

User Manual

AC-SC1-AUHD

18 GBPS Up/Down Scaler, EDID Manager, Audio De-Embedder & Image Enhancer



USER MANUAL Ver. 1.1

pg. 1

Introduction

The AVProConnect's AC-SC1-AUHD is the ideal solution for integrators that are needing to distribute a signal to a variety of displays and keep an optimal picture. Integrators will enjoy its versatility of not only being able to control up/down scaling but handling EDID issues (including 4K HDR EDID's), image enhancement, and being able to access audio from the stream. This scaler is ready for future content as well as it's able to distribute 18GBPS signaling. Yet if you have 1080p displays the AC-SC1-AUHD will make sure it's getting the right picture.

Typical Applications:

- For mixed systems with SD, HD and UHD displays in a matrix. Since a matrix will typically down-clock to the lowest common format putting a scaler in will “trick” the matrix into send 4K UHD material and the scaler will downscale the content to 1080P for the HD display.
- As an Audio Extractor – stand-alone audio extractors cost about the same thing...no brainer
- EDID causes about 80% of HDMI connectivity issues – you can fix them all with the SC1
- EDID capture and emulation – would you like to test end points prior to hanging that 600-pound projector 100 feet up on the ceiling? Use the AC-SC1-AUHD and your problem is solved.

What's in the Box?

- 1 x AC-SC1-AUHD
- 1 x Mini USB Cable
- 1 x 5V 1A USB Power Supply
- Mounting Ears
- User Manual

Features

- HDMI 2.0a w/HDR & HDCP 2.2
- 4K-->1080P Downscaler
- 1080P-->4K Upscaler
- Plug & Play Auto Scaling & EDID
- 16 EDID Options (Including Auto & HDR EDID Options)
- Custom User EDID Option
- L/R Audio De-embedding
- Video Enhancement Circuit
- Simple, easy to use. 3-Button Operation

Specifications

Video Bandwidth

HDMI - 18 GBP/sec

Video Resolutions

All SMPTE & VESA in HDMI 2.0 Specification. Max SMPTE UHD - 4096x2160P60/RGB/4:4:4 8-bit.

Note: Scaling is only supported on 1080P & 3840x2160P

Color Space

RGB, YUV

Color Bit Depth

8-bit, 10-bit, 12-bit & 16-bit per pixel

Note: Resolution and video bandwidth limited – ex. 2160P60 RGB or 4:4:4 8-bit would use almost the entire 18 GBPS of bandwidth. 2160P60 4:2:2 12-bit (new players with HDR) would exceed the previous 10.2 GBPS maximum of HDMI 1.4a and would not be able to travel over category cable using HDBaseT.

Chroma Subsampling

4:4:4, 4:2:2, 4:2:0

See note above – chroma subsampling or color compression is related to bit depth and video resolution settings with regard to total bandwidth requirements. A 4K/60 signal at 4:4:4 chroma subsampling can have a maximum bit depth of 8 bits.

Audio

HDMI in & Out – Up to Dolby TrueHD and DTS-HD Master
3.5 Stereo - Analog 2 Channel

Distance - HDMI – Up to 11M @ 4K60 4:4:4, HDBaseT – Up to 100M at 4K/60 4:2:0 8-bit

HDCP – all up to HDCP 2.2

CEC - Pass through

Connections

- 1 x HDMI type A HDMI Input
- 1 x HDMI type A HDMI Output
- 1 x 3.5MM Analog 2-Channel Audio Output
- 1 x Mini USB Jack for Power, Firmware & PC Control

Temperature – Operating 32-122 F (0-50 C), Humidity: 20-90% non-condensing.

Dimensions

AC-SC1-AUHD – 2.5" L x 2" W x .5"

Weight

AC-SC1-AUHD - .4 pounds

Certifications/Compliance

FCC, CE, RoHS, HDCP, HDMI

General Operation

Powering the device:

The easiest way to use the AC-SC1-AUHD is to simply plug the device in to power using one of 2 methods:

1. Use the supplied 5V power adaptor and plug it in to a power outlet using the Mini USB cable.
2. Plug the Mini USB cable directly into a USB port on a display or other peripheral device. REMEMBER, when powering this way, the device it is plugged into may not provide constant power to the AC-SC1-AUHD, while the settings you put in will stay the same, sync times may increase slightly due to having to power up when the device it is plugged into is being turned on.

Setting the device:

The AC-SC1-AUHD used a simple on device control method, and all of the available settings are printed on the top as pictured:

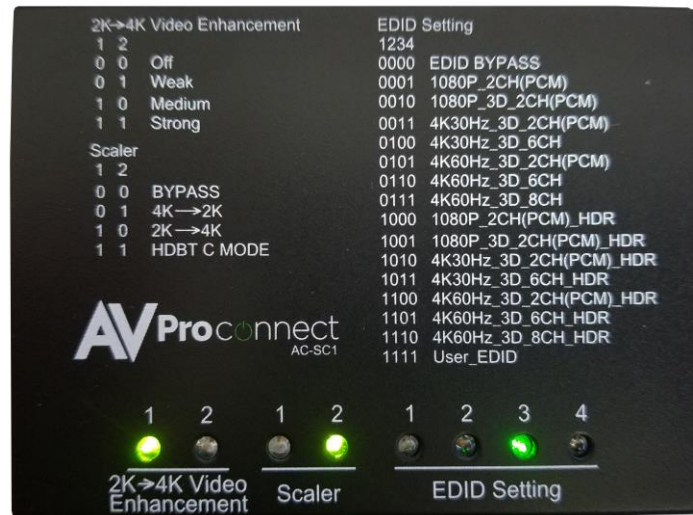


Top View



Toggle Buttons

To control the device simply press the corresponding button on the front of the device to toggle through the settings (Pictured Above). To indicate what your current setting is there are lights on the top (Pictured Below) whereas the number "1" indicates the light is on and "0" indicates the light is off.



Here is a list of the available settings:

Video Enhancement	Scaler	EDID Settings
1 2	1 2	1234
0 0 Off	0 0 Bypass	0000 EDID BYPASS
0 1 Weak	0 1 4k->2k	0001 1080P 2CH(PCM)
1 0 Medium	1 0 2k->4k	0010 1080P 3D 2CH(PCM)
1 1 Strong	1 1 HDBT C	0011 4K30Hz 3D 2CH(PCM)
	1*1 HDBT C2	0100 4K30Hz 3D 6CH
		0101 4K30Hz 3D 2CH(PCM)
		0110 4K60Hz 3D 6CH
		0111 4K60Hz 3D 8CH
		1000 1080p 2CH(PCM) HDR
		1001 1080p 3D 2CH(PCM) HDR
		1010 4K30Hz 3D 2CH(PCM) HDR
		1011 4K30Hz 3D 6CH HDR
		1100 4K60Hz 3D 2CH(PCM) HDR
		1101 4K60Hz 3D 6CH HDR
* - Flashing		1110 4K60Hz 3D 8CH HDR
		1111 User EDID

Explanation of settings:

Video Enhancement: This feature enables incredible video enhancement when scaling from 1080P to 4K. The enhancement is designed take full advantage of the 4K Pixel Space and maximize the end user experience while using legacy (1080P) sources on new displays/projectors.

- *OFF* – No enhancement is added
- *Weak* – A minimal amount of enhancement is added (Ideal for high quality 1080p content, e.g. Blu-Ray)
- *Medium* – Adds a medium level of enhancement (Ideal for poor quality sources, e.g. Cable boxes)
- *Strong* – Adds significant amount of enhancement (Ideal for long distance viewing situations)

Note: Image Enhancement is only available when scaling from 1080P to 4K

Scaler: This simple scaler was designed to be a cost effective way to overcome resolution compatibility issues in mixed resolution systems. It can be placed in line to “right size” the output for the situation. This prevents the practice of reducing the system quality due to individual components, especially when using switching devices

- *Bypass* – Scaler is OFF
- *4K->2K* – Downscales 4K to 1080P (Ideal after a 4K switching product when a 1080P display is in the system to prevent system downscale)
- *2K->4K* – Up-scales 1080P to 4K (Ideal to maximize legacy (1080P) sources on 4K displays)
- *HDBT C Mode* – Reduces the bandwidth of 9.1G – 18G signals (HDR/4K60 4:4:4) to 9G using the least destructive methods based on the input signal. (Ideal to reduce 4K sources to fit down traditional extension pipelines like HDBaseT)
- *HDBT C Mode 2 (Both Lights Flash) – ICT Mode (Invisible Conversion Technology).* You need two AC-SC1-AUHDs on either end of the transmission for this to work.
- The Modes are
 - 1 = BYPASS
 - 2 = 4K > 2K
 - 3 = 2K > 4K
 - 4 = HDBT C Mode
 - 5 = HDBT C Mode 2

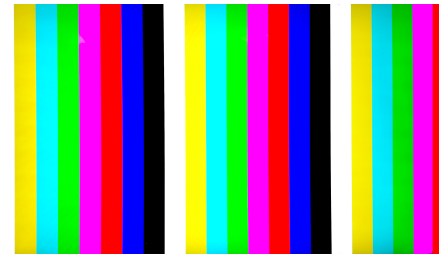
EDID Settings: With EDID Settings you can manage the sources devices and force a certain output. This is especially important on newer sources that rely on EDID communications in implement high bandwidth and HDR signals.

- *1080 EDIDs* – Legacy EDIDs, these will ask the sources (especially high bandwidth ones) to output 1080 to function in 1080 Systems.
- *4K30 EDIDs* – Asks the sources to output 4K30 and/or 4K60 4:2:0 (Ideal to force source device to work on common extension infrastructure that are less than 10G like HDBaseT)
- *4K60 EDIDs* – Asks the source to output 4K60 4:4:4 or signals above 9G
- *HDR EDIDs* – When you see HDR in the EDID, the EDID will ask the source to send HDR regardless of resolution.
- *USER EDID* – If you press and hold the EDID button for 2 seconds while connected to a display that's powered on will copy the displays EDID.

Test Pattern Generator: There are two built in Test patterns available

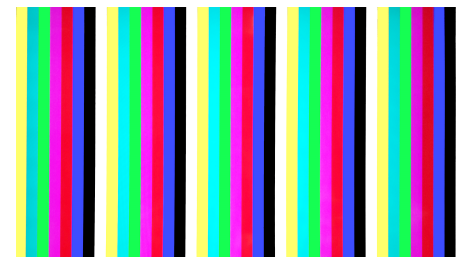
To Enable and Disable press and hold "Enhance & EDID" Buttons for 2 seconds.

- Press and hold the first time will enable the 1080p test pattern
 - 3 sets of color bars (see right)
- Press and hold to again will disable the test pattern
- Press and hold a third time will enable the 4k test pattern
 - 5 sets of color bars (see below, right)
- Press and hold a fourth time will disable the test pattern



You can also send the commands

SET OUT1 SGM EN
SET OUT1 SGM DIS



Lock Function: Locks the device so setting can't be changed by mistake

- Press and hold the "ENHANCE & SCALER" buttons for 2 seconds
 - All the lights will flash twice and the device is now locked.
 - Repeat to unlock

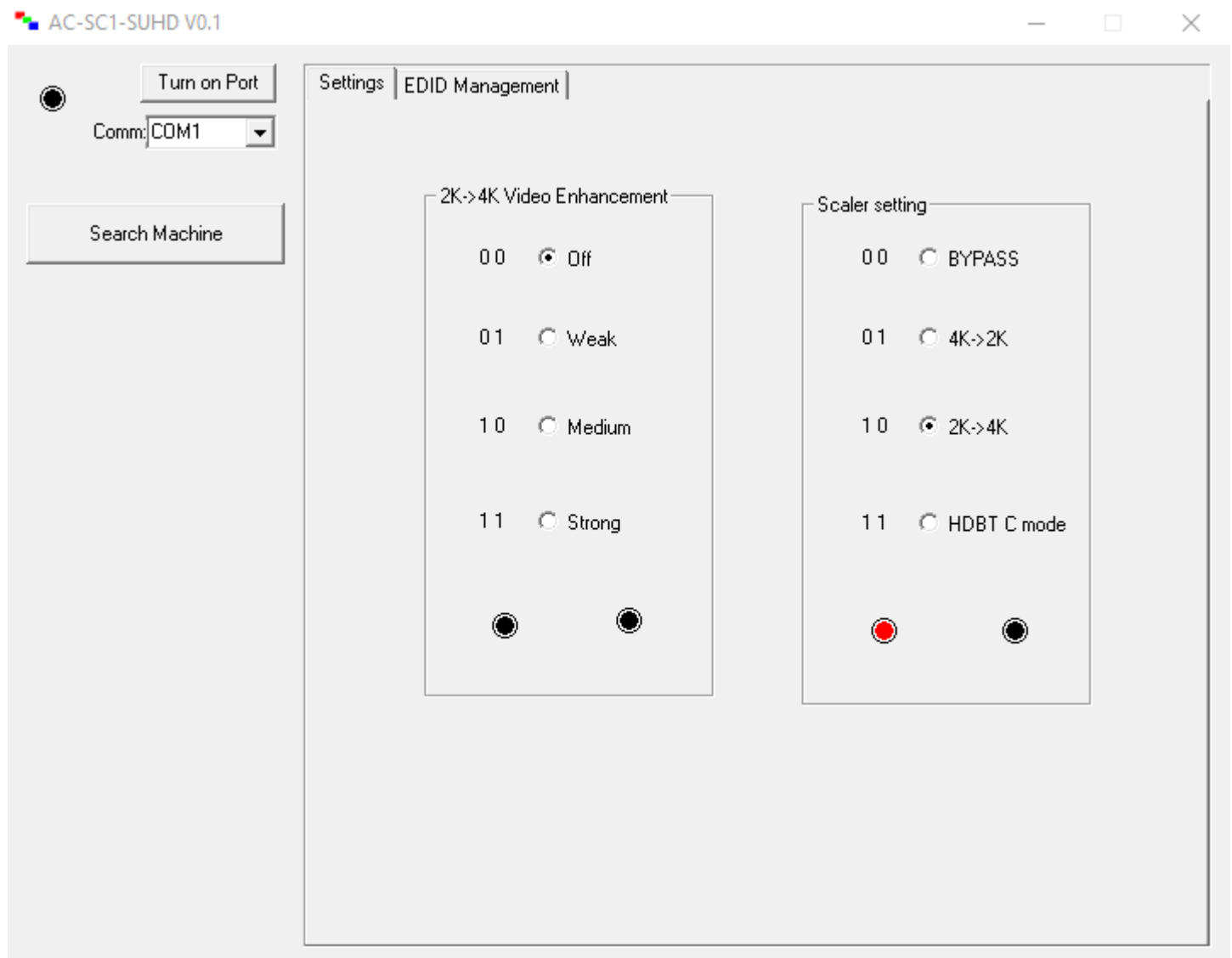
AC-SC1-AUHD Software Operation:

There is also a simple to use software utility for the AC-SC1-AUHD. To use this software simply:

1. Plug the Micro USB cord in from the PC to the AC-SC1-AUHD and this will provide power and install a COM Port.
2. Open the Software
3. Click "Search Machine"
4. You are now connected to the software.

Software Screen Shots:

Settings Screen: Allows you to set the Video Enhancement and the Scaler.



EDID Management Screen: Allows you to set the EDID.

AC-SC1-SUHD V0.1

Turn on Port

Comm: COM1

Search Machine

Settings EDID Management

0000 ☐ EDID bypass

0001 ☐ 1080P_2CH

0010 ☐ 1080P_3D_2CH

0011 ☐ 4K30Hz_3D_2CH

0100 ☐ 4K30Hz_3D_6CH

0101 ☐ 4K60Hz_3D_2CH

0110 ☐ 4K60Hz_3D_6CH

0111 ☐ 4K60Hz_3D_8CH

1000 ☐ 1080P_2CH_HDR

1001 ☐ 1080P_3D_2CH_HDR

1010 ☐ 4K30Hz_3D_2CH_HDR

1011 ☐ 4K30Hz_3D_6CH_HDR

1100 ☐ 4K60Hz_3D_2CH_HDR

1101 ☐ 4K60Hz_3D_6CH_HDR

1110 ☐ 4K60Hz_3D_8CH_HDR

1111 ☐ User_EDID

● ● ● ●

Basic EDID information:

Load EDID file and write to input port user EDID

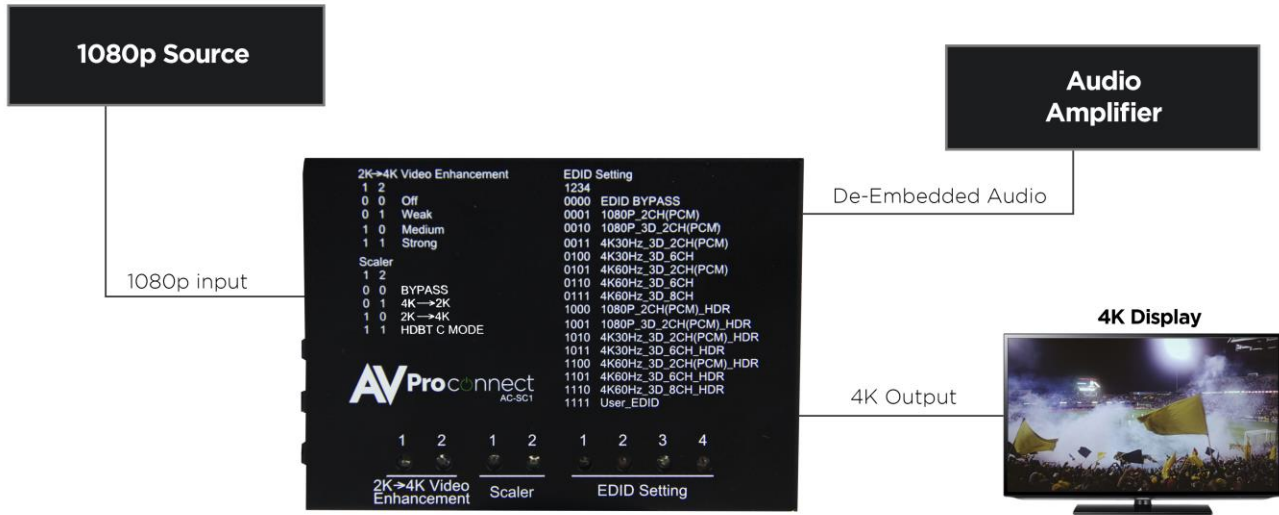
AC-SC1-AUHD ASCII Command List:

AC-SC1-AUHD Commands	
Command	Action
H	Help
STA	Show Global System Status
SET RST	Reset to Factory Defaults
SET ADDR xx	Set System Address to xx {xx=[99~99][00=Single]}
GET ADDR	Get System Address
GET STA	Get System Status
AC-SC1-AUHD Output Setup Commands	
Command	Action
SET OUT1 VIDEOy	Set Output VIDEO Mode{y=[1~4][1=BYPASS, 2=4k->2k, 3=2k->4k, 4=HDBT C Mode, 5=HDBT C Mode 2]}
SET OUT1 IMAGE ENH y	Set Output Image Enhancement {y=[0~3](0=OFF,1=WEAK,2=MEDIUM,3=STRONG)}
SET OUT1 EXA EN/DIS	Set Ex-Audio Output Enable/Disable
SET OUT1 SGM EN/DIS	Set Output Signal Generator Enable/Disable
SET OUT1 SGMTx	Set Output Signal Generator Timing{x=[0~1](0=1080p 60Hz,1=4K 30Hz)}
GET OUT1 HDCP	Get Output1 HDCP Mode
GET OUT1 VIDEO	Get Output1 Video Mode
GET OU1 IMAGE ENH	Get Output1 Image Enhancement Mode
GET OUT1 EDID DATA	Get Output1 EDID Data
GET OUT1 EXA	Get Ex-Audio Output Enable/Disable Status
GET OUT1 SGM	Get Output Signal Generator Enable/Disable Status
GET OUT1 SGMT	Get Output Signal Generator Timing Status
AC-SC1-AUHD Input Setup Commands	
Command	Action
SET IN1 EDID y	Set Input x EDID{y=[0~15]} 0:EDID_BYPASS 1:1080p_2CH 2:1080P_3D_2CH 3:4K30Hz_3D_2CH 4:4K30Hz_3D_6CH 5:4K60Hz_3D_2CH 6:4K60Hz_3D_6CH 7:4K60Hz_3D_8CH 8:1080P_2CH_HDR 9:1080p_3D_2CH_HDR 10:4K30Hz_3D_2CH_HDR 11:4K30Hz_3D_6CH_HDR 12:4K60Hz_3D_2CH_HDR 13:4K60Hz_3D_6CH_HDR 14:4K60Hz_3D_8CH_HDR 15:User_EDID
SET IN1 EDID CY OUT1	Copy Output 1 EDID To Input 1(USER_EDID)
SET IN1 EDID U1 DATAz	Write EDID To User y Buffer of Input1{z=[EDID Data]}
GET IN1 EDID	Get Input x EDID Index
GET IN1 EDID y DATA	Get Input x EDID y Data{y=[1~15]}

Applications:



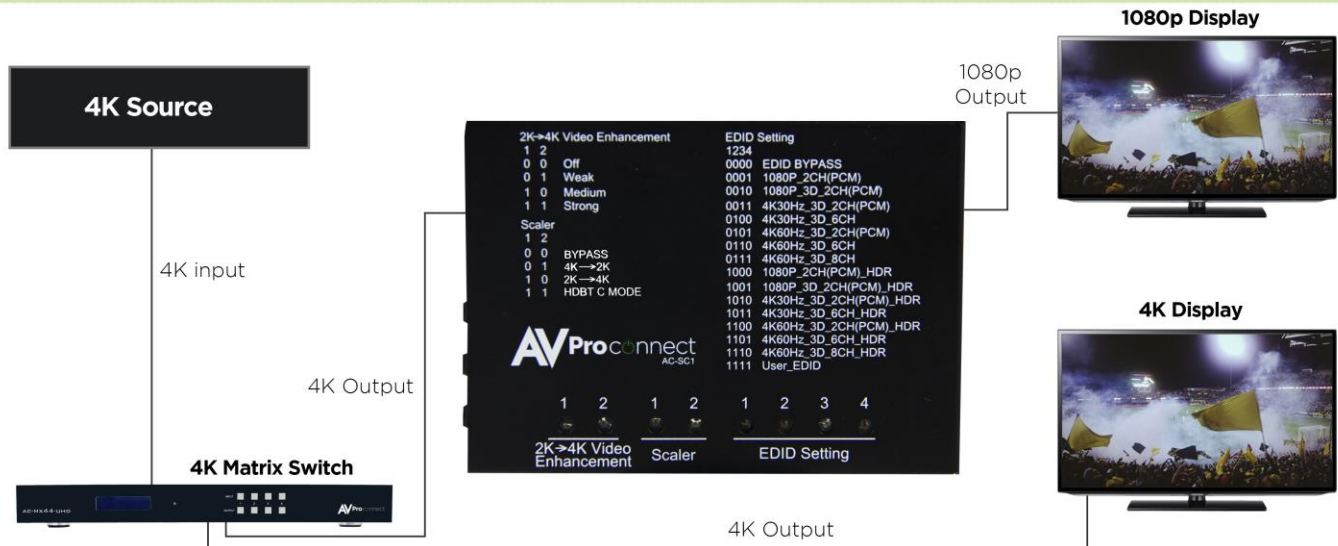
Audio De-embedding / Upscaling



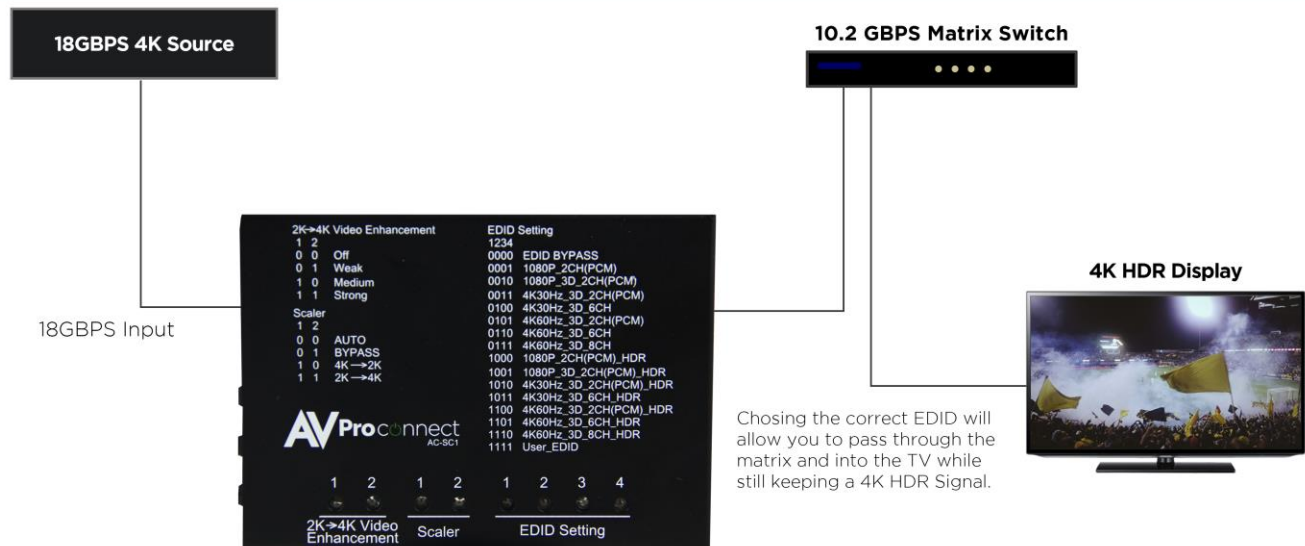
With the AC-SC1-AUHD you are able to de-embed audio and upscale a signal at the same time.



Distributed System Down-Scaling



With the AC-SC1-AUHD you are able to downscale (as shown) or upscale a signal so can distribute the best possible picture to any display.



With the AC-SC1-AUHD common EDID settings are easy to find as they are printed right on the box.

■ Maintenance

Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner or benzine to clean this unit.

■ Product Service

● Provided Service

1) Damage Requiring service: The unit should be serviced by qualified service personnel if:

- The DC power supply cord or AC adaptor has been damaged;
- Objects or liquids have gotten into the unit;
- The unit has been exposed to rain;
- The unit does not operate normally or exhibits a marked change in performance;
- The unit has been dropped or the cabinet damaged.
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2) Servicing Personnel: Do not attempt to service the unit beyond that described in these operating instructions. Refer all other servicing to authorized servicing personnel.

3) Replacement parts: When parts need replacing ensure the service uses parts

specified by the manufacturer or parts that have the same characteristics as the original parts. Unauthorized substitutes may result in fire, electric shock, or other hazards.

4) Safety check: After repairs or service, ask the service to perform safety checks to confirm that the unit is in proper working condition.

● Mail-In Service

When shipping the unit, carefully pack and send it prepaid, adequately insured and preferably in the original carton. Include a letter detailing the complaint and provide a daytime phone and/or email address where you can be reached. If repair is needed during the limited warranty period, the purchaser will be required to furnish a sales receipt/proof of purchase indicating date of purchase, amount paid and place of purchase. Customer will be charged for the repair of any unit received without such proof of purchase.

● Warranty

If your product does not work properly because of a defect in materials or workmanship, AVProConnect (referred to as “the warrantor”) will, for the length of the period indicated as below, (10 Years) which starts with the date of original purchase (“Limited Warranty period”), at its option either (a) repair your product with new or refurbished parts, or (b) replace it with a new or a refurbished product. The decision to repair or replace will be made by the warrantor. During the “Labor” Limited Warranty period there will be no charge for labor. During the “Parts” warranty period, there will be no charge for parts. You must mail-in your product during the warranty period. This Limited Warranty is extended only to the original purchaser and only covers product purchased as new. A purchase receipt or other proof of original purchase date is required for Limited Warranty service.

● Warranty Limits and Exclusions

1) This Limited Warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The Limited Warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by the warrantor, or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, or service by anyone other than a Factory Service Center or other Authorized Service, or damage that is attributable to acts of God.

2) There are no express warranties except as listed under “limited warranty coverage”. The warrantor is not liable for incidental or consequential damages resulting from the use of this product, or arising out of any breach of this warranty. (As examples, this excludes damages for lost time, cost of having someone remove or re-install an installed unit if applicable, travel to and from the service location, loss of or damage to media or images, data or other recorded content. The items listed are not exclusive, but are for illustration only.)

Safety Instructions:

After Sale Service

To ensure reliable operation of this product as well as protecting the safety of any person using or handling this device while powered, please observe the following instructions.

1. Use the power supplies provided. If an alternate supply is required, check voltage, polarity and that it has sufficient power to supply the device it is connected to.
2. Do not operate these products outside the specified temperature and humidity range given in the above specifications.
3. Ensure there is adequate ventilation to allow this product to operate efficiently.
4. Repair of the equipment should only be carried out by qualified professionals as these products contain sensitive devices that may be damaged by any mistreatment.
5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.

After Sale Service

1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual before contacting Technical Support.
2. When Calling Technical Support, the following information should be provided:
 - Product name and model number
 - Product serial number
 - Details of the fault and any conditions under which the fault occurs.
3. This Product has a ten-year standard warranty, beginning from the date of purchase as stated on the sales invoice.
4. Product warranty is automatically void under any of the following conditions:

The product is already outside of its warranty period

- Damage to the product due to incorrect usage or storage
- Damage caused by unauthorized repairs
- Damage caused by mistreatment of the product

5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.

Thanks for Using AVProConnect

If you have any questions just call us at 1-877-886-5112

