ZIGEN

SW-42Plus

MkIII (2020)
4x2 HDMI 2.0 Switch
User Manual

SW-42Plus 4x2 HDMI Switch User Manual
UM-002-0002-000-00 | December 18, 2020

Important Safety Instructions

Read this user manual carefully before using the product. Pictures shown in this manual are for reference only. Different models and specifications are subject to real product.

This manual is only for operation instruction, please contact the local distributor for maintenance assistance. The functions described in this version were updated on December 2020. In the constant effort to improve the product, we reserve the right to make function or parameter changes without notice or obligation. Please refer to Zigen dealers for the latest details.

This warning symbol is used to alert anyone to heed important operating, installing, and maintenance instructions. Failure to do so could result in injury to installers and end-users or damage to equipment.

This lightning symbol is used to alert anyone of the presence of dangerous voltage that has to potential to cause serious injury to installers and end-users.

Safety Statements

1. Follow all instructions and heed all warnings.
2. Do not expose equipment to rain or moisture and ensure that no objects containing liquids are placed on top of equipment. This includes cups, glasses, or vases.
3. Do not place equipment in confined spaces such as cabinets or bookshelves. Do not block any ventilation holes of equipment that may restrict airflow. This may cause dangerous overheating, fire hazard, or electric shock.
4. Do not place near heat sources such as fireplaces, heaters, boilers, radiators or any apparatus that produce heat such as computers or power amplifiers.
5. Unplug equipment from power supply during dangerous lightning conditions or during prolonged periods of non-use.
6. Keep power cord away from walking traffic. Keep cord from being pinched by heavy objects.
7. Always unplug power supply before cleaning equipment. Clean only with dry cloth.
8. Handle equipment with proper Electro-Static-Discharge (ESD) practices. Failure to do so may result in equipment failure.
9. Only use attachments or accessories specified by the manufacturer.
10. No user serviceable parts inside. Refer all servicing to qualified service personnel.
11. Batteries that may be included with this product and/or accessories should never be exposed to open flame or excessive heat. Always dispose of used batteries according to the instructions.

FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference. Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.

Licensing

This product uses software that is subject to open source licenses, lwIP is licensed under the BSD license:

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This Software is provided by the author “as is and any express or implied warranties including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall the author be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) However caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

Packing List

The SW-42Plus, packaged with the following items:

- 1x SW-42Plus 4 x 2 HDMI 2.0 Switch
- 1x Universal 100-240 VAC, 12V/2A Power Supply
- 1x IR Remote Control with CR2025 battery
- 1x RS-232 Cable (male DB9 to female DB9)
- 2x Wall Mounting Ears including Hardware
- 2x Rack Mounting Ears (1/2 Rack Height)
- 4x Plastic Cushions
- 1x Quick Start Guide

If any of these products are not present upon first opening of the package, please contact Zigen or your dealer.

Specifications

Video Connection	HDMI 2.0b
Content Protection	HDCP 1.4 | 2.2
Maximum Video Resolution	4K60P UHD 4:4:4, 4K60P UHD 4:2:2 HDR
HDMI Inputs	4x
HDMI Outputs	2x
SPDIF Output	2x
Analog Audio Left/Right	2x (Configurable Balanced/Unbalanced)
RJ-45 Ethernet LAN Port	1x (10/100BaseT)
RS-232 Port	1x (DB9)
3.5mm IR In Port	1x
IR Sensor (for Remote Control)	1x
2-Pin Power Input Jack	1x (Locking Connector)
Maximum HDMI Bandwidth	17.82 Gbps
Color Space Support	RGB, YUV
YUV Subsampling	4:4:4, 4:2:2, 4:2:0
Full Color Depth	8 bits, 10 bits, 12 bits
High Dynamic Range (HDR)	Dolby Vision | HDR10+ | HDR10 | HLG
Audio Format (HDMI Output)	2-Channel PCM, DTS, DTS-HD, Dolby Digital, Dolby TrueHD, Dolby Atmos
Audio Format (SPDIF Output)	PCM, Dolby Digital, DTS 5.1
Audio Format (Analog Output)	2-Channel Stereo *Note: Noise may be heard on the Analog outputs if audio EDID is set for multichannel surround sound format (5.1, 7.1, Dolby Digital, DTS, etc.)*
Audio DSP (Analog Output)	Volume Attenuation, Tone Control Bass/Treble, 5-Band Equalizer, Equalizer Presets, Bass Enhancement, and Surround Sound Effects
Auto Switching	✓
IR Remote Control	✓
RS-232 Port	✓
IR Input Port (2 or 3 Pins)	✓
Ethernet Port (100BaseT)	✓
ZigNet Administration	✓
EDID Management	✓
Advanced Diagnostics	✓
CEC	✓
ARC	✓ (HDMI Output #1 to HDMI Input #1) *Decoded ARC Audio can be embedded to HDMI Output #2, SPDIF, and Analog Audio [2-Channel].*
Low Power Standby Mode	✓
Power	12VDC @ 2A, Center pin hot
Dimensions	325.00mm x 22.50mm x 94.00mm | 12.79 inches x 0.89 inch x 3.70 inches
Weight	726 grams | 1.6 pounds
Temperature	0° to 40° C (10% - 90% Non-Condensing Humidity) | 32° to 104° F
HDMI 4K 600Mhz ESD Protection	Exceeds IEC61000-4-2 (Level 4)
Contact/Air Gap Discharge on External Lines	±15-kV
Regulatory Safety and Emissions	CE | FCC | RoHS | UL Listed Power Supply

Table of Contents

1 Introduction

The SW-42Plus is an HDMI 2.0 Audio/Video 4x2 Matrix Switch. The device has four HDMI inputs, two HDMI outputs, two SPDIF outputs, and two Analog Audio Left/Right Balanced/Unbalanced outputs. Each HDMI video output can be connected to any HDMI video input. Audio outputs 1 and 2 mirror the embedded audio of HDMI outputs 1 and 2.

Both HDMI outputs have automatic down scalers for mixed resolution display environments. For example, HDMI output #1 is connected to a native UHD display and HDMI output #2 is connected to a 1080p Display. If both outputs select the same source input with UHD resolution, then output #1 will send the native UHD resolution video to the UHD display while output #2 will automatically downscale the video for the 1080p display. This ensures compatibility by displaying the same source with different resolution displays, while maintaining the highest quality native resolution for the UHD display.

Audio can be extracted from the connected HDMI inputs or from Audio Return Channel (ARC) on HDMI Output #2. **Table 1** shows where the extracted audio can be heard. Extracted ARC from HDMI output #1 can be directed to HDMI input #1 if an ARC enabled Audio/Video Receiver (AVR) is connected to HDMI input #1. Refer to **Figure 3: Typical Interconnect Diagram**. ARC can also be decoded and re-embedded to HDMI Output #2, SPDIF Outputs, or Analog Audio Outputs (2-channels only).

Table 1: Audio Source to Audio Output support.

Source of Extracted Audio	Audio Outputs
HDMI Input	• Analog Audio Output 1 or 2 (2-Channel PCM Stereo Only) • TOSLINK 1 or 2 (Multi-Channel Dolby/DTS Surround Sound) • HDMI Output 1 • HDMI Output 2
ARC (HDMI Output 1)	• Analog Audio Output 1 or 2 (2-Channel PCM Stereo Only) • TOSLINK 1 or 2 (Multi-Channel Dolby/DTS Surround Sound) • HDMI Input 1 (Multi-Channel Dolby/DTS Surround Sound) • HDMI Output 2

The SW-42Plus can negotiate with a Smart TV connected to HDMI Output #1 to enable ARC audio even if there is no ARC supported AVR or a SoundBar connected in the system. This extracted ARC can be directed to the SPDIF outputs, Analog Audio Outputs, and HDMI Output #2.

The SW-42Plus includes an IR Remote Control for configuring the video matrix connections between inputs and outputs. The unit can also be controlled by 3rd party Control Systems (appropriate drivers required) through control ports such as IR Port (3.5mm Jack), RS-232 (DB9), and Ethernet LAN.

The SW-42Plus is featured with a webGUI interface called ZigNet. With ZigNet, the user has full control of Audio/Video Switching, Analog Audio Processing, Source and Sink Diagnostics, and EDID Reporting. ZigNet eliminates the need for costly analyzers and time-consuming step by step troubleshooting.

Front Panel

1 IR Sensor

This IR sensor receives signals from the included IR Remote Control unit. Aim the IR Remote Control in this window while pressing its buttons.

2 HDMI Input Selection Buttons

These illuminated buttons are used to select which of the four HDMI Inputs are to be routed to the HDMI Outputs. Both video and embedded audio will be routed. If the buttons are illuminated blue, then Output #1 will be connected to the selected HDMI Input. If the buttons are illuminated red, then Output #2 will be connected to the selected HDMI Input. The selected HDMI input button will illuminate while all other input buttons will be off. Flashing LED behaviors may occur for alert and diagnostic purposes.

3 Output Button

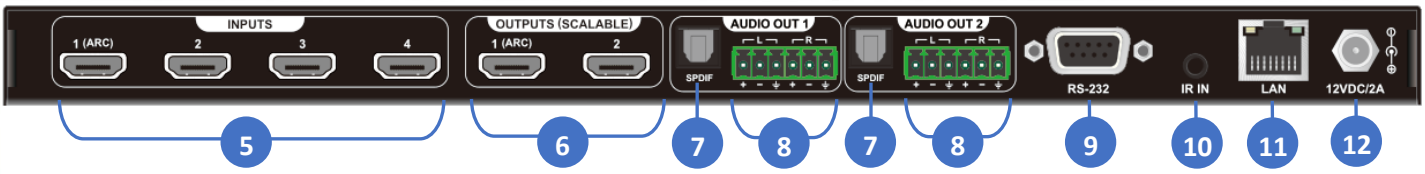
The Output button selects which of the two HDMI Outputs will be configured. Pressing the Output button will toggle its illumination between blue and red. If the Output button is illuminated blue, then HDMI Output #1 will be connected to the selected HDMI input. Conversely, red illumination will configure HDMI Output #2 to the selected HDMI input.

4 Power Button

Pressing this illuminated button will toggle between Active Mode (Blue) and low power Stand-By Mode (Red) when power is applied from the included 12V DC power supply connected to an electrical outlet.

In Stand-By Mode, no video will be present at the output and the audio will be muted. However, administration through Ethernet and RS-232 ports will still be active to wake up the SW-42Plus.

Rear Panel



5 HDMI Inputs

Connect the video sources to any of the four HDMI inputs, which corresponds to the HDMI Input Selection buttons 1-4 located in the front panel. Input #1 supports Audio Return Channel (ARC), and by default, should be connected to an ARC capable AVR or Soundbar.

Note: Zigen highly recommends the use of premium 4K certified HDMI cables when viewing UHD 60p 4:4:4 or UHD 60p HDR 4:2:2 video resolutions. Zigen offers these premium 4K certified cables in varying lengths from 3 meters to 9 meters.

6 HDMI Output

Connect displays to the HDMI Outputs. One of the selected inputs will route video and embedded audio to this output. ARC is supported on HDMI Output #1. If ARC is enabled from a SmartTV, then the ARC audio sourced by the SmartTV will be redirected to HDMI input #1 if an ARC capable Audio/Video Receiver (AVR) or Soundbar is connected (refer to **Figure 3: Typical Interconnect Diagram**).

ARC can be extracted from HDMI Output 1 even if an ARC supported AVR or SoundBar is not implemented in the system. In this case, the SW-42Plus becomes an Audio System to negotiate with the Smart TV to enable its ARC. This extracted ARC audio can be routed to the SW-42Plus audio outputs, even embedding the audio to HDMI Output 2. This is useful to allow audio sourced from SmartTVs to be sent to legacy AVRs (connected to Output #2), or any other sink devices, that do not support ARC.

7 SPDIF (TOSLINK) Output

The SPDIF (TOSLINK) optical ports will output the embedded audio from either the selected HDMI Inputs or from HDMI Output #1 ARC depending on the audio source selection on the ZigNet Web Interface. The SPDIF outputs supports 2-Channel PCM as well as surround sound formats like DOLBY Digital and DTS.

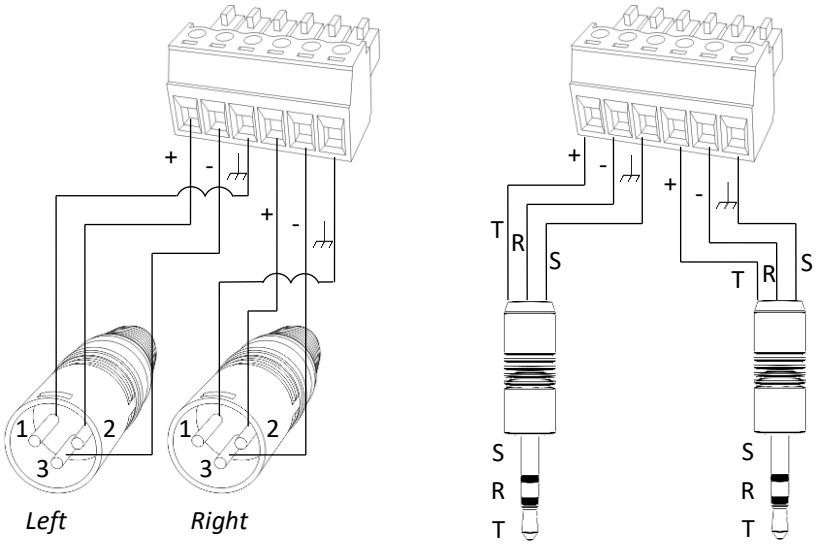
If HDMI Inputs are the source of the audio, then SPDIF optical port #1 mirrors the embedded audio of HDMI Output #1. Moreover, SPDIF optical port #2 mirrors the embedded audio of HDMI Output #2.

8 Balanced/Unbalanced Analog Audio Outputs

The Analog Audio Left/Right connectors will output analog audio from either the selected HDMI Inputs or from HDMI Output #1 ARC depending on the audio source selection on the ZigNet Web Interface. Only 2-Channel Stereo audio format is supported. Noise may be heard on the Analog Audio Outputs if audio EDID is configured for surround sound formats, such as 5.1, 7.1, Dolby Digital, DTS, etc.

Rear Panel

The Analog Audio Outputs can be configured for either Balanced or Unbalanced format depending on the wiring of the Phoenix connector and the configuration of the ZigNet Interface. The figures below depict the pin outs of Balanced or Unbalanced audio formats with differing audio connectors.



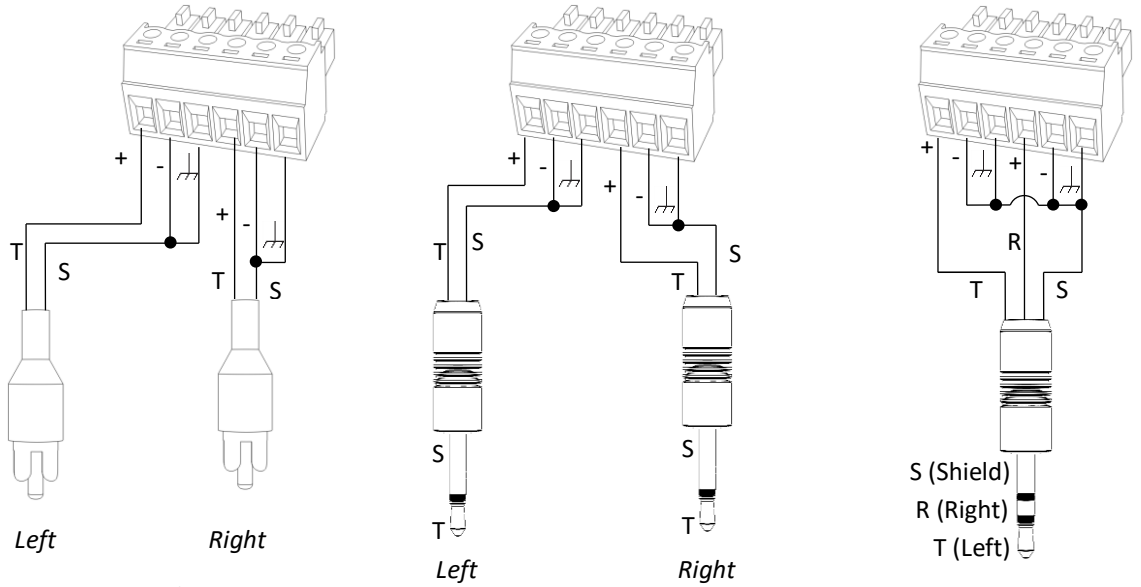
XLR Male – Audio Output

1 = Shield
2 = (+)
3 = (-)

TRS Phono Jack

T = (+)
R = (-)
S = Shield

Figure 1: Balanced (Professional-Level) Audio Pin Out



RCA Male

T = (+)
S = Shield

TS Phono Jack

T = (+)
S = Shield

TRS Stereo Phono Jack

T = (Left)
R = (Right)
S = Shield

Figure 2: Unbalanced (Line-Level) Audio Output Pin Out

Rear Panel

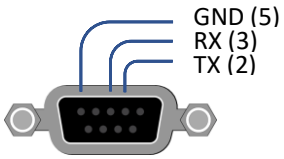
Ensure that the SW-42Plus audio setting in the ZigNet Web Interface is properly configured for either Balanced or Unbalanced audio. Refer to section **Audio Tab** for more information on the audio settings.

Important: *Ensure the SW-42Plus audio settings in the ZigNet Web Interface match the audio interface (Balanced or Unbalanced) wiring. Failure to do so may result in extremely high volume and possibly causing damage to speakers or other equipment.*

9 RS-232 Connection

An RS-232 connection is typically connected to a 3rd party Control System to configure the SW-42Plus. Communication through the RS-232 port is enabled in both Active and Standby Modes.
The default settings are:

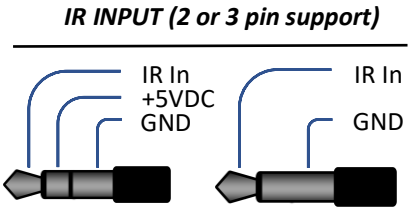
Baud Rate: 115,200
Data Bits: 8
Stop Bits: 1
Parity: None
Flow Control: None



For information on the RS-232 control port, refer to section **Configuring an RS-232 Connection**.

10 IR Input Connection

The IR Input Plug can be connected to an IR Receiver (3-pin Jack, 5V) or 3rd party Control Systems (2-pin Jack). The pin out for the IR connectors are as follows:



Refer to section **Infrared (IR) Protocol** for a list of available IR command protocols used to command the SW-42Plus.

11 Ethernet LAN Port

The Ethernet LAN port is a 100 Base-T connection to any router, switch, or directly to a computer. The SW-42Plus features a web graphical (webGUI) interface, called ZigNet. Hardware configuration, EDID management, and advanced diagnostics can all be accessed through ZigNet.

The Ethernet LAN also feature HTTP or Curl protocol to allow 3rd party Control Systems with appropriate drivers to control the SW-42Plus. Refer to section **Application Program Interface (API)** for more information.

Rear Panel

12 Power

The SW-42Plus requires 12VDC @ 2Amps to power the unit. Use the included power adaptor and ensure the locking ring is threaded snugly to prevent inadvertent disconnection of the power jack. Make sure all video, audio, and control ports are properly connected before applying power to the SW-42Plus.

4 Using the Front Panel

The front panel of the SW-42Plus has a set of four LED push button selectors, labeled HDMI 1-4, and are associated with each HDMI input connector on the rear of the unit. An Output button selects which HDMI output will be connected when an HDMI 1-4 button is pressed. If the Output button is illuminated blue, then HDMI output 1 is the active output to connect to an HDMI input. The connected HDMI input button will also illuminate blue. Conversely, if the Output button is pressed again and is illuminated red, then HDMI output 2 is the active output to connect to an HDMI input. The connected HDMI input button will also illuminate red. Press any HDMI Input button to select the desired input to route to the active HDMI output.

1. When the SW-42Plus is powered-on for the first time, Input 1 will automatically be selected.
2. Under normal conditions, the four input selector buttons will illuminate blue when the corresponding input is selected. However, all input selectors will flash simultaneously if a fault condition is detected.
3. The button labeled Power will illuminate blue when pressed after connecting power to the unit. Pressing the button again will put the unit in Standby and the button will illuminate red.

Example Front Panel Button sequence.

1.) Connecting HDMI Input #3 to HDMI Output #1

a. Press Output until blue illumination.
b. Currently connected HDMI Input Selection Button will be lit blue.
c. Press HDMI 3, this button will illuminate blue.

2.) Connecting HDMI Input #4 to HDMI Output #2

a. Press Output until red illumination.
b. Currently connected HDMI Input Selection Button will be lit red.
c. Press HDMI 4, this button will illuminate red.

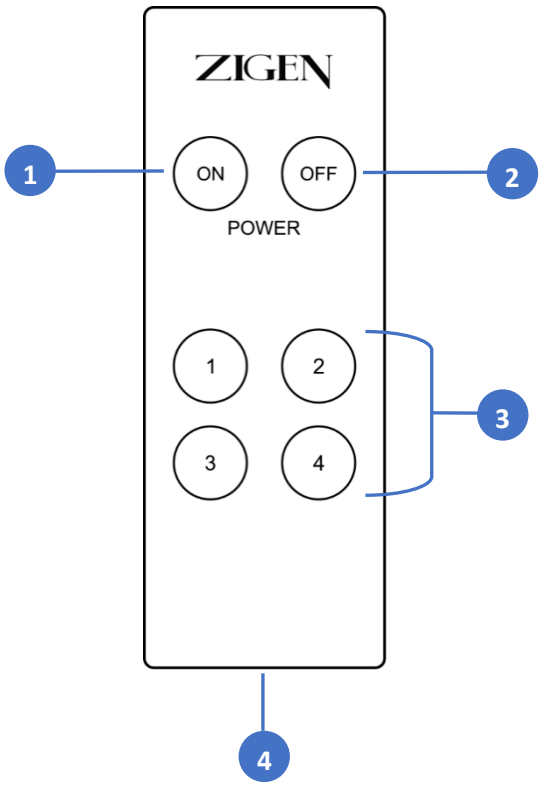
Reset to Factory Defaults

The SW-42Plus can Reset to Factory Defaults by pressing and holding **HDMI 1** and **Power** buttons at the same time for approximately 5 seconds. The front panel LEDs will scroll flash confirming the Factory Reset.

Note: *The unit's IP address will revert back to default static 192.168.0.10.*

5 IR Remote Control

The SW-42Plus IR remote control can be used for switching between inputs and powering the unit on or off.



1 On/Output Button

If the SW-42Plus is in a low power Stand-By mode, pressing the ON button will set the unit in Active Mode and resets the unit.

If the SW-42Plus is already in Active Mode, pressing the ON button will toggle between the Output selections. If the Output button is illuminated blue, then pressing the ON button will illuminate the Output button red. Pressing the ON button again will illuminate the Output button back to blue. The color of the Output button selects which of the two HDMI Outputs will be configured. If the Output button is illuminated blue, then HDMI Output #1 will be connected to the selected HDMI input. Conversely, red illumination will configure HDMI Output #2 to the selected HDMI input.

2 Off Button

Press the OFF Button to put the SW-42Plus in low power Stand-By mode. Press the ON button to wake up the unit.

3 Input Buttons 1-4

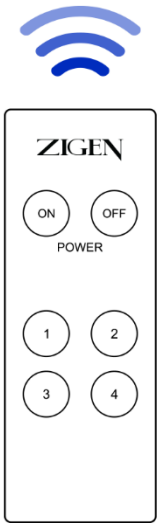
Press these buttons to select the desired input when performing routing operations. Each button corresponds to an accompanying HDMI port (1-4) on the back panel of the device.

4 Battery Compartment

Accepts one CR2025 Lithium Cell 3V Battery (included).

6 Using the IR Remote Control

When the SW-42Plus is powered-on for the first time, Input 1 will automatically be selected. Point the IR remote control unit at the IR sensor on the front panel. If an IR extender is being used, then both IR sensors will be used to receive IR signals.



Example IR Remote Control sequence to connect an HDMI Input to an HDMI Output. The SW-42Plus is already in Active Mode.

1.) **Connecting HDMI Input #3 to HDMI Output #1.**
   a. Using the IR Remote Control, press the ON button until the OUTPUT button on the front panel is illuminated blue.
   b. Press Input 3.

2.) **Connecting HDMI Input #4 to HDMI Output #2**
   a. Using the IR Remote Control, press the ON button until the OUTPUT button on the front panel is illuminated red
   b. Press Input 4.

7 Installation

Video

1. Use HDMI cables to connect UltraHD sources to the Inputs on the back panel of the unit.

2. Use an HDMI cable to connect a display to the Output on the back panel of the unit.

   The HDMI cable can then be connected in any of the following ways:
   - Connect the HDMI cable to an Ultra HD display.
   - Connect the HDMI cable to another Zigen switch or splitter, for cascading purposes.

   Note: Zigen highly recommends the use of premium 4K certified HDMI cables when viewing UHD 60p 4:4:4 or UHD 60p HDR 4:2:2 video resolutions. Zigen offers these premium 4K certified cables in varying lengths from 3 meters to 9 meters.

Audio

1. Determine desired Audio output type: Balanced or Unbalanced.

Wire the appropriate Audio connectors to the included Phoenix plug in accordance with the diagram on **Figure 1: Balanced (Professional-Level) Audio Pin Out** or **Figure 2: Unbalanced (Line-Level) Audio Output *Pin Out***.

2. Connect the Audio connectors to appropriate Multi-Zone Amplifiers, AVRs, and/or Mixers.
3. On ZigNet, configure Audio Output Type parameter, Balanced or Unbalanced, and ensure the selection matches the wiring of the Analog Audio Ouput Phoenix connectors.

Important: *Ensure the SW-42Plus audio settings in the ZigNet Web Interface match the audio interface (Balanced or Unbalanced) wiring. Failure to do so may result in extremely high volume and possibly causing damage to speakers or other equipment.*

Power

1. Connect the included 12VDC@2A locking power supply to the 12V DC power receptacle on the rear panel of the switch.

2. Connect the power supply to an electrical outlet.

IMPORTANT: Ensure that all video, audio, and control port interconnects are properly connected before applying power to the unit. Failure to do so could cause irreparable damage to the unit or cause injury to installers and end-users.

Interconnect Diagram Example

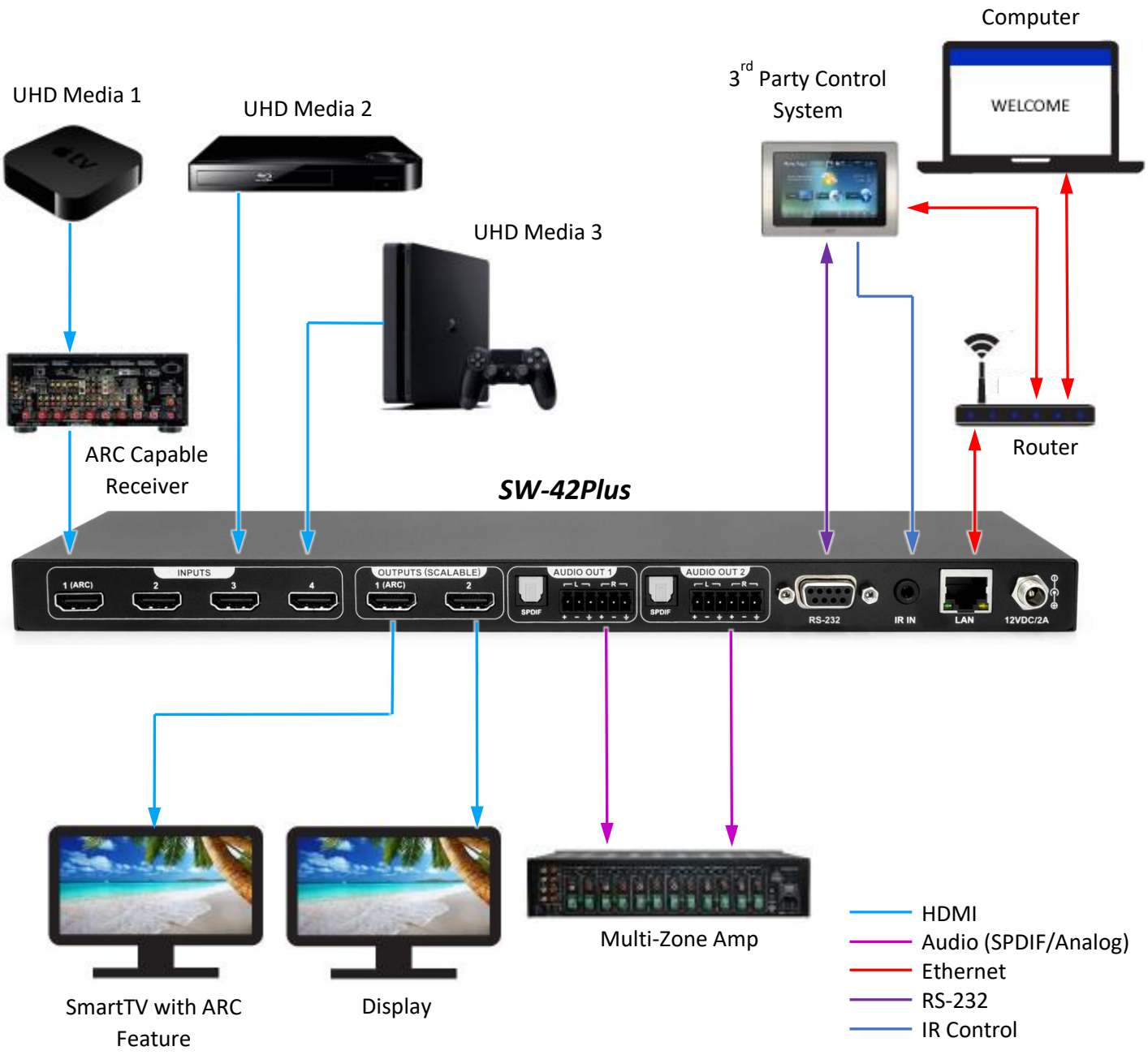


Figure 3: Typical Interconnect Diagram

9 ARC Support

Audio Return Channel (ARC) is a feature where a display can send audio back to an Audio/Video Receiver (AVR) or Soundbar using the display's existing HDMI cable. Any HDMI cable can be used to transmit ARC and no additional audio cables, such as TOSLINK or RCA, are required. Audio to be sent through the ARC channel can be sourced from the display's numerous HDMI Inputs or, in the case of a SmartTV, built-in Apps such as Netflix®, or YouTube®.

There are two ways to connect the SW-42Plus to make the unit work with ARC. In both methods, a SmartTV is the ARC source and is connected to the SW-42Plus Output #1. **Figure 3** shows a typical interconnect where an ARC featured AVR is connected to HDMI Input #1. In this method, the SW-42Plus becomes a passive device and directly passes all CEC and ARC traffic from HDMI Output #1 to HDMI Input #1. ARC negotiation and CEC control are performed directly between the Smart TV and the AVR. The SW-42Plus can intercept the ARC audio and redirect it to the unit's audio output interfaces. The SW-42Plus can decode ARC and re-embed this audio to HDMI Output 2. This is useful to allow ARC featured SmartTVs to output its audio stream to multi-zone amplifiers or legacy AVRs without ARC support. ARC redirection to audio output interfaces is enabled using the ZigNet interface.

Figure 4 shows an interconnect where no ARC featured AVRs or SoundBars are implemented in the system. In this second method, the SW-42Plus becomes an Audio System and will negotiate with the SmartTV to enable its ARC. The SW-42Plus will extract the ARC audio and can redirect it to the unit's audio output interfaces as well as HDMI Output #2. ARC redirection to audio output interfaces is enabled using the ZigNet interface.

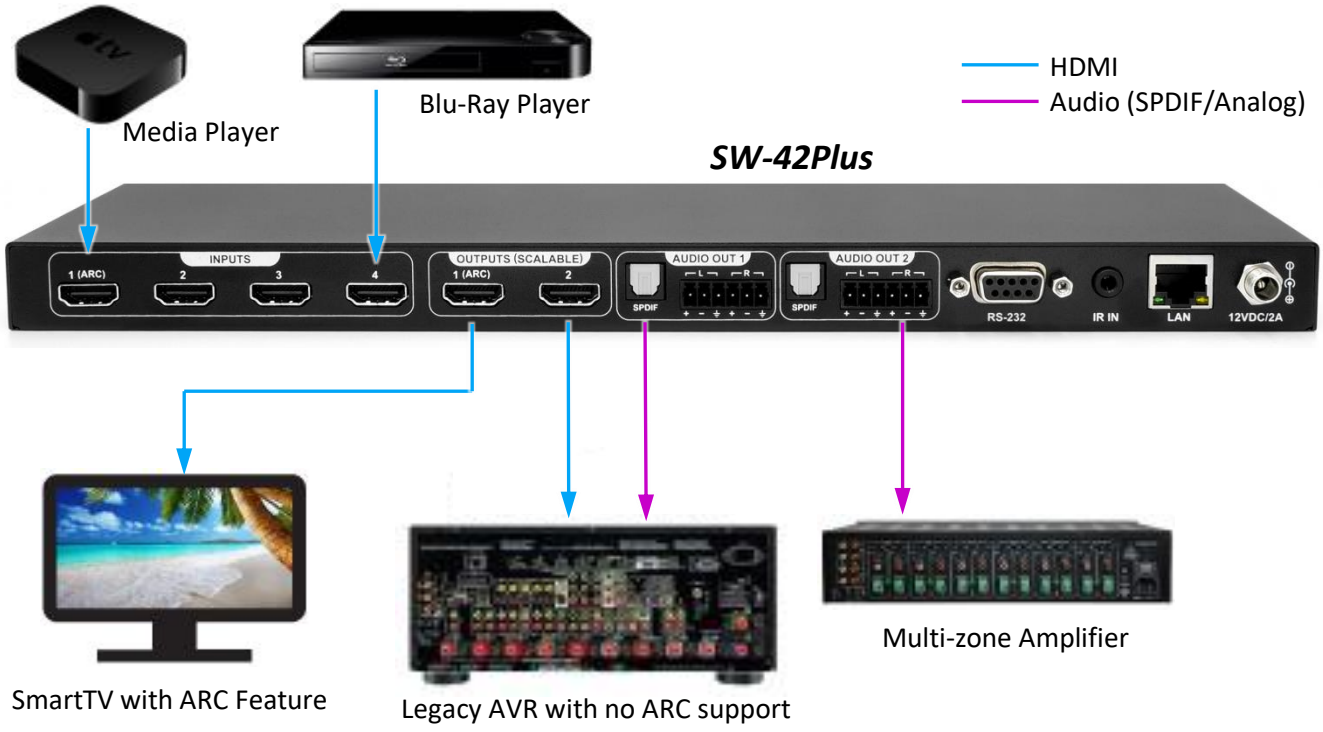


Figure 4: Interconnect using ARC featured SmartTVs with Legacy Audio/Video Receivers.

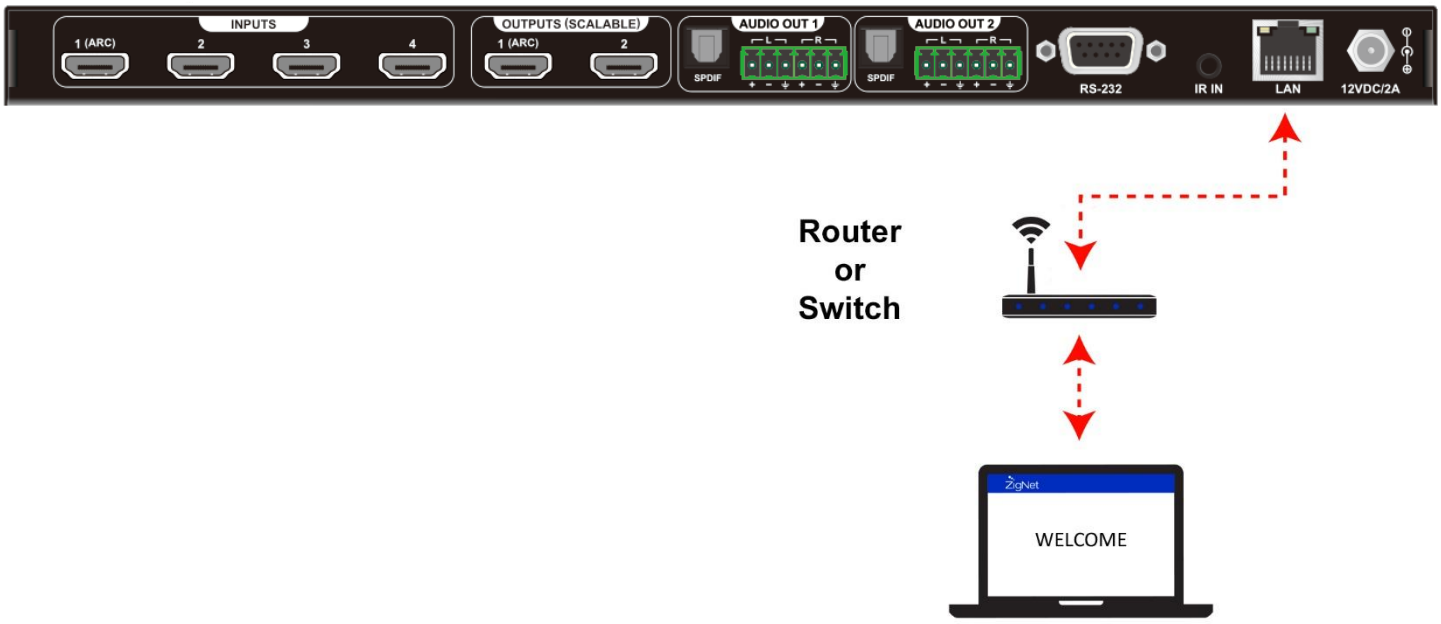
10 Connecting to ZigNet

ZigNet is the SW-42Plus Web-based Graphical User Interface (webGUI) for control and management of the device. To access ZigNet, the SW-42Plus must be connected to the same network LAN as a computer with a web browser. There are two network options to connect the SW-42Plus to a computer.

> ***Note**: The SW-42Plus factory default IP Address is set to static 192.168.0.10. Configure the computer on the same network LAN to access the ZigNet webGUI.*

Network Setup Option 1:

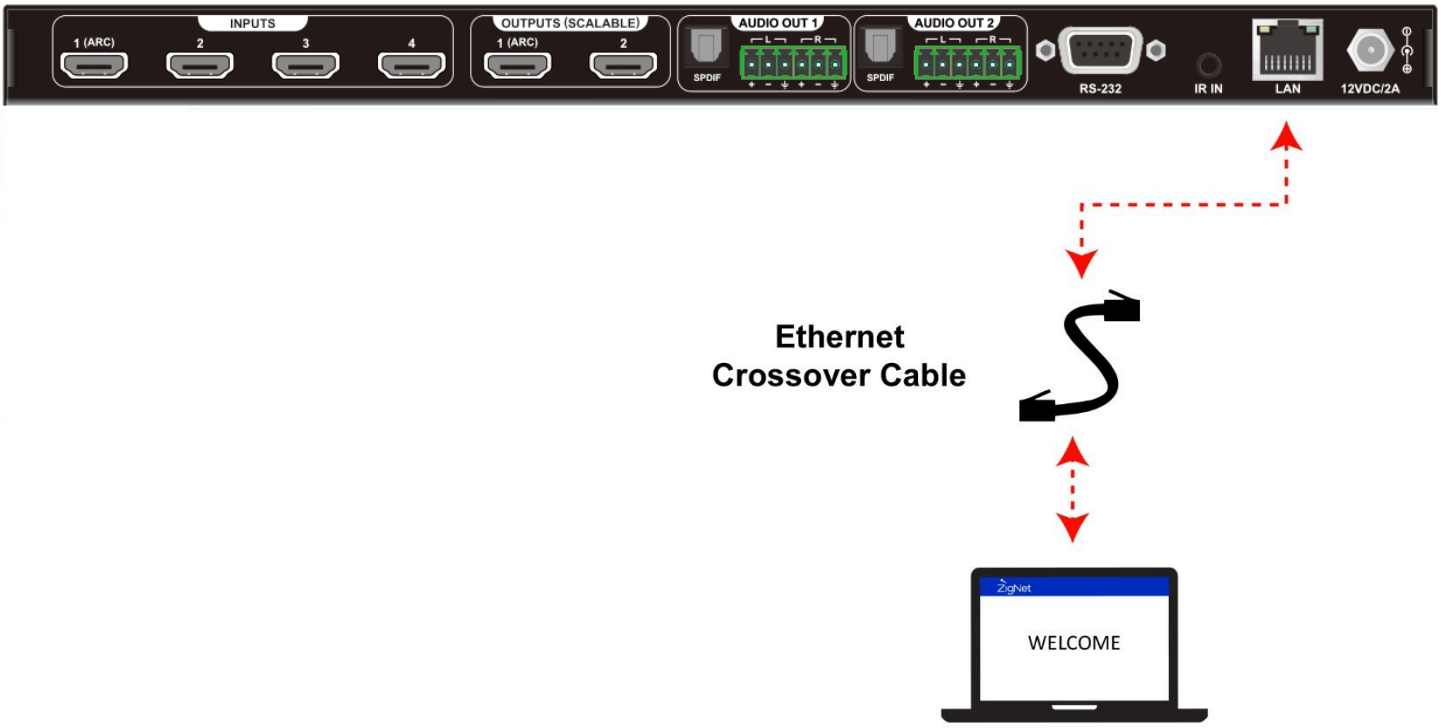
Connect the unit and computer to a router or switch with built-in DHCP Server.



Connecting to ZigNet

Network Setup Option 2:

Connect a computer directly into the unit by using an Ethernet Category 5 or better cable.



Accessing ZigNet

Download the application ZigNet-Finder from the Zigen Website. Download the ZigNet-Finder that is proper with your computer's Operating System such as Windows, OSX, or Linux.

Install ZigNet-Finder then run the application. Click the SEARCH button to find any network connected Zigen devices. Find the proper SW-42Plus unit and note its IP Address and Hostname.

***Note**: ZigNet-Finder will find network connected Zigen devices even though the unit is on a different Ethernet subnet as the computer. However, the computer and the SW-42Plus must be on the same Ethernet subnet to access the ZigNet webGUI.*

Open the computer's web browser, enter the SW-42Plus IP Address in the web browser's Uniform Resource Locator (URL) field.

> ***Note**: Instead of entering the SW-42Plus IP Address, the unit's Hostname (appended with ".local") can be entered on the web browser's URL field. For example, if the Hostname of the unit is "SW42-0000", then enter "SW42-0000.local" on the URL field.*

Using ZigNet

ZigNet provides easy management of all features used by the SW-42Plus.

ZigNet is a highly functional web server that is accessible either remotely across the Internet or directly with a connection between a personal computer on a local area network, or a connection directly to the Ethernet connector on the back panel of the unit.

With ZigNet, you are in full control. Managing all of the excellent features Zigen products have to offer is just a click away with a built in and free web interface. Use any Web Browser to view features like Video Matrix, Audio Matrix, Diagnostics and Control pages. The new Diagnostics page allows an operator to monitor the health and disposition of the system. So, say goodbye to bulky and expensive analyzer tools forever.

The new Plus Series products are the first to include this web interface. ZigNet is a powerful tool that brings ease to managing and maintaining the installed Audio/Video infrastructure.

ZigNet truly works for you.

Navigation Bar

From the navigation bar, select the appropriate tab to get to the corresponding page. The highlighted icon and underlined text indicate the page of the selected tab.

Video Tab

Allows the user to switch the inputs for the output and manage EDID settings.

Audio Tab

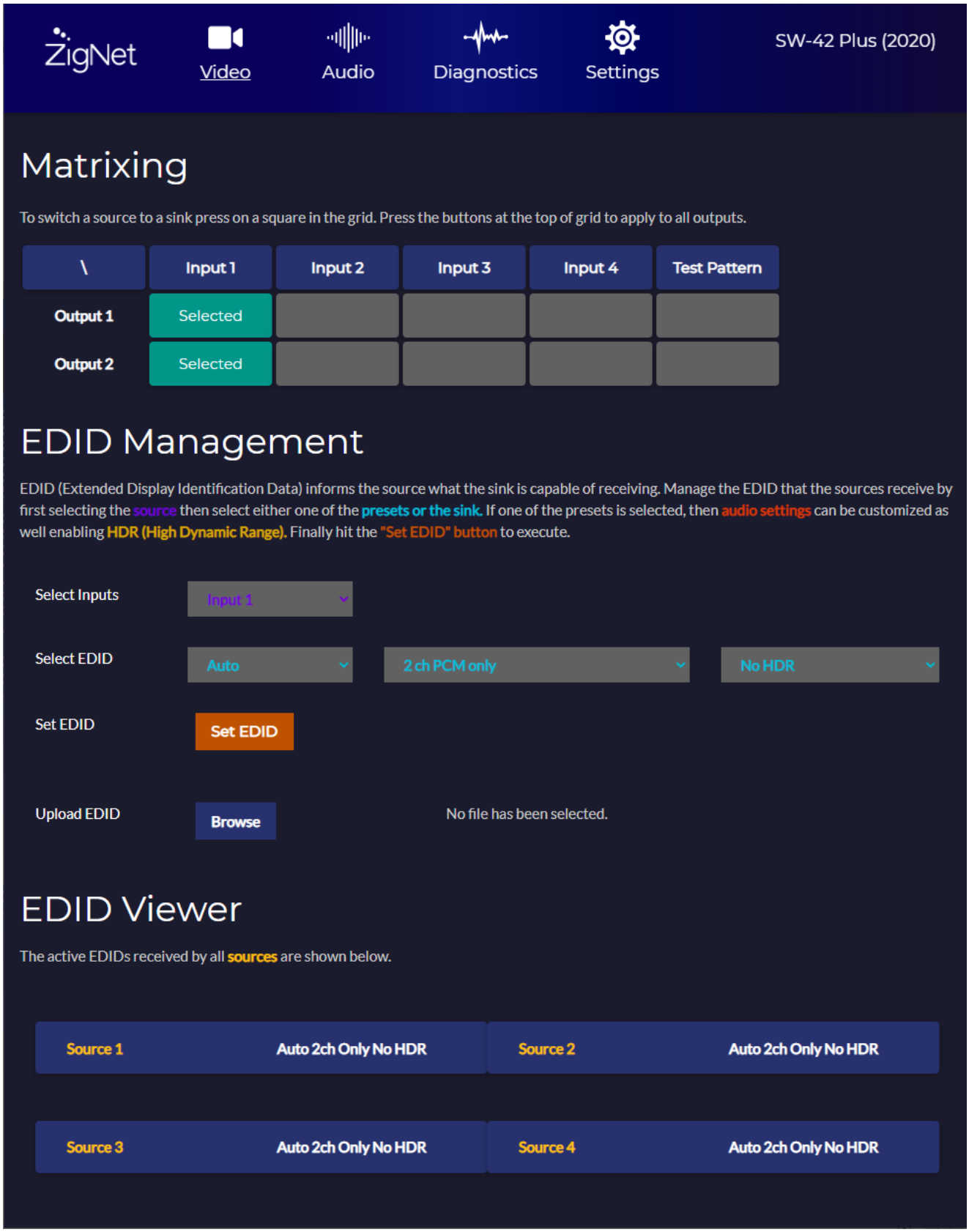
Allows the user to manage audio settings.

Diagnostics Tab

Allows the user to monitor video signals and system vitals.

Settings Tab

Displays the unit's Hardware and Firmware revisions. Allows the user to change network settings and update the latest firmware if available. The SW-42Plus can only detect the availability of current firmware if the unit has access to the Internet through its network port.



Matrixing

This section is used to map an HDMI Output to and HDMI Input. Click on the appropriate rectangle on the matrix to connect an output to an input. Clicking on a top row labeled "Input" will map this column to all the outputs. Clicking on the top row labeled "\" will map Input 1 to Output 1 and Input 2 to Output2.

A fixed Test Pattern video can also be selected to either outputs. The Test Pattern can be utilized as a substitute for an input source to aid in troubleshooting an installation. Different Test Patterns with varying resolutions and bit depths can be configured (see section **Test Pattern**).

EDID Management

EDID (Extended Display Identification Data) informs the HDMI source what the HDMI sink (Display) is capable of receiving (refer to Diagnostics section **EDID Selection** for a complete list of EDID information transmitted by the sink).

Manage the EDID that the sources receive by first clicking on the "Select Inputs" pulldown and selecting the desired HDMI input.

Next, click on the "Select EDID" pulldown and choose any following selections:

Select EDID	Description
1080p60	SW42-Plus built-in 1080 lines/Progressive/60 FPS video resolution
2160p30	SW42-Plus built-in 2160 lines/Progressive/30 FPS video resolution
2160p60	SW42-Plus built-in 2160 lines/Progressive/60 FPS video resolution
Auto	If a sink is matrix connected to a source, the sink's EDID is sent to the source. If two sinks are connected to the same source, the SW42-Plus selects the sink EDID with the best resolution and downscales the other sink if required.
Follow Output	If a sink is matrix connected to a source, the sink's EDID is sent to the source. If two sinks are connected to the same source, the SW42-Plus selects the sink EDID with the lower resolution.
Sink 1	The source will use the Sink 1 EDID (the display connected HDMI Output 1)
Sink 2	The source will use the Sink 2 EDID (the display connected HDMI Output 2)
Custom 1	The source will use the first custom EDID file if it has been uploaded.
Custom 2	The source will use the second custom EDID file if it has been uploaded.
Custom 3	The source will use the third custom EDID file if it has been uploaded.
Custom 4	The source will use the fourth custom EDID file if it has been uploaded.

Next, select the audio formats compatible with the installation. The audio formats range from 2-Channel PCM up to 8-Channel Dolby/DTS.

Select whether the source should output High Dynamic Range (HDR). This depends on the HDR capability of the displays.

Lastly, click “Set EDID” and the SW-42Plus will send the configured EDID information to the appropriate sources. The displays may temporarily go to black as EDID negotiation is handled between the SW-42Plus and the sources.

To upload Custom EDID files, click the “Browse” button next to Upload EDID. A pop-up folder (depending on the Operating System of the computer) will appear. Navigate to the proper directory and select the Custom EDID file stored in the computer. If the Custom EDID file is the proper format, the “Browse” button will change to “Upload”. Click the Upload button and a pop-up message will confirm the successfully uploaded file.

Click the “Upload EDID Browse” button to choose a Custom EDID file stored on the computer. Depending on the computer’s operating system, a file browser will open to allow the user to select a proper EDID file (256-byte binary file format). Once an EDID file is selected, click the Upload button then a pop-up window will indicate a successful upload. Up to four Custom EDID files can be uploaded to the unit. Clicking on the “Select EDID” button will now show the new Custom EDID file(s) on the dropdown list.

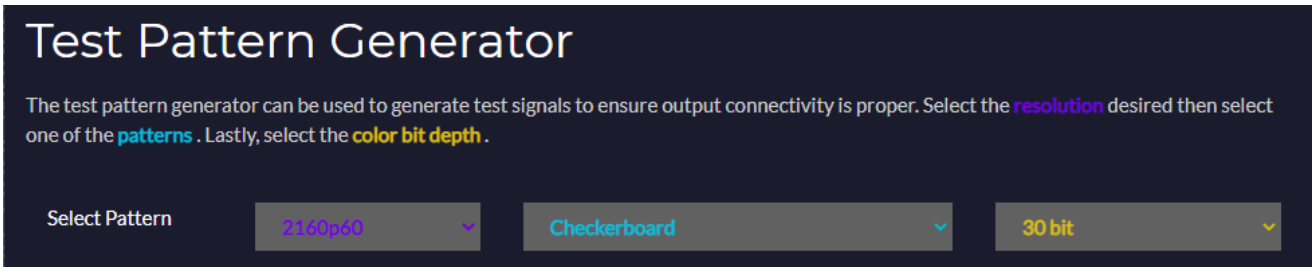
EDID Viewer

The EDID Viewer table shows the active EDID selected for each source. To change the active EDID, use the EDID Management section to configure an available EDID for each source. The default active EDID for all sources is “Auto, 2ch PCM Only, No HDR”.

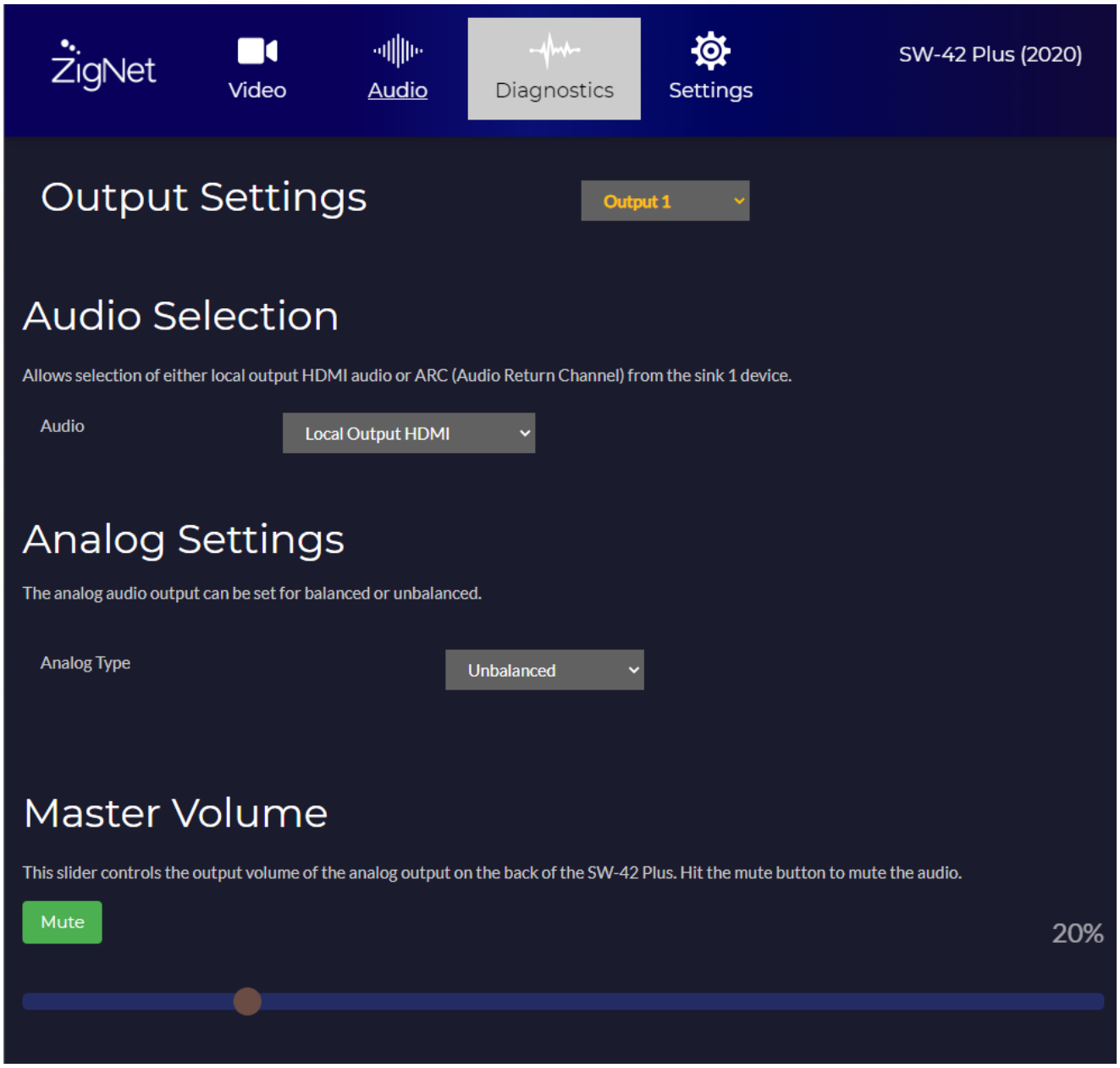
Test Pattern

The SW-42Plus features a built-in Test Pattern generator containing 12 different signals with varying resolutions and bit depths. The Test Patterns can be used as a substitute to video sources when troubleshooting installations. Test Patterns can output to either HDMI Outs by selecting Test Pattern in the video matrix table. If a Test Pattern is selected, the Test Pattern Generator configuration will appear on the ZigNet webGUI. Use the Test Pattern Generator pull-down menus to configure the video resolution, video type, and bit depth.

Selecting any Inputs (1-4) on the video matrix table will disable the Test Pattern Generator.

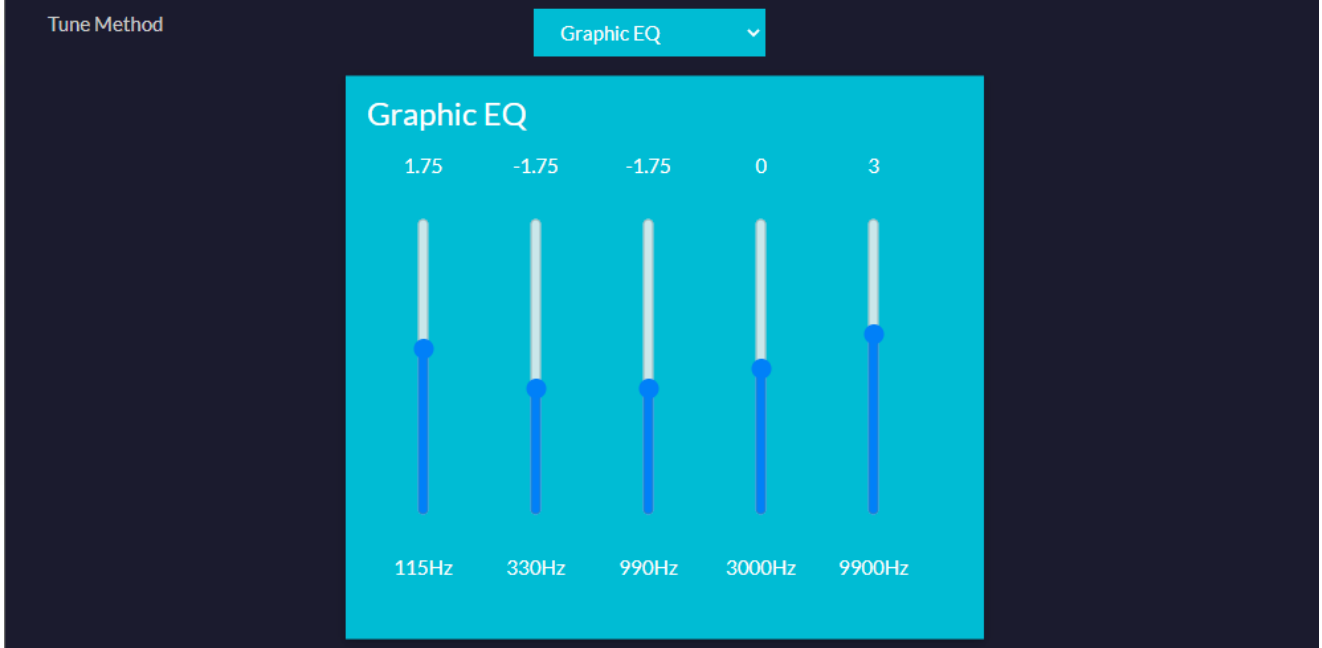


ZigNet Audio



Equalizer

The audio equalizer can be controlled by three different tuning methods. Select presets to pick a preprogrammed parametric equalizer setting such as 'Acoustic'. Or select graphic EQ to fine tune each filter in a 5 band equalizer. Lastly, a simple tone control tuning method can be enabled to set bass and treble.

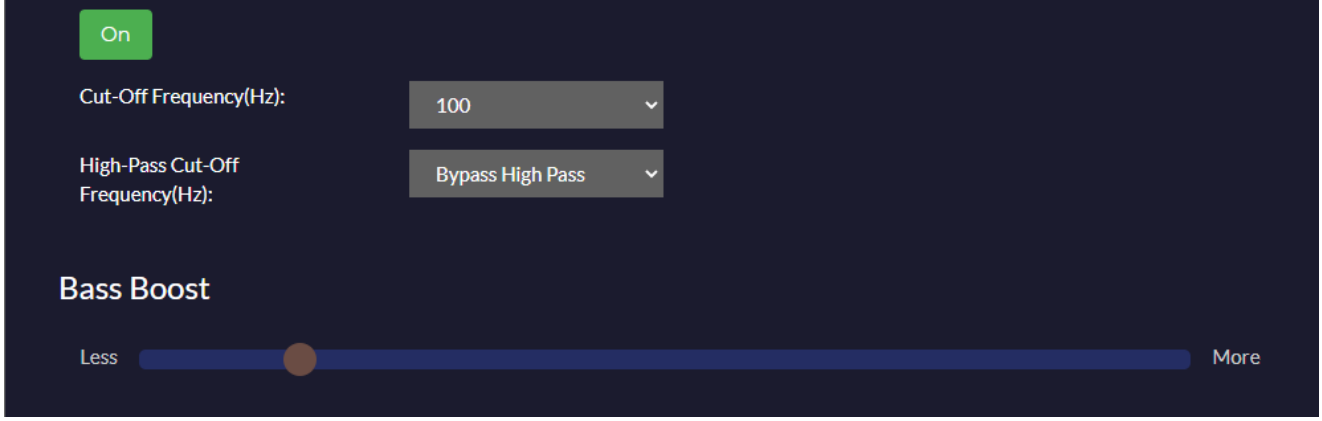


Surround Sound Effect

Enable this option to apply a spatial surround sound effect to the output audio. Note that this does not affect the audio embedded in the HDMI link.

Bass Enhancement

Enable this option to add a deeper bass to the audio output. Select the cut-off frequency and whether to bypass the high pass filter. Then use the bass boost slider to adjust the bass boost level.



Output Settings

There are two audio outputs labeled Audio Out 1 and Audio Out 2. Each Audio Out has a set of SPDIF (TOSLINK) and Analog Audio connectors. Audio Out 1 mirrors the audio heard from HDMI Output 1, while Audio Out 2 mirrors the audio heard from HDMI Output 2.

> ***Note:*** *The Analog Audio outputs only support 2-Channel PCM. If the source's audio is outputting a surround sound format such as 6-Channel Dolby, noise may be heard on the Analog Audio output.*

The Audio tab controls the SW-42Plus Audio Digital Signal Processing (DSP) functions available for the Analog Audio outputs. DSP functionality is not available for the SPDIF and HDMI Outputs. Use the "Output Settings" pull-down to select which Analog Audio Out is being controlled.

Audio Selection

The Audio Selection pulldown will determine the source of the audio to be heard on the HDMI Outputs, TOSLINK Outputs, and Analog Audio Outputs. Select Local Output HDMI to listen to the audio coming from the selected HDMI Inputs. Select Output 1 ARC to listen to the audio coming from a SmartTV connected to HDMI Output 1 (refer to section **9 ARC Support** for more information on enabling system ARC functionality).

Analog Settings

This control configures and Analog Audio type for either Professional-level Balanced or Line-Level Unbalanced. Use the "Analog Type" pull-down menu to select **Balanced** or **Unbalanced**. The wiring of the Analog Audio Output must match the setting of the Analog Type (refer to section **Balanced/Unbalanced Analog Audio Outputs** for a description of the Phoenix connector wiring).

> ***Important:*** *It is crucial that Analog Type is properly configured based on the wiring of the Analog Audio Output of the SW-42Plus. The Analog Type setting must also match the audio input interface of the receiving device. For example, if the receiving device input is Line-Level Unbalanced, and the Analog Type is configured for Balanced mode, the SW-42Plus will over-drive the receiving device with very high audio levels, possibly causing damage to speakers or other equipment.*

Master Volume

Use slider and Mute button to control the volume of the Analog Audio output. TOSLINK and Embedded audio of the HDMI output will not change. The default Master Volume is 20%.

Equalizer

The Equalizer only controls the frequency response of the Analog Audio output. TOSLINK and Embedded audio of the HDMI output will not change.

1.) Disabled: Bypass Equalizer tuning.
2.) Presets: Select a preset to configure the parametric equalizer
3.) Graphical EQ: Use the sliders to configure dB levels for each frequency band.
4.) Tone Control: Use the sliders to set bass and treble.

Surround Sound Effect

The Surround Sound Effect only controls the spatial response of the Analog Audio output. TOSLINK and Embedded audio of the HDMI output will not change.

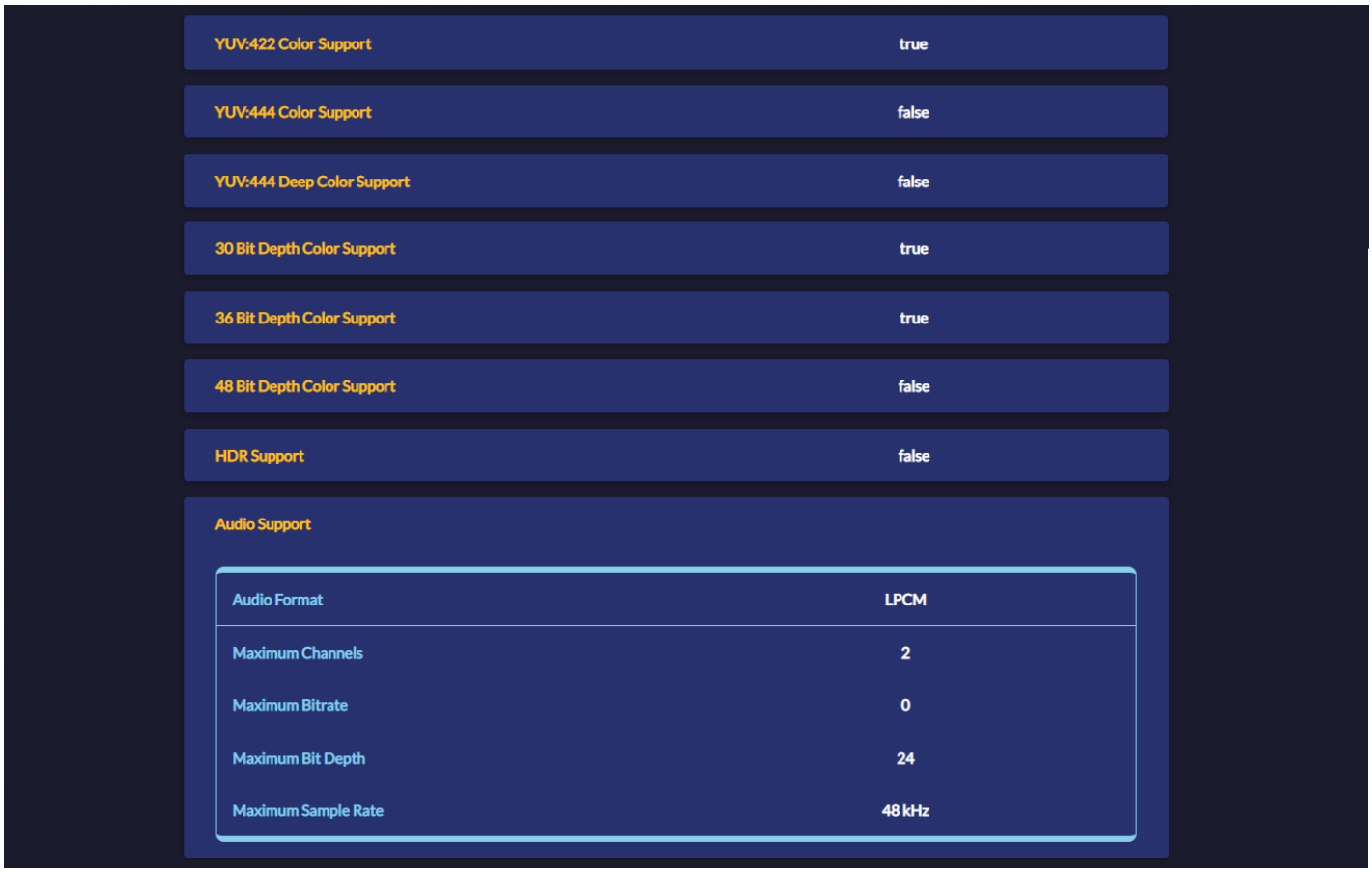
Use the On/Off toggle and slider to configure the desired surround sound effect.

Bass Enhancement

The Bass Enhancement only controls the bass response of the Analog Audio output. TOSLINK and Embedded audio of the HDMI output will not change.

Use the drop-down menus to configure the cut-off frequency and high-pass filter cut-off frequency. The high-pass filter can also be bypassed. Use the Bass Boost slider to set the bass levels.

ZigNet Diagnostics



Source and Sink Diagnostics

Diagnostics displays the status and parameters of the HDMI Input, Outputs and the disposition of the system. The Source and Sink Diagnostic Specifications are explained in the table below.

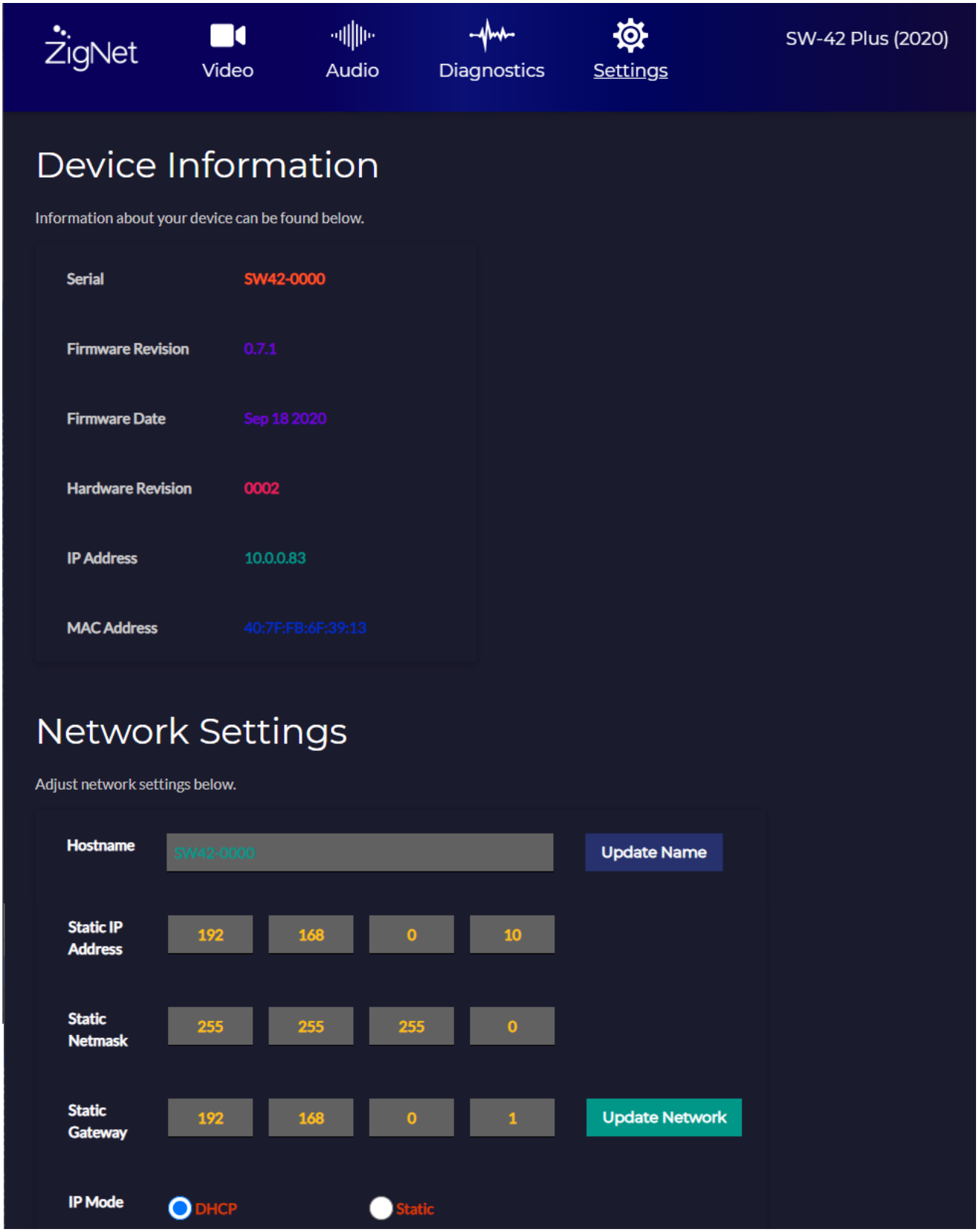
Source Link	Indicates if a source is connected to the unit's HDMI input.
Sink Link	Indicates if the unit's HDMI output is connected to a sink (display).
Video Stable	Indicates if the incoming video is valid and stable.
Signal Stable	Indicates if the incoming HDMI input is receiving TMDS signals from a source.
HDCP Status	Indicates the HDCP authentication status of the selected input and output.
Resolution	Indicates the video resolution of the selected input and output.
Scan Type	Indicates whether the video is interlace or progressive.
Frame Rate	Indicates the frame rate of the selected input and output.
Color Format	Indicates if the incoming video is RGB 444, YUV444, YUV422, or YUV420.
Color Bit Depth	Indicates if the incoming video is 8, 10, 12, or 16 bits of quantization.
Pixel Clock	Indicates the pixel clock frequency of the incoming and outgoing video.
Audio Type	Indicates the audio type of the incoming HDMI audio such as LPCM.
Audio Sample Rate	Indicates the incoming and outgoing audio sample rate frequency.
Audio Channels	Indicates the number of incoming and outgoing audio channels

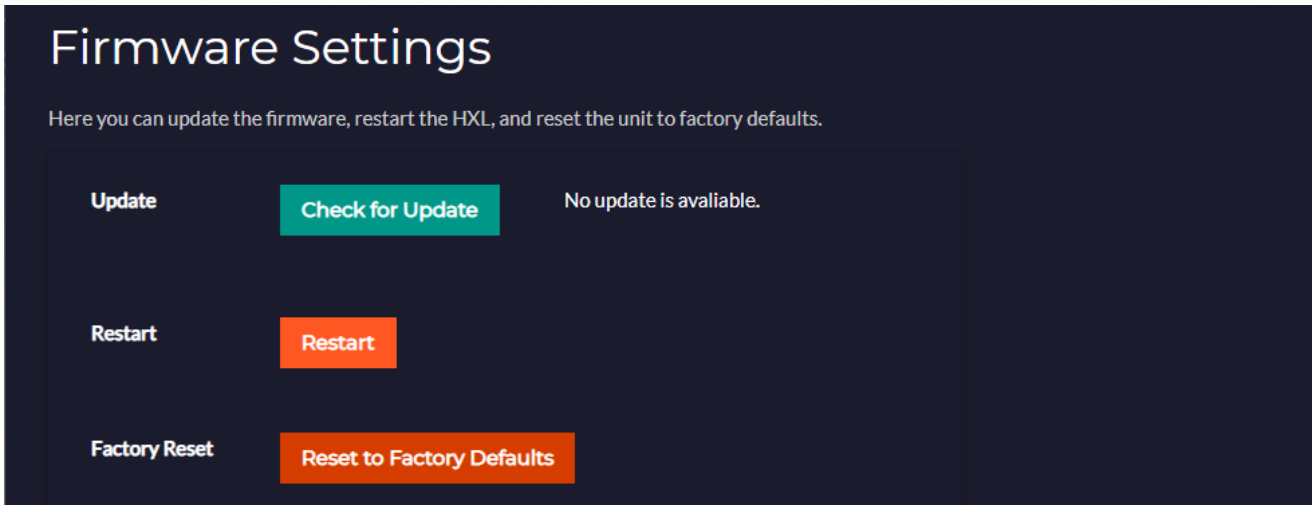
EDID Selection

Use the EDID Selection pull-down button to view the desired Sink EDID information. The EDID Specifications are explained in the table below.

Monitor Name	Indicates the model name of the monitor specified in the EDID data.
CEC Physical Address	Indicates the CEC Physical address as specified in the EDID data.
Horizontal Pixels	Indicates the monitor's native Horizontal Pixels.
Vertical Pixels	Indicates the monitor's native Vertical Pixels.
Framerate	Indicates the native refresh rate of the monitor shown in Hertz.
Scan Type	Indicates the native scan type specified as progressive or interlaced.
Maximum Pixel Clock	Indicates the monitor's maximum supported pixel clock shown in MHz.
YUV:422 Color Support	Indicates if the monitor is capable of supporting YUV 422 color space.
YUV:444 Color Support	Indicates if the monitor is capable of supporting YUV 444 color space.
YUV:444 Deep Color Support	Indicates if the monitor is capable of supporting Deep Color Space.
30 Bit Depth Color Support	Indicates if the monitor is capable of 30-bit quantization.
36 Bit Depth Color Support	Indicates if the monitor is capable of 36-bit quantization.
48 Bit Depth Color Support	Indicates if the monitor is capable of 48-bit quantization.
HDR Support	Indicates if the monitor is capable of displaying High Dynamic Range.
Audio Support	Indicates all the monitor's audio format capabilities (LPCM, Dolby Digital, Dolby Digital Plus, etc), Maximum Audio Channels, Maximum Bitrate, Maximum Bit Depth, and Maximum Sample Rate.

ZigNet Settings





Device Information

Serial: Indicates the SW-42Plus serial number.
Firmware Revision: Indicates the current firmware of the unit.
Firmware Date: Indicates the build date of the installed firmware.
Hardware Revision: Indicates the current hardware revision of the SW-42 Plus.
IP Address – Indicate the current IP Address of the unit. This can be changed below by the user.
MAC Address – Indicates the MAC address of the hardware.

***Note**: The MAC address of the unit is unique and cannot be changed.*

Network Settings

Hostname: Type desired host name and press Update Name. The source name could be device type or location (default Hostname is **SW42-0000**).

The Hostname (appended with ".local") can be entered on a computer's web browser to access the SW-42Plus ZigNet webGUI. The computer must be on the same Ethernet subnet as the SW-42Plus to access ZigNet. Using the default Hostname as shown above, type the following on the URL address of the computer's web browser to access ZigNet: **www.sw42-0000.local**

***Note**: If ZigNet is not accessed after typing the hostname (appended with ".local") on the web browser's URL address field, make sure that the computer is on the same Ethernet subnet as the SW-42Plus. Use the application ZigNet-Finder to determine the IP Address and Hostname of the SW-42Plus then type this IP Address on the web browser's URL field.*

IP Address, Static Netmask, Static Gateway, and IP Mode: Enter the IP Address, Netmask, and Gateway fields if the desired IP Mode will be set to Static. If DHCP is selected, then the network settings will be automatically configured by the DHCP Server. If DHCP is selected but no DHCP Server is found, the SW-42Plus will automatically assign network configuration using Auto-IP. Click Update Network upon completion.

***Note**: The SW-42Plus factory default IP Address is set to static 192.168.0.10. Configure the computer on the same network LAN to access the ZigNet webGUI.*

***Note**: Use the ZigNet-Finder application to determine the IP Address and Hostname of the SW-42Plus if DHCP mode is selected.*

Firmware Settings

Update: If the SW-42Plus is connected to the Internet through its Ethernet port, the unit will be able to determine if there is a new firmware version available. If "Update available" is indicated, press the Update button and wait for the unit to complete the programming process.

***Important**: Do not turn off the unit or disrupt the Internet connection while the unit is programming. In the event of an unsuccessful firmware update, the unit will revert back to its previous firmware version.*

Restart: This button restarts the unit but retains the existing system settings.

Factory Reset: Allows the unit to restore all settings back to factory defaults.

***Note**: The SW-42Plus will revert back to default static IP Address 192.168.0.10 when restoring back to factory defaults.*

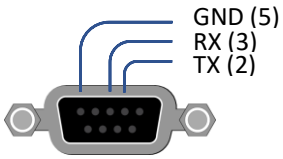
***Note**: The SW-42Plus Factory Reset can be invoked by simultaneously pressing HDMI 1 and Power buttons on the front panel for approximately 5 seconds. The front panel LEDs will scroll flash confirming the Factory Reset. The unit's IP address will revert back to default static 192.168.0.10.*

11 RS-232

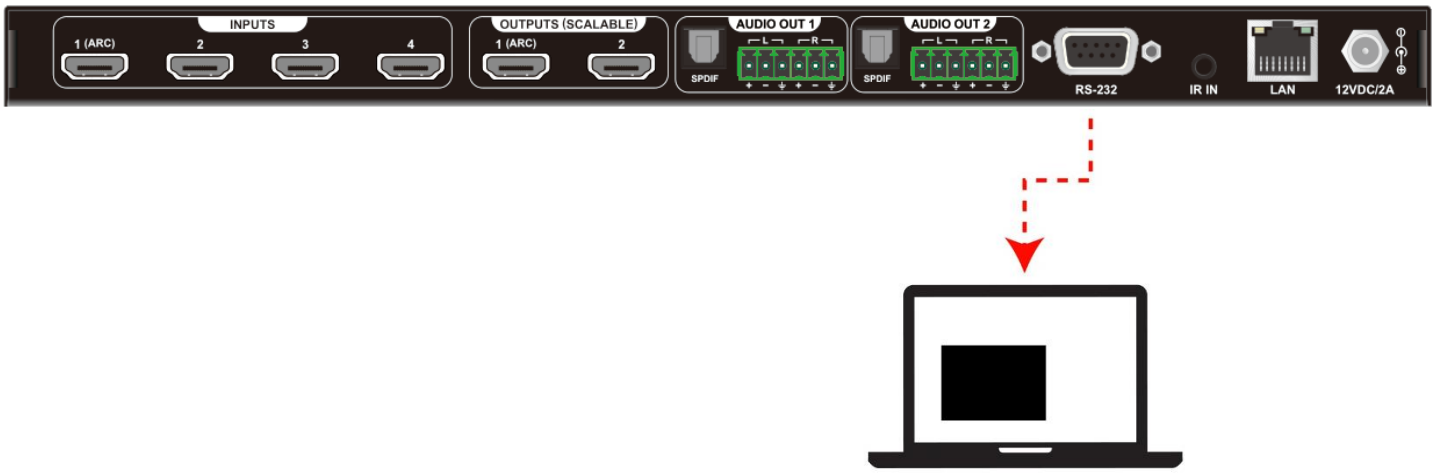
Configuring an RS-232 Connection

1. Connect the RS-232 port on the back of the SW-42Plus to a computer using an RS-232 cable.
2. Open a hyper-terminal app of your choice (Putty recommended) on a computer.
3. Enter default settings shown below:

   Baud Rate: 115200
   Data Bits: 8
   Stop Bits: 1
   Parity: None
   Flow Control: None



4. Your unit should now be connected.



12 RS-232 Control

The RS-232 Control port can be used to control the SW-42Plus device using a 3rd party Control System or a computer running a Terminal emulator such as Putty, or Tera Term. The system status of the unit can also be determined through this serial port.

Upon boot time, the SW-42Plus will display the following status:

ZIGEN SW42 Plus
0.7.1 (Sep 18 2020)
SW42-0000
IP address: 10.0.0.10
Netmask: 255.255.255.0
Gateway: 10.0.0.1

The table below describes the RS-232 Control protocol. Every command must end with the special character "Line Feed <LF> (ASCII Hex code 0x0A)".

Command	Syntax	Description
Help	help<LF>	Shows a list of available commands.
Version	version<LF>	Shows product name, firmware release, version, build date, and serial number.
System Info	sysinfo<LF>	Shows product name, firmware release, version, build date, serial number, and network information.
Get Network	getnet<LF>	Displays the current IP address, netmask, and gateway if resolved.
Device Status	status<LF>	Shows connected monitors and sources.
Switch	switch <0-2> <1-4><LF>	Allows to switch the video output to a desired input. Use 0 for all output.
Set EDID	set edid <0-4> <0-10><LF>	Allows to set the EDID for a specific Source Input 0-4. Use "0" to configure all Source Inputs to the selected Sink EDID. **Sink EDID Assignment:** • 0-2: Built-In EDID (1080p60/ 2160p30/2160p60) • 3: Auto • 4: Follow Output • 5: EDID from Sink 1 • 6: EDID from Sink 2 • 7-10: Uploaded Custom EDID files if exists.
Volume Up	vol+ out <0-2><LF>	Allows to increase the volume of the Analog Audio output. Use 0 for all outputs.

Volume Down	vol- out <0-2><LF>	Allows to decrease the volume of the Analog Audio output. Use 0 for all outputs.
Mute Toggle	mutetogg out <0-2><LF>	Allows to toggle mute the Analog Audio output. Use 0 for all outputs.
Power	pwr <on/off><LF>	Powers the device on or off.

***Note**: These commands can be combined like so: "sysinfo version<LF>"*

Device Command Examples:

- To power ON the SW-42Plus, use command: **pwr on<LF>**
- To connect HDMI output 1 to HDMI input #3 of SW-42Plus, use command: **switch 1 3<LF>**
- To connect all HDMI outputs to HDMI input #2 of SW-42Plus, use command: **switch 0 2<LF>**
- To increase the Analog Audio output 2 of SW-42Plus, use command: **vol+ out 2<LF>**
- To decrease all Analog Audio outputs of SW-42Plus, use command: **vol- out 0<LF>**

13 Glossary

4:4:4 – Type of chroma subsampling. 4:4:4 defines 12 unique values of color per 4 pixels.

4:2:2 – Type of chroma subsampling. 4:2:2 defines 8 unique values of color per 4 pixels.

4:2:0 – Type of chroma subsampling. 4:2:0 defines 6 unique values of color per 4 pixels.

4K60 – defines a video format of 3840 x 2160 pixels at 60 Hz.

CEC – Consumer electronics control. A channel in the HDMI connection that allows consumer electronics to control other media.

S/PDIF – Digital audio interconnect delivering digital audio over a coaxial cable with RCA connectors.

DHCP – Dynamic Host Configuration Protocol is a standardized network protocol used to designate IP addresses to media.

DIP Switch – dual in-line package switch is a manual electric switch that is packaged with others in a group.

Dolby TrueHD – High performance audio codec from Dolby.

DTS-HD Master – High performance audio codec from DTS.

EDID – Extended Display Information Data is used to relay specifications and capabilities of a sink device to a source device.

HDCP – High-bandwidth Digital Content Protection is a form of digital copy protection to prevent copying of digital audio and video content across connections.

HDMI – High Definition Multimedia Interface is a proprietary audio/video interface for transmitting video data and audio data.

HDR – High Dynamic Range refers to a technique in imaging to reproduce a greater range of luminosity.

HPD – Hot plug detect is a signal in the HDMI interface that allows a sink device to notify a source that a connection is valid.

IR – Infrared

LAN – Local Area Network.

Null Modem – Null modem is referred to as a device or implementation that allows the receiver and transmitter lines of the RS232 protocol to be swapped.

RCA – also called a phono connector is an electrical connector used to carry audio and video signals.

RGB – A color format in which color data is represented as a combination of Red, Green, and Blue.

RS-232 – RS-232 is a standard for serial communication transmission of data. It is commonly used with a DB-9 connector.

SMPTE – Society of Motion Picture and Television Engineers (SMPTE) is a foundation that has set standards for television and digital cinema formats. In this manual it is used to refer to cinema formats such as 4096 x 2160.

Glossary

Static IP – In contrast to DHCP, static IP refers a to unit or device that has a set IP address and configured to attempt connect with the predefined IP address.

UHD – Ultra High Definition. This is commonly referred to the video format 3840 x 2160.

VESA – Video Electronics Standards Association is a technical standards organization for computer display formats.

ZigNet – Proprietary web control developed by Zigen, Inc.

HDMI 2.0 4K Specifications

The table below specifies the only combinations of resolution, frame rate, color space and depth.

<table>
<tr><th></th><th>8 bit</th><th>10 bit</th><th>12 bit</th><th>16 bit</th></tr>
<tr><td>4K@24</td><td rowspan="3">RGB
4:4:4</td><td rowspan="3">RGB
4:4:4</td><td rowspan="3">RGB
4:4:4
4:2:2</td><td rowspan="3">RGB
4:4:4</td></tr>
<tr><td>4K@25</td></tr>
<tr><td>4K@30</td></tr>
<tr><td>4k@50</td><td rowspan="2">RGB
4:4:4
4:2:0</td><td rowspan="2">4:2:0</td><td rowspan="2">4:2:2
4:2:0</td><td rowspan="2">4:2:0</td></tr>
<tr><td>4K@60</td></tr>
</table>

14 Application Program Interface (API)

The SW-42Plus can be controlled over Ethernet using 3rd party Control Systems and appropriate drivers. The SW-42Plus units support network HTTP or Curl protocol. For specific usage details of the API, download the API HTLM document from the Zigen Website in the SW-42Plus downloads section.

15 Infrared (IR) Protocol

The SW-42Plus IR protocol uses the NEC standard over 38kHz. An example IR message that uses the protocol with address 0x00 and command 0xAD is shown below this section.

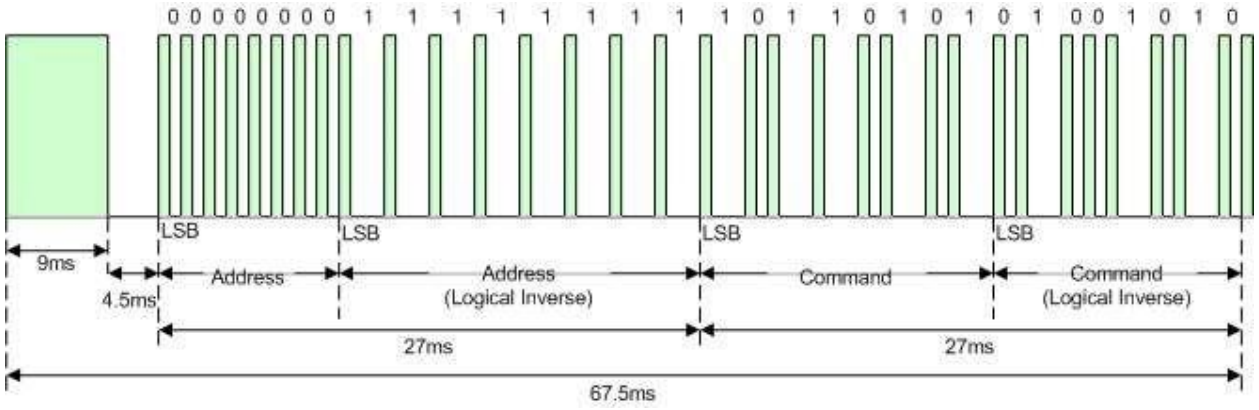


Illustration 1: NEC Protocol

IR Commands

The Pronto Hex Codes for the IR Commands can be downloaded from the Zigen website. Go the SW-42Plus downloads section to get all relevant documentation.

16 Contacting Zigen

Technical Support

Tel: (818) 654-5252
Fax: (818) 654-5355

9:00AM - 5:00PM (PST)

Email

info@zigencorp.com

Web

www.zigencorp.com

Mailing Address

Zigen Corp.
c/o Customer Service
16135 Wyandotte Street
Lake Balboa CA 91406
USA

17 Warranty Information

Powered Product Warranty

Zigen, Inc. warrants its powered products against any defects in materials and workmanship for a period of three years from the date of invoice. Touchscreen displays carry a one-year parts and labor warranty. If a malfunction occurs during the warranty period, Zigen, Inc. will repair or replace a product to its original operating condition. A return authorization number must be obtained from Zigen, Inc. before products are returned for service.

Non-Powered and Cable Products - Lifetime Limited Performance Warranty

Zigen, Inc. warrants that its non-powered products and cable products will be free from defects in material and workmanship for as long as you or your customer owns the product. All Zigen non-powered products and cables are designed and engineered to meet and exceed performance specifications. If, at any time, the product fails due to manufacturer defect, Zigen will repair or replace the product to ensure that it meets original performance specifications. Reduced performance due to normal wear and tear, or damages caused by misuse or negligence will not be covered. Zigen will test and evaluate all non-powered and cable products claimed defective. Products must be shipped to Zigen, prepaid along with proof of purchase only after obtaining a Return Merchandise Authorization (RMA) number from the Zigen. This statement of policy is in lieu of any other policy expressed or implied and no representative or person is authorized to assume any other liability or adopt any other policy for Zigen without our written consent.

Return Policy

If you would like to return a Zigen product, it can be done within 30 days of purchase for a full refund, less shipping and handling. Zigen will not be responsible for shipping and handling of product returns. Returns will only be accepted of products with proof of purchase, products in the original packaging with zero to minimal use and a Return Merchandise Authorization RMA number provided by Zigen.