# SHD-310SM Switcher Scaler Quick Start Guide

Thank you for purchasing the Luxi Electronics® SHD-310SM switcher scaler. Please read through this manual before using the product.

How the product functions: Please refer to the "Video signal path" and "Audio signal path" sections in the right column of the specs on page 4 for details.

Power options: This product draws power from an external 12 V power supply sold separately (Luxi P/N 69-002-01). Do NOT plug the power supply connector into any other connectors; this could cause permanent damages to the product and void the warranty.

Captive screw plug termination: The captive screw plugs for power, audio, RS-232 and contact controls are supplied with the unit. Separate the wires about 1" (2.5 cm) long; strip off the wire insulation precisely 3/16" (5 mm) from the end. Identify the positive and negative leads for power; Luxi power supply has a white stripe on the positive wire. If not sure, use a multi meter to verify.
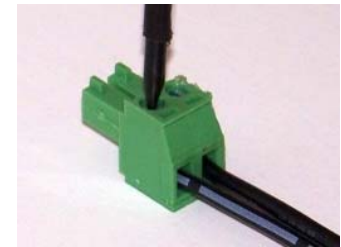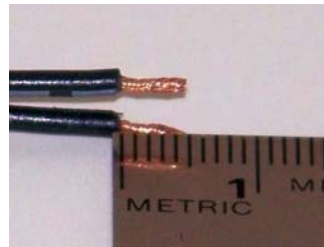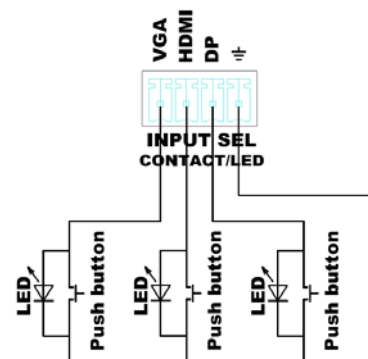
Mounting options: Luxi has the under desk mount sold separately (Luxi P/N 78-002-01); the product also fits many other mounting hardware from Extron, Middle Atlantic, etc. Only use the type 4-40, 3/16" (5 mm) long screws supplied with the mounting hardware to screw onto the product. Wrong type of screw could strip the threads; too long screw could touch and short the internal circuit, cause permanent damages to the product and void the warranty.
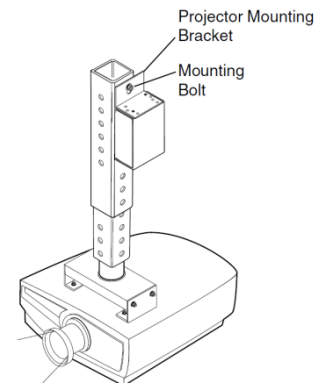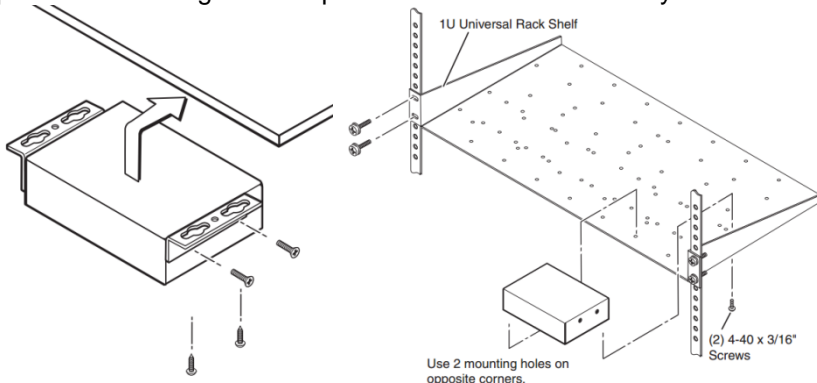
Control options: Pressing the "Input Sel." button on the front panel will toggle thru the 3 video inputs. 3 sets of external contact closure push buttons and LEDs can select inputs discretely with the LED indication, see wiring diagram on the right side; when a button is pressed, the associated LED would blink once, then stay on. A RS-232 host connected to the rear panel can control all functions, see page 3 for the RS-232 commands and responses.

Auto input switching: when activated by a RS-232 command, the switcher will select the last connected input with active signal as the

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Specifications are subject to change without notice

current input. Auto switching is turned off after any front panel, external button push, or a RS-232 input command. Default is auto switching off. Note: due to the nature of the wide varieties of the DP product designs, some DP source devices may not trigger the auto switch. Use manual switch when this happens.

Audio output connector wiring: refer to the diagrams on the right for the wiring to the 5-pin captive screw connector. Do NOT connect the sleeve (audio cable shield) to the "-" pin of the audio output; this could cause permanent damages to the product and void the warranty.

RS-232 controls: Only the input selections can be controlled by front panel or external buttons; all other functions can only by controlled by RS-232. See the RS-232 Setup Guide on Luxi website for more information: http://luxielectronics.com/attachments/File/Luxi_RS-232_setup_guide.pdf. Refer to page 3 for RS-232 commands and responses.
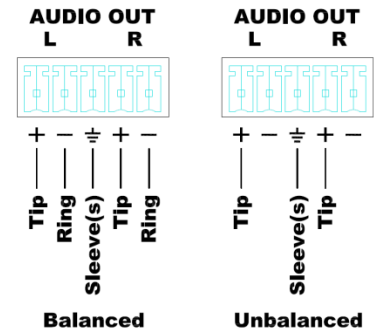
Input select commands: Command "s" is to check the current selected input; "0s" is to enable auto switching; "1s" is to select VGA input, "2s" HDMI input; "3s" DP input. There will be a blank screen for a brief period of time during input switching. The length of the duration depends on the handshake time of the display and the source device, and the input and output resolutions, generally around 2 seconds or less. Note: the DP input only works with the source devices compatible with DP++ (dual mode).

Front panel and contact closure lockup: Command "A" is to check the current front panel switch status; "0A" is to defeat front panel and contact closure controls; "1A" (default) is to allow front panel and contact closure controls.

Auto image settings: Command "a" is to initiate auto image settings.

Scaler output video format settings: Command "o" is to check the current output video format; "1o" is to set the output to 720p; "2o" (default) is to set the output to 1080p; "3o" is to set the output to "Pixel to pixel" (source device to match display's native resolution).

Image size (zoom) adjustments: Many displays made by consumer electronics manufacturers tend to set the image on the screen in overscan even fed by computer signals, making the menu icons on the sides cut off or disappear. Use the "z" commands to set (shrink) the proper picture size on screen. Command "z" is to check the current zoom level; "1z" is to set the zoom level to 1 (default, same size as the original in a non-overscan display), "2z", "3z", … "6z" are to set the zoom levels to 2, 3, … 6, respectively.

Audio mode commands: Command "M" is to check the current audio status; "0M" is to mute the audio from the HDMI outputs (note the audio from the 5-pin connector is not affected); "1M" is to send digital audio from the HDMI or DP inputs directly to the HDMI outputs in their original format (default, use this option to retain the surround sound modes); "2M" is to mix the front panel analog audio input with the de-embedded audio from HDMI or DP inputs, and embed and send to the HDMI outputs. The 5-pin audio outputs always send the mixed audio between the front panel analog audio input and the de-embedded audio from HDMI or DP inputs regardless the audio mode settings.

Resetting the product to factory defaults: Use the RS-232 command "r" to reset the product to factory defaults. See page 3 for the default values.

Support: Please contact your reseller directly for local support; or Luxi using the contact info in the header. See Luxi website for additional and more updated documents.

Luxi switcher SHD-310SM RS-232 commands   Rev 1.18
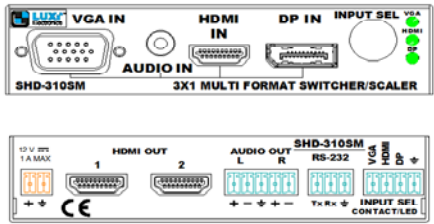
Function	External host to MCU	MCU to external host	Notes	Factory default settings
Product information commands				
Query device part number	*p*	71-003-01¶	Numeric and dash only	
Query device firmware version	*P*	x.xx¶	Numeric and dash only	
Reset command				
Reset to factory defaults	*r*	Reset		
Input selection commands				
Select local input x	*x*s	Input *x* live¶	x has 3 possible values, 1 thru 3	2s (HDMI input)
Set auto switch on	0s	Auto sw on¶		
Query local input status	s	Input *x* live¶		
		(or) Auto sw on¶		
Defeat front panel switch	0A	Front panel sw off¶		
Allow front panel switch	1A	Front panel sw on¶		1A (front panel allowed)
Query front panel switch status	A	Front panel sw off¶		
		(or) Front panel sw on¶		
Scaler commands				
Initiate auto image	*a*	Auto image on¶		
Set output format to 720p	1o	Output format 720p¶		
Set output format to 1080p	2o	Output format 1080p¶		2o (output 1080p)
Set output format to pixel to pixel	3o	Output format pixel to pixel¶	Only supports 5 preset resolutions: 720p, 1080p, 1024x768, 1280x800, 1366x768	
Query output format	o	Output format 720p¶		
		(or) Output format 1080p¶		
		(or) Output format pixel to pixel¶		
Set zoom level on	*x*z	Zoom level *x*¶	x has 6 possible values, 1 thru 6	1z (zoom level 1)
Query zoom level	z	Zoom level *x*¶		
Audio commands				
Audio mute on	0M	Audio mute on¶		
Digital audio pass thru	1M	Digital audio pass thru¶		1M (digital audio pass thru)
Audio mixing and embedding	2M	Audio mixing and embedding¶		
Query audio mode	M	Audio mute on¶		
		(or) Digital audio pass thru¶		
		(or) Audio mixing and embedding¶		

RS-232 baud rate and proto 9600 baud, 8 data bits, 1 stop bit, no parity
RS-232 port pin configurati 1 = Tx, 2 = Rx, 3 = GND

Note: The italic and underlined letters represent decimal numeric numbers
    ¶ is CR/LF (carriage return/line feed) (HEX value 0D 0A)
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VGA/HDMI/DP/audio 3x2 switcher with scaler	Model: SHD-310SM
Product Image	**Product Drawing**

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Features and Benefits

> Universal interface, compatible with all source signal formats
> World's smallest high performance all purpose signal
  converter, scaler, switcher, splitter, mixer, HDCP compliant
> VGA, HDMI, DP input, auto switch or front panel, RS-232,
  contact controllable with discrete input LED indications
> Independent analog audio input, can be coupled with any
  video input, mixed with audio de-embedded from HDMI or DP
  outputs to bal/unbal analog output, or embedded to HDMI
> Dual mirrored HDMI outputs, drive both big screen/projector
  and local monitor simultaneously
> Unique RS-232 controlled picture zoom (out) adjustments
  to compensate for common display overscan
> RS-232 selectable video resolutions of common 1080p
  720p or pixel to pixel modes
> RS-232 selectable audio digitally pass thru or mixing and
  embedding, or mute
> High efficiency fanless design for ultimate reliability
> Rack mountable, under-table mountable, above-projector
  mountable metal enclosures

Package

One piece in one color cardboard box; with captive screw
  plugs and quick start guide
  no power supply

Box size: 5.9" x 4.8" x 1.1" (15.0 x 12.2 x 2.8 cm)
Weight: package, 0.63 lb (0.29kg); product, 0.49 lb (0.22kg)
36-pc box size: 12.4" x 11.6" x 9.5" (31.5 x 29.5 x 24 cm)
36-pc box weight: 24.5 lb (11 kg)

Connections

Input connectors: 1 VGA, 1 HDMI, 1 DP, 1 mini jack (audio)
Output connector: 2 HDMI, (1) 5-pin captive screw (audio)
Power connector: 2-pin 3.5 mm captive screw receptacle
Control connectors: (1) 3-pin RS-232, (1) 4-pin contact

Other Related Products

Power supply, 100-240 V in on US plug,
12 V out, P/N 69-002-01

Under desk mount, P/N 78-002-01

Presenter transmitter, P/N 74-017-01,
model TPR-110CR

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Mechanical

Enclosure material: steel
Enclosure size: 4.29" x 1.00" x 3.00" (10.9 x 2.5 x 7.6 cm)

Electrical

Video signal path: There are 3 video inputs and 2 video outputs.
  The analog RGB video from the VGA input goes to the
  scaler's analog input; the DisplayPort (DP) input signal is
  first converted to HDMI, then switched with the HDMI input
  signal, the selected signal goes to the digital input of the
  scaler. The scaler converts all video to LVDS, feeds to a
  HDMI encoder, then a 1x2 HDMI splitter for dual outputs.
VGA input: 0.7 Vp-p analog RGBHV, 75 ohm impedance
HDMI input: HDMI 2.0, 1080p deep color, max 6.7 Gbps
DP input: DP 1.3 Dual Mode, 1080p deep color, max 6.7 Gbps
Video processing: 36-bit decoding, sampling, 225 MHz clock
Video input resolution range: from 800x600 to 1920x1080
Scaled video output resolutions presets: 1080p, 720p, "pixel to
  pixel": 1024x768, 1280x800, 1366x768, 720p, 1080p, etc
HDCP compliance: HDCP 1.2
Audio signal path: There are 3 audio inputs and 3 audio
  outputs. The digital audio embedded in HDMI and DP inputs
  are selected by a HDMI switcher, then goes to the scaler.
  The scaler produces both SPDIF digital audio and de
  -embedded analog audio. The latter is mixed with the analog
  audio input and goes to the bal/unbal analog audio outputs,
  and a analog to digital converter. The HDMI encoder can
  select this mixed audio, or the digital audio from HDMI/DP
  and directly pass it thru to dual HDMI outputs.
Analog audio input: stereo on 3.5 mm mini jack, nominal
  level -10 dBV (316 mV), max +3.5 dBV (1.5 V), 22k ohms
Analog audio output: stereo on 5-pin 3.5 mm captive screw
  connector, balanced output nominal -4 dBV (632 mV), un-
  balanced output nominal -10 dBV (316 mV), 60 ohms
Audio gain: 0 dB (x1) to unbal, +6 dB (x2) to bal output
Controls: Front panel button toggle thru all 3 inputs
  RS-232 on 3-pin 3.5 mm captive screw, 9600/8-N-1
  Contact port on 4-pin 3.5 mm captive screw, discrete pin for
  each input, dual function (switch to select, LED for indication)
Power consumption: 12 V DC, 0.2 A
Optional power supply: Not included. Luxi 69-002-01
  Auto switching 100-240 V AC input on US plug, 12 V DC
  1 A max on bare wires, wall ward type, UL, PSE, CE, FCC
Mounting: Not included. Luxi under desk mount 78-002-01
  compatible with several Extron and Middle Atlantic mounts
Regulatory compliance
  Safety: CE, cUL, UL (power supply only)
  EMI/EMC: CE, FCC Class A
MTBF: 30,000 hours
Warranty: 3 years parts and labor

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