THB-350 Scaler Transmitter Quick Start Guide

Thank you for purchasing the Luxi Electronics® THB-350 scaler transmitter. Please read through this manual before using the product.

How the product functions: To use the 2nd video output for remote locations, this product needs to be connected to a Luxi RHB-350 or a compati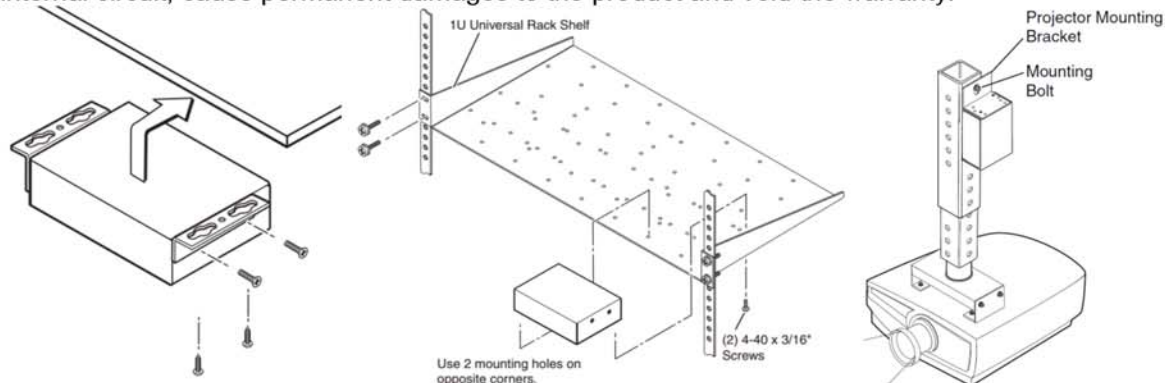ble HDBT receiver with POC or POE turned off; failure to turn it off may cause damages and void warranty. Please refer to the "Video signal path" and "Audio signal path" sections in the right column of the specs on page 5 for details.

Power options: This product draws power from an external 24 V power supply sold separately (Luxi P/N 69-008-01). 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.
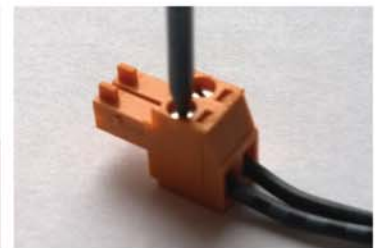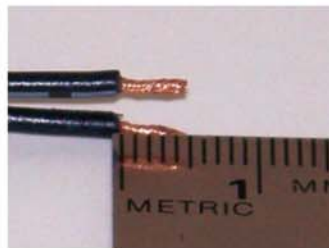
Mounting options: Luxi has the under desk mount (Luxi P/N 78-002-01) or the MediaHub table tanks sold separately; the product also fits many other mounting hardware from Extron, Middle Atlantic, etc. Only use the type 4-40, 3/16" (5 mm) long screws supplied with the mounting hardware to screw onto the 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.

1U Universal Rack Shelf

Use 2 mounting holes on opposite corners.

(2) 4-40 x 3/16" Screws

Projector Mounting Bracket

Mounting Bolt

Control options: When auto switching off, 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 this or RHB-350 can control all functions, see page 3 for the RS-232 commands.

VGA HDMI DP ⏚

INPUT SEL
CONTACT/LED

LED Push button
LED Push button
LED Push button
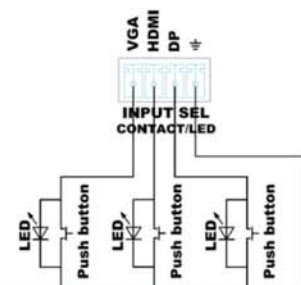
Auto input switching: The default is auto switching on, front panel button defeated. When the button pressed, the 3 LEDs next to it will blink 3 times. To turn off auto switching, press and hold the button for about 7 seconds until the LEDs blink twice, or use RS-232 command. When auto switching off, use the button or contact closure buttons or RS-232 to select input. To engage auto switching again, press and hold the button for more about 7 seconds until the LEDs blink 3 times, or use RS-232 command.

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.

AUDIO OUT
L   R

+ − ÷ + −

Tip   Ring   Sleeve(s)   Tip   Ring

Balanced

AUDIO OUT
L   R

+ − ÷ + −

Tip   Sleeve(s)   Tip

Unbalanced

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.
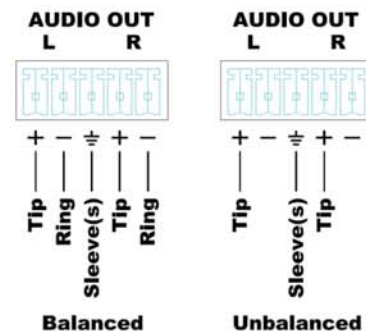
Input select commands: Command "s" is to check the current selected input; "0s" is to enable auto switching; "1s" is to select VGA input, "2s" HDMI input; "3s" DP input. There will be a blank screen for a brief period of time during input switching. The duration depends on the handshake time of the display and the source device, and the input and output resolutions, generally around 2 seconds or less.

Front panel and contact closure lockup: Command "A" is to check the current front panel switch status; "0A" is to turn off auto switching and defeat front panel and contact closure controls; "1A" is to turn off auto switching and allow front panel and contact closure controls; "2A" (default) is to turn on auto switching and defeat front panel/contact closure controls.

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

Scaler output video format settings: Refer to RS-232 "o" series commands on page 3 for more details.

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.
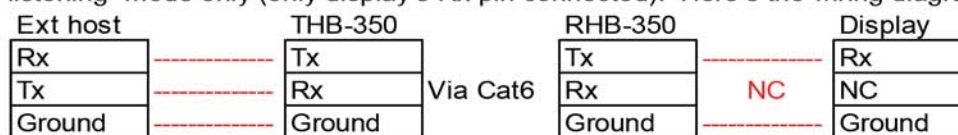
Video output commands: Refer to RS-232 "m" series commands on page 3 for more details. If the monitors can go to sleep without input signal and can wake up with input signal, use RS-232 command "1m" to enable this feature. If your projector needs screen saver to prevent burn in, use command "2m" to turn on OSD (On Screen Display) when no input signal.

Audio commands: Refer to RS-232 "M" series commands on page 3 for more details. Use RS-232 command "0M" to mute all audio outputs; "1M" to set digital audio pass thru for preserving the movie surround sound; "2M" to mix the 3.5 mm audio to input digital audio; "3M" to pair the 3.5 mm audio with VGA input only; "4M" to use the 3.5 mm audio all the time (for wireless microphone).

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.

Display power controls: THB-350 has the configurable display power control feature to enable fully automated system operations without any operator or 3rd party control devices. THB will send a display

power off command via RS-232 ports of both THB-350 and RHB-350 with a set delay time (1 to 60 minutes) after the last input signal disappears; and will send a display power on command as soon as the first input signal detected, and will automatically select that input. The switcher uses one RS-232 port to connect both external host (optional; only required for setup) and display in parallel with the display in "listening" mode only (only display's Rx pin connected). Here's the wiring diagram:

Ext host		THB-350		RHB-350		Display
Rx	-----------	Tx		Tx	-----------	Rx
Tx	-----------	Rx	Via Cat6	Rx	NC	NC
Ground	-----------	Ground		Ground	-----------	Ground

NC = Not Connected

Use the "2{xxx}R" and "1{yyy}R" commands listed in next page to setup the display power on and off commands respectively, then use the "1*zR" command to enable the display power control feature while setting the power off delay time at "z" minutes. Use "0R" command to disable the display power control feature. Once setup finished, the external host is not needed for daily operations. The system reset command "r" will not erase the stored display power on and off commands, but will disable the display power control feature (factory default).

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 THB-350 scaler Tx RS-232 commands   Rev 1.01

Function	Command to THB-350	Response from THB-350	Notes	Factory default	
Product information commands					
Query device part number	p	74-040-01¶	Numeric and dash only		
MCU firmware version	1P	x.xx¶	Numeric only		
Scaler firmware version	2P	x.xx¶	Numeric only		
Splitter firmware version	3P	x.xx¶	Numeric only		
HDBT firmware version	4P	x.xx¶	Numeric only		
Reset command					
Reset to factory defaults	r	Reset			
Input selection commands					
Select local input x	xs	Input x live¶	x has 3 possible values, 1 thru 3	2s (HDMI input)	
Set auto switch on	0s	Auto sw on¶	Will release by new input selection		
Query local input status	s	Input x live¶	Send all 3 groups of status to "s" command, only one group of status to the one just changed		
		Auto sw on (or off)¶			
		Input x signal present¶			
		Input x signal present¶			
Defeat front panel input selection	0A	Front panel sw off¶	When front panel switch pressed, the LED fast blinking twice		Press and hold front panel switch for about 7 seconds will toggle the auto sw on or off; LED fast blinking 3 or 2 times respectively
		Auto sw off¶			
Allow front panel input selection	1A	Front panel sw on¶			
		Auto sw off¶			
Allow auto switching and defeat front panel input selection	2A	Front panel sw off¶	When front panel switch pressed, the LED fast blinking 3 times	2A (auto sw on, front panel sw off)	
		Auto sw on¶			
Query front panel switch status	A	Front panel sw off (or on)¶			
		Auto sw on (or off)¶			
Scaler commands					
Initiate auto image	a	Auto image on¶			
Set output format to pixel to pixel	0o	Output format pixel to pixel¶	Only supports 7 preset resolutions: 720p, 1080p, 1280x800, 1920x1200, 1024x768, 1280x1024, 1600x1200		
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 1280x800	3o	Output format 1280x800¶			
Set output format to 1920x1200	4o	Output format 1920x1200¶			
Set output format to 1024x768	5o	Output format 1024x768¶			
Set output format to 1280x1024	6o	Output format 1280x1024¶			
Set output format to 1600x1200	7o	Output format 1600x1200¶			
Query output format	o	(One of the responses from cell C30 to C37)			
Set zoom level on	xz	Zoom level x¶	x has 6 possible values, 1 thru 6	1z (zoom level 1)	
Query zoom level	z	Zoom level x¶			

See Luxi website for more commands

Product Specifications	Part Number: 74-040-01
VGA/HDMI/DP/audio 3x2 switcher scaler Tx	Model: THB-350 (Tx)

Product Image	Product Drawing

Product Drawing shows:
VGA IN — HDMI IN — DP IN — INPUT SEL (VGA/HDMI/DP)
AUDIO IN
THB-350 — 3X2 MULTI FORMAT SW/SCALER Tx

24 V DC 1 A MAX — HDMI OUT — HDBT OUT — AUDIO OUT L R — THB-350 RS-232 — INPUT SEL CONTACT/LED
CE — Tx Rx

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
> Configurable display power controls via RS-232 enables fully auto operation systems without any 3rd party controller
> 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 outputs, HDBT for big screen/projector and HDMI for local monitor, with or without OSD or screensaver, enable monitor sleep/wake up (energy saving)
> Unique RS-232 controlled picture zoom (out) adjustments
> HDBT output sending signals up to 70 m (235') with POC
> RS-232 selectable video resolutions of common 16:9, 16:10, 4:3 or pixel to pixel modes
> 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: 7.4" x 6.1" x 1.1" (18.9 x 15.4 x 2.8 cm)
Weight: package, 1.1 lb (0.49kg); product, 0.97 lb (0.44kg)
20-pc box size: 12.4" x 11.6" x 9.4" (31.5 x 29.5 x 24.0 cm)
20-pc box weight: 23 lb (10.5 kg)

Connections

Input connectors: 1 VGA, 1 HDMI, 1 DP, 1 mini jack (audio)
Output connector: 1 HDMI, 1 HDBT, (1) 5-pin CS (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, 24 V out, P/N 69-008-01

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

HDBT Rx, P/N 74-037-01, model RHB-350

Mechanical

Enclosure material: steel
Enclosure size: 4.29" x 1.00" x 6.00" (10.9 x 2.5 x 15.2 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 to 1 HDMI and 1 HDBT output
VGA input: 0.7 Vp-p analog RGBHV, 75 ohm impedance
HDMI input: HDMI 2.0, 4k 30 Hz, max 10.2 Gbps
DP input: DP 1.3, 4k 30 Hz, max 10.2 Gbps
Video processing: 36-bit decoding, sampling, 225 MHz clock
Video input resolution range: from 800x600 to 1920x1200
Scaled video output resolution presets: 720p, 1080p, 1280x800 1920x1200, 1024x768, 1280x960, 1600x1200, pixel to pixel
HDBT output: up to 70 m (235') with Cat6 cable; POC 24 V
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 HDMI and HBDT 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: 24 V DC, up to 1 A
Optional power supply: Not included. Luxi 69-008-01
  Auto switching 100-240 V AC input on US plug, 24 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