PRO-HDMI-CAT

HDMI 1.3 over Single CAT5 Extender

User Manual

Full HD 1080 x.v.Color HDMI HIGH-DEFINITION MULTIMEDIA INTERFACE HDCP HIGH-DEFINITION CONTENT PROTECTION CE FC RoHS Compliance

Made in Taiwan **rev.1008**

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Safety and Notice

The **PRO-HDMI-CAT over Single CAT5 Extender** has been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the PRO-HDMI-CAT should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation and air circulation and do not use near water.
- Keep objects that might damage the device and assure that the placement of this unit is on a stable surface.
- Use only the power adapter and power cords and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

Warranty Information

PESA Switching Systems, Inc., (PESA) warrants this equipment against defective workmanship or materials for a period of one (1) year from date of shipment. The sole warranty responsibility of PESA, shall be to replace or repair product proved to be defective. During the warranty period, defective parts will be replaced at no charge. Labor to repair or replace defective parts covered under the warranty will be performed at no charge at PESA. This warranty covers only products manufactured by PESA, and the components used in their manufacture. The warranty on assembled products sold by PESA., but manufactured by others shall be that of the original manufacturer. This warranty does not include shipping damage or damage caused by abuse, neglect, tampering by unauthorized personnel, damage inadvertently caused by the user, preventative maintenance, or any equipment or part thereof whose serial number has been removed or defaced. Neither the seller nor the manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the inability to use the product. Before using, user shall determine the suitability of the product for the intended use, and user assumes all risk and liability whatsoever in connection therewith. This warranty is effective only at the PESA factory in Huntsville, Alabama, USA. If possible, retain the original packing material for use in the unlikely event that your equipment must be returned to the PESA factory. When shipping your equipment, the shipping charges must be prepaid. The repaired unit will be returned to you, freight prepaid. This warranty is exclusive and in lieu of all other warranties, whether expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose.

INTRODUCTION

The **PRO-HDMI-CAT HDMI 1.3 over Single CAT5 Extender** boosts up the audio/video transmission distance up to 60m in HDTV 1080i format, 40m in HDTV 1080p format, or 20m in HDTV 1080p with 36-bit color depth. With only one cost effective solid category cable, users can readily extend HDTV sources from DVD player, Blu-ray Disc player, PS3, PC, and any other kinds of sources compliant with TMDS to distant display monitors including HDMI or DVI enabled TV sets or LCD PC monitors. With the state-of-the-art Silicon Image chipsets embedded, deep color video, 7.1ch audio, and HDCP supports and compatibility are all further assured. Therefore any HDMI source device can transmit utmost high quality video and audio over great distance at minimal cost.

The PRO-HDMI-CAT includes two units: transmitting and receiving units. The transmitting unit is used to capture the input HDMI or DVI signals and carry the signals through one RJ45 connector into one cost effective Cat-5/5e/6 cable. The receiving unit is responsible for equalizing the transmitted HDMI signal. The transmission distance between the sending and receiving units can be up to 60m at HD (720p/1080i) or 40m at Full HD (1080p). With an 8-level equalization rotary control on the receiving unit, users can adjust the equalization strength to the received HDMI signals accordingly, and therefore optimize the transmission distance between source and destination.

Features

- HDMI founder Silicon Image chipsets embedded for superior compatibility and reliability
- HDMI 1.3c compliant
- HDCP compliant
- Extends HDMI signals to 40m over CAT5e at 1080p and likely longer with better HDMI source device, better grade HDMI display, and better quality solid CAT6/7 cable
- Extends HDMI signals to 60m over CAT5e at 1080i or 720p and likely longer with better HDMI source device, better grade HDMI display, and better quality solid CAT6/7 cable
- Purely unaltered uncompressed 7.1ch digital HDMI transmission
- Allows cascading
- Minimizes the cable skew by adjustable 8-level equalization control
- Easy installation with wall mounting design
- Perfectly integrated with other HDMI over CAT5 series products

The length depends on the characteristics and quality of the cables. Higher resolutions and longer transmission distances require low skew cables (<25ns/100m) for best performance. Unshielded CAT6 with metal RJ45 connectors is recommended

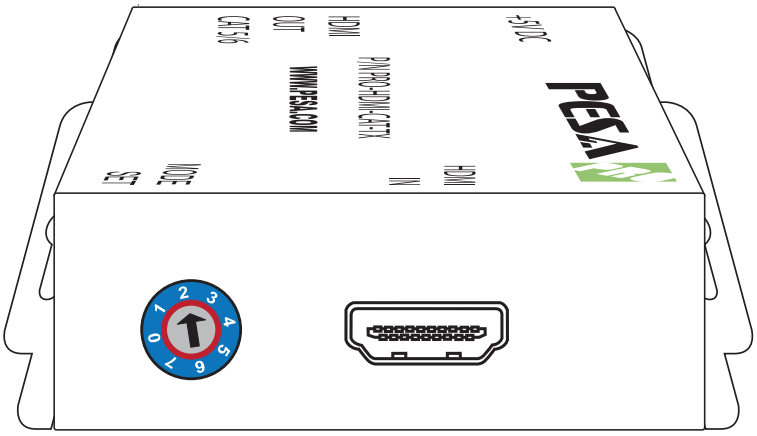
Specifications & Package Contents

Model Name		PRO-HDMI-CAT	
Technical			
Role of usage		Transmitter [TX]	Receiver [RX]
HDMI compliance		HDMI 1.3c	
HDCP compliance		Yes	
Video bandwidth		Single-link 225MHz (6.75Gbps)	
Video support		480i / 480p / 720p / 1080i / 1080p60 24/30/36-bit color	
Audio support		Surround sound (up to 7.1ch) or stereo digital audio	
HDMI over UTP transmission (24-bit)		Full HD 1080p: 40m CAT5e / 50m CAT6 HD 720p/1080i: 50m CAT5e / 60m CAT6	
HDMI equalization		N/A	8-level digital rotary control
Input TMDS signal		1.2 Volts (peak-to-peak)	
Input DDC signal		5 Volts (peak-to-peak, TTL)	
ESD protection		Human body – ±19kV air-gap discharge & ±12kV contact discharge Core chipset – ±8kV	
PCB stack-up		4-layer board (impedance control – differential 100Ω; single 50Ω)	
Input		1x HDMI	1x RJ45
Output		1x RJ45	1x HDMI
HDMI connector		Type A (19-pin female)	
RJ45 connector		WE/SS 8P8C with 2 LED	
Rotary control		Mode selection	EQ for signal equalization
Mechanical			
Housing		Metal enclosure	
Dimensions LxWxH	Model	3.6”x3.6”x1.1” / 91 x 91 x 27mm	
	Package	6.9”x10.4”x3” / 174 x 264 x 77mm	
Weight	Model	7 oz / 200g	7 oz / 196g
	Package	1.8 lbs / 800g	
Fixedness		Wall mounting and latch-locking power jacks	
Power supply		5V 2A DC	
Power consumption		1 Watt (max)	
Operation temperature		32-104°F / 0-40°C	
Storage temperature		-4-140°F / -20-60°C	
Relative humidity		20-90% RH (no condensation)	
Package Contents		**1x PRO-HDMI-CAT** **2x 5V power supply unit** **1x User manual**	

PANEL DESCRIPTION

Transmitting unit ▸ PRO-HDMI-CAT-TX

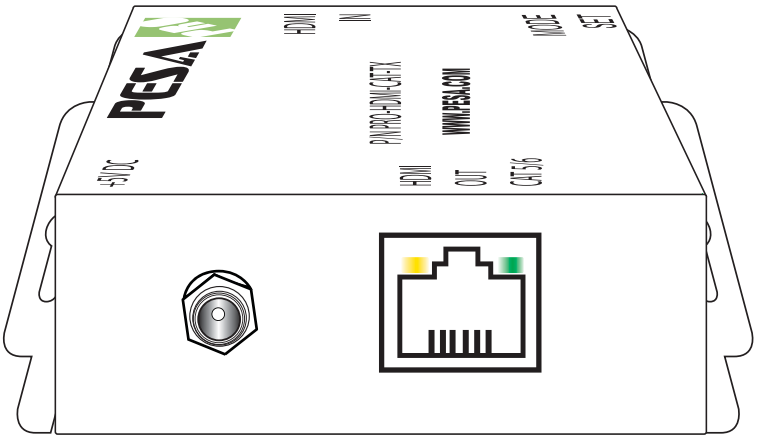
Input Panel



MODE SET: 0 – Supported up to 1080p 36-bit video and up to 7.1ch audio output.
1 – Supported up to 1080p 36-bit video and stereo audio output.
2 – Supported up to 1080p 24-bit video and up to 7.1ch audio output.
3 – Supported up to 1080p 24-bit video and stereo audio output.
4 – Supported up to 1080p 24-bit video in DVI mode and no audio output.
5 – Default EDID with up to 1080p 24-bit and stereo audio output
6 – Default EDID with up to 1080p 24-bit and up to 7.1ch audio output
7 – EDID learning from the display

HDMI IN: Connect to a HDMI source device with a HDMI male-male cable.

Output Panel

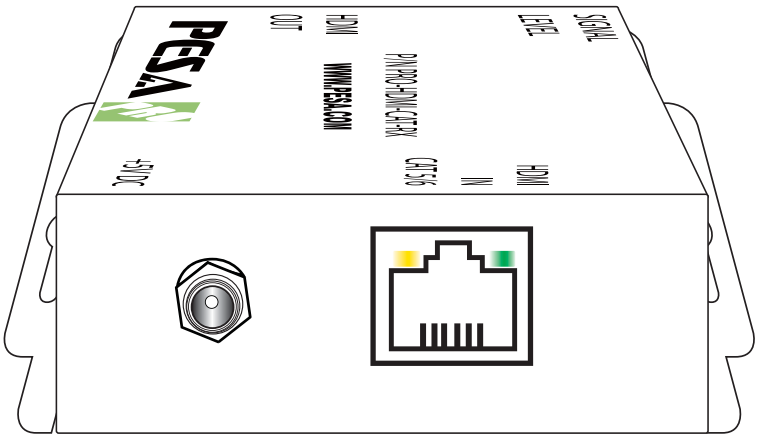


+5V DC: Connect to a 5V DC latch-locking power supply unit.

HDMI OUT CAT 5/6: Plug in a Cat-5/5e/6 cable and link it to the RJ45 port **HDMI IN CAT5/6** on the receiving unit PRO-HDMI-CAT-RX.

Receiving unit ▸ PRO-HDMI-CAT-RX

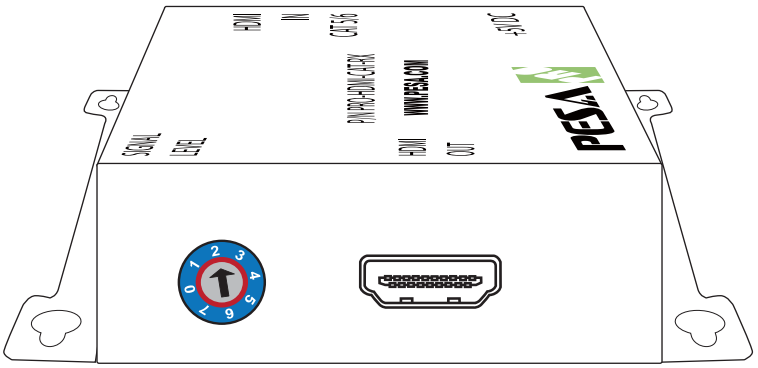
Input Panel



+5V DC: Connect to a 5V DC latch-locking power supply unit.

HDMI IN CAT 5/6: Plug in a Cat-5/5e/6 cable and link it to the RJ45 port **HDMI OUT CAT 5/6** on the transmitting unit PRO-HDMI-CAT-TX.

Output Panel



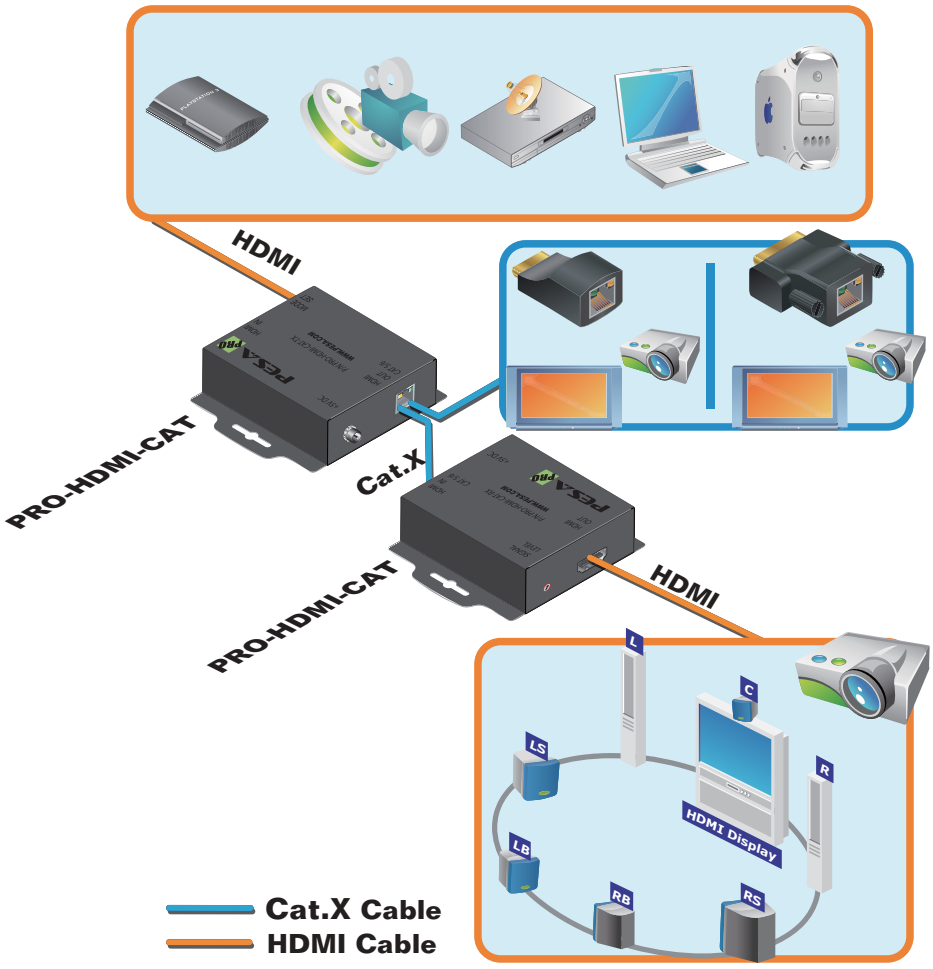
SIGNAL LEVEL: Adjust the 8-level signal equalization control to the received HDMI signals. The HDMI signal level varies from 0 (strongest) to 7 (weakest) for respective transmission length from longest possible range to short distance. Adjust the signal level may cause overpowering issue that would shorten the product life significantly!

HDMI OUT: Connect to a HDMI display or projector with a HDMI male-male cable.

INSTALLATION

1. Connect a HDMI source to the transmitting unit PRO-HDMI-CAT-TX.
2. Connect a HDMI display or projector to the receiving unit PRO-HDMI-CAT-RX.
3. Connect a Cat-5/5e/6 cable between the transmitting and receiving units.
4. Make sure this Cat-5/5e/6 cable is tightly connected and not loose.
5. Plug in 5V DC power supply units to the latch-locking power jack on the both transmitting and receiving units of PRO-HDMI-CAT.
6. If you see flickering or blinking image on the display, please adjust the rotary control switch to improve the cable skew. 0 stands for the strongest HDMI signal level for longest possible transmission length while 7 stands for the weakest HDMI signal level for short transmission length. Please adjust the EQ signal level from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issue that would shorten the product life significantly!

Connection Diagram



TROUBLESHOOTING

A. If you cannot get the audio/video output from the connected display from the first time setup. Please follow the instructions below to check if the extender is OK:

Step 1 – Set the rotary arrow on the TX unit at **Mode 5** for Safe Mode, and wait for the RJ45's LED blinking for a couple seconds.

Step 2 – Dial the rotary arrow counterclockwise [↺] from **Mode 5** to **Mode 3**. If you can get audio/video from the display, you can stay tune at this setting for 1080p and stereo audio. If you need to get 1080p and 7.1ch audio output, dial the rotary arrow counterclockwise [↺] from **Mode 3** to **Mode 2**. If you cannot get the audio/video out normally, please do EDID learning sequence stated in EDID LEARNING section.

B. For desirable 1080p video output, please follow the instructions below:

Step 1 – Set the rotary arrow on the TX unit at **Mode 6** for Default Mode, and wait for the RJ45's LED blinking for a couple seconds.

Step 2 – Dial the rotary arrow clockwise [↻] from **Mode 6** to **Mode 1**. If you can get audio/video from the display, you can stay tune at this setting for 1080p and stereo audio. If you need to get 1080p with 7.1ch audio output, dial the rotary arrow counterclockwise [↺] from **Mode 1** to **Mode 0**. If you cannot get the audio/video out normally, please learn the EDID from this HDMI display for PRO-HDMI-CAT.

EDID LEARNING

For learning EDID from the HDMI display, please follow the instructions below:

Step 1 – Turn on the transmitter PRO-HDMI-CAT-TX.

Step 2 – Dial "**MODE SET"** on the transmitting unit PRO-HDMI-CAT-TX counterclockwise [↺] to **7**.

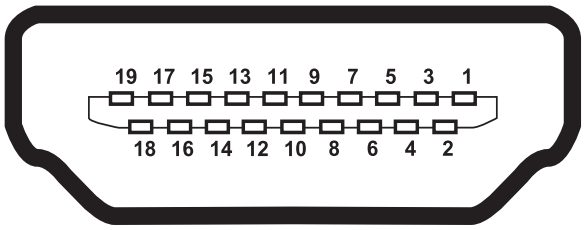
Step 3 – Connect the HDMI display to "**HDMI IN**" on the PRO-HDMI-CAT-TX transmitter with a HDMI cable. The LED on the RJ45 connector of PRO-HDMI-CAT-TX transmitter will dim and light again, which indicates the EDID learning procedure is complete.

Step 4 – Dial "**MODE SET"** on the transmitting unit PRO-HDMI-CAT-TX clockwise **[↻]** from **7** to 0 (for surround sound) or **1** (for stereo). The most important thing is don't let the rotary arrow pass through Mode 5 and Mode 6 which will erase the EDID just learned and restore to default EDID.

Step 5 – Unplug the HDMI cable from the display and follow the instruction in INSTALLATION section to set up the PRO-HDMI-CAT.

PIN DEFINITION

HDMI

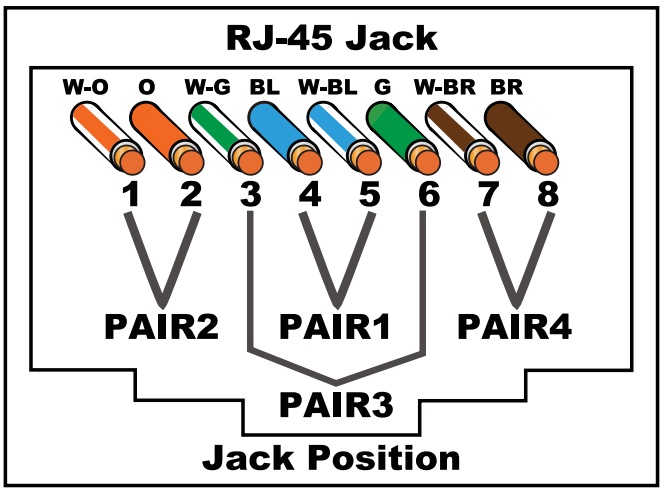


Type A (Receptacle) HDMI

Pin 1 » TMDS Data2+
Pin 2 » TMDS Data2 Shield
Pin 3 » TMDS Data2–
Pin 4 » TMDS Data1+
Pin 5 » TMDS Data1 Shield
Pin 6 » TMDS Data1–
Pin 7 » TMDS Data0+
Pin 8 » TMDS Data0 Shield
Pin 9 » TMDS Data0–
Pin 10 » TMDS Clock+
Pin 11 » TMDS Clock Shield
Pin 12 » TMDS Clock–
Pin 13 » CEC
Pin 14 » Reserved (N.C. on device)
Pin 15 » SCL
Pin 16 » SDA
Pin 17 » DDC/CEC Ground
Pin 18 » +5V Power
Pin 19 » Hot Plug Detect

CAT5 / RJ45

Data Link TIA/EIA-568-B		
PIN	Color	Function
1	W-O	TX0-
2	O	TX0+
3	W-G	TX1-
4	BL	TX2-
5	W-BL	TX2+
6	G	TX1+
7	W-BR	TXC-
8	BR	TXC+



NOTICE

1. When adjusting the signal level on the receiver unit, please dial the rotary control switch from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issues that would shorten the product's life significantly!
2. All HDMI over CAT5 transmission distances are measured using Belden 1583A CAT5e 125MHz UTP cable and ASTRODESIGN Video Signal Generator VG-859C.
3. The transmission length is largely affected by the type of Category cables, the type of HDMI sources, and the type of HDMI display. The testing result shows solid UTP cables (usually in the form of 300m bulk cables) can transmit a lot longer signals than stranded UTP cables (usually in the form of fixed length patch cords). Shielded STP cables are better suited than unshielded UTP cables. A solid UTP Cat-5e cable shows longer transmission range than stranded STP Cat-6 cable. For long extension applications, solid UTP/STP cables are the only viable choice.
4. EIA/TIA-568-B termination (T568B) for category cables is recommended.
5. To reduce the interference among the unshielded twisted pairs of wires in category cable, one can use double shielded STP cables to improve EMI problems, which is worse in long transmission.
6. Because the quality of the category cables has the major effect on how long the transmission limit can achieve and how good is the received picture quality, the actual transmission range is subject to one's choice of Cat-5/5e/6 cables. For desired resolutions greater than 1080i or 1280x1024, a Cat-6 cable is recommended.
7. If your HDMI display has multiple HDMI inputs, it is found that the first HDMI input [HDMI input 1] generally can produce better transmission performance among all HDMI inputs.

Performance Guide for HDMI over Category Cable Transmission

Performance rating		**Type of category cable**		
Wiring	**Shielding**	**CAT5**	**CAT5e**	**CAT6**
Solid	Unshielded (UTP)	★★★	★★★★	★★★★★
	Shielded (STP)	★★★	★★★	★★★★
Stranded	Unshielded (UTP)	★	★★	★★
	Shielded (STP)	★	★	★★
Termination		Please use **EIA/TIA-568-B** termination (**T568B**) at any time		

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