage return will shut off the display. Typing a "TV 1" and carriage return will turn the display on.

Type "TV" and carriage return to view the current state of the display's power status.

> Note: This feature requires that CEC is enabled on the display device. See the detailed discussion on Page 8 regarding this feature and manufacturer trade names of CEC.

Freerun On / Off

Freerun is a term to describe what happens when one selects an input that doesn't have a

device connected or when one selects an input that has a device connected but the device isn't sending video.

When freerun is enabled (on) a blue screen displays at a fixed resolution of 480p (a resolution that is required by all HDMI display devices per the HDMI standard). When freerun is disabled the display will receive a disconnected signal (no signal present).

By default, freerun is enabled. To disable:

```
PS190 by Presentation Switchers
Firmware Revision 1.0

$ FRUN 0
FRUN 0
```

In the example above, "FRUN 0" with a carriage return will shut off the freerun feature. Typing a "FRUN 1" and carriage return will turn the freerun feature on.

Type "FRUN" and carriage return to view the current state of the freerun feature.