HDAV®

HDMI Extender over Single Cat.X with Bi-directional IR

User Manual

(HDMI-C5S4IR)

[Must be used with Solid CAT5e or CAT6 Cable]

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Rev.1101

Full HD 1080 | IR 20-60kHz | x.v.Color | Blu-ray 3D READY | CAT-5e/6/7 SINGLE PATENTED | HDMI HIGH-DEFINITION MULTIMEDIA INTERFACE | FC CE | RoHS Compliance

HDCP HIGH-DEFINITION CONTENT PROTECTION | 7.1 CH AUDIO | **Made in Taiwan**

Safety and Notice

The **HDMI-C5S4IR HDMI Extender over Single Cat.X with Bi-directional IR** has been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the **HDMI-C5S4IR** 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.

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The **HDMI-C5S4IR HDMI Extender over Single Cat.X with Bi-directional IR** boosts up your video/audio transmission distance up to 60m (200ft) in HDTV 1080i format, 40m (130ft) in HDTV 1080p format, and 20m (65ft) in HDTV 1080p with 36-bit color depth. HDMI-C5S4IR also supports the most advanced 3D video format complaint with HDMI 1.4 specification and therefore guarantees the highest 3D video compatibility on the market. With only one cost effective Cat.5/5e/6 cable, users can readily extend HDTV sources from DVD players, 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 advanced design for the latest HDMI technology, deep color video, DTS-HD Master Audio or Dolby TrueHD audio, and HDCP supports and compatibility are all further insured. This flexibility makes HDCP compliant DVD players or PS3 transmit utmost high quality video and audio with a greater distance at the minimal cost, when integrating several components apart. In addition, HDMI-C5S4IR is also equipped with bi-directional IR pass-through path. This bonus feature allows users to boost IR control distance up to 100m (330 ft) and makes IR control possible through only single Cat.5/5e/6 cable including HDMI signals.

The HDMI-C5S4IR includes two units: transmitting unit HDMI-C5S4IR-TX and receiving unit HDMI-C5S4IR-RX. The transmitting unit is used to capture the input HDMI / DVI signals with IR control packets and carry the signals via one cost effective Cat.5/5e/6 cable. The receiving unit is responsible for equalizing the transmitted HDMI signal and reconstructing IR signals. The transmission distance between the sending and receiving units can be up to 60m (200ft) at HD 720p or 1080i; or 40m (130ft) 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 1.4a compliant [3D video]
- Extend the transmission up to 60m (200ft) from the HDMI source at HD 1080i or 720p 24-bit
- Extend the transmission up to 40m (130ft) from the HDMI source at Full HD 1080p 24-bit
- Extend the transmission up to 20m (65ft) from the HDMI source at Full HD 1080p 36-bit
- HDCP 1.1 compliant
- Minimize the cable skew by adjustable 8-level equalization control
- Pure unaltered uncompressed 7.1ch digital HDMI over Cat.5/5e/6 cable transmission
- DTS-HD Master Audio and Dolby TrueHD high bit rate audio support
- Support full frequency IR signal from 20kHz to 60kHz
- Bi-directional IR pass-through
- Allows cascading
- Wall mounting housing design for easy and robust installation
- Perfectly integrated with other HDMI over Cat.X series products

> ⓘ *The claimed transmission distance here is subject to the grade of installed cable(s), source device and display.*
>
> *For over CAT.X transmission, the cable(s) has to be solid, not stranded. Any keystone jack along the transmission path will kill the transmission performance significantly!*

Package Contents

- 1x HDMI-C5S4IR [TX & RX]
- 1x IR receiver
- 1x User manual

- 1x IR blaster
- 2x DC 5V 2A wall wart

Specifications

| Model Name	HDMI-C5S4IR	
Technical		
Role of usage	Transmitter [TX]	Receiver [RX]
HDMI compliance	HDMI 1.4a	
HDCP compliance	Yes	
Video bandwidth	Single-link 225MHz [6.75Gbps]	
Video support	480i / 480p / 720p / 1080i / 1080p60	
HDMI over UTP transmission [24-bit]	Full HD (1080p)-40m (130ft) [CAT5e] / 50m (165ft) [CAT6] HD (720p/1080i)-50m (165ft) [CAT5e] / 60m (200ft) [CAT6]	
Audio support	Surround sound (up to 7.1ch) or stereo digital audio	
Signal Equalization	8-level digital control at RX	
Input TMDS signal	1.2 Volts [peak-to-peak]	
Input DDC signal	5 Volts [peak-to-peak, TTL]	
ESD protection	[1] Human body model — ±19kV [air-gap discharge] & ±12kV [contact discharge] [2] Core chipset — ±8kV	
PCB stack-up	4-layer board [impedance control — differential 100Ω; single 50Ω]	
IR pass-thru	Bi-directional	
Input	1x HDMI + 1x 3.5mm	1x RJ45 + 1x 3.5mm
Output	1x RJ45 + 1x 3.5mm	1x HDMI + 1x 3.5mm
HDMI source control	Controllable via IR pass-through from RX to TX with IR extenders	
IR remote control	Electro-optical characteristics: $\tau = 25°$ / Carrier frequency: 20-60kHz	
HDMI connector	Type A [19-pin female]	
RJ45 connector	WE/SS 8P8C with 2 LED indicators	
3.5mm connector	IR receiver	IR blaster
Rotary control switch	EDID Mode	Signal level
Mechanical		
Housing	Metal enclosure	
Dimensions [L x W x H] — Model	75 x 92 x 27mm [3" x 3.6" x 1"]	
Dimensions [L x W x H] — Package	270 x 175 x 80mm [10.6" x 6.9" x 3.1"]	
Dimensions [L x W x H] — Carton	450 x 370 x 300mm [1'6" x 1'3" x 1']	
Weight — Model	480g [1.1 lbs]	
Weight — Package	780g [1.7 lbs]	
Fixedness	Wall-mounting case with screws	
Power supply	5V 2A DC	
Power consumption	3 Watts	
Operation temperature	0~40°C [32~104°F]	
Storage temperature	-20~60°C [-4~140°F]	
Relative humidity	20~90% RH [no condensation]	

Transmitting unit of HDMI-C5S4IR

Front Panel
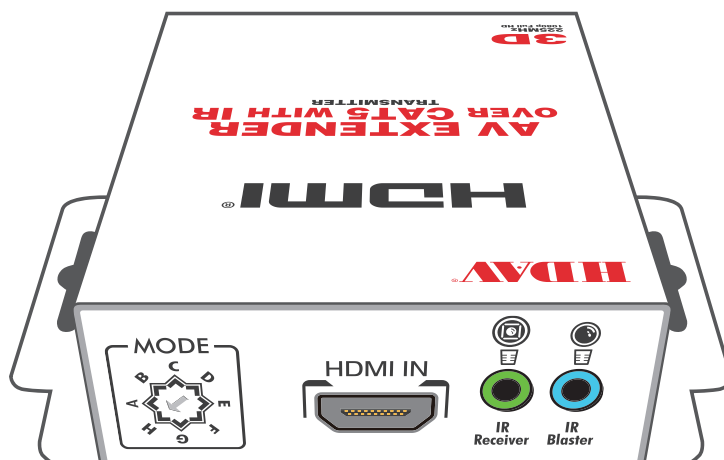
MODE: A - EDID Full-HD(1080p@60) - 24bit 2D video & 7.1ch audio

B - EDID Full-HD(1080p@60) - 24bit 2D video & 2ch audio

C - EDID Full-HD(1080p@60) - 36bit 2D video & 7.1ch audio

D - EDID Full-HD(1080p@60) - 36bit 2D video & 2ch audio

E - EDID HD(1080p@30)(1080i@60)(720p@60) - 24bit 2D video & 7.1ch audio

F - EDID HD(1080p@30)(1080i@60)(720p@60) - 24bit 2D video & 2ch audio

G - EDID Full-HD(1080p@60) - 36bit 3D video & 2ch audio

H - EDID learning mode

HDMI IN: Connects to a HDMI source with a HDMI male-male cable

IR Receiver: Infrared 3.5mm socket for plugging in the extension cable of IR receiver

IR Blaster: Infrared 3.5mm socket for plugging in the extension cable of IR blaster

Rear Panel
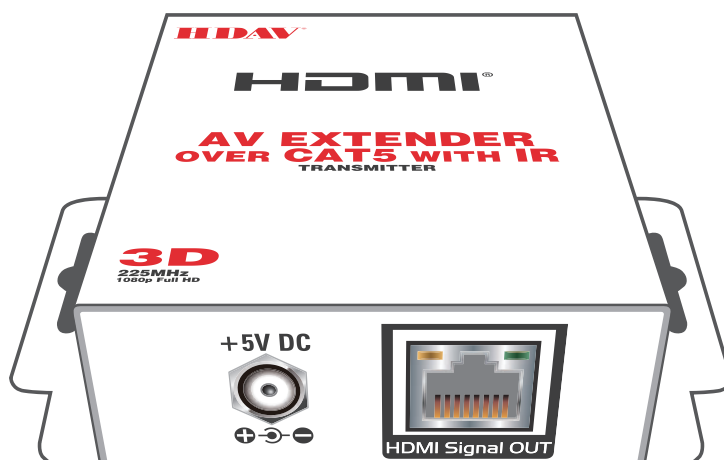
+5V DC: Connect to 5V DC power supply.

HDMI Signal OUT: Plug in a Cat-5/5e/6 cable that needs to be linked to the transmitting unit HDMI-C5S4IR-TX.
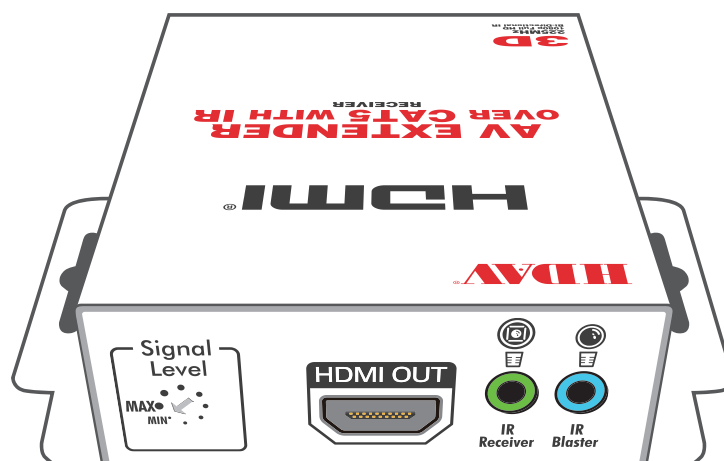
Receiving Unit of HDMI-C5S4IR

Front Panel

+5V DC: Connect to 5V DC power supply.

HDMI Signal IN: Plug in a Cat-5/5e/6 cable that needs to be linked to the receiving unit HDMI-C5S4IR-RX.

Rear Panel

Signal Level: Adjust the 8-level equalization control to the received HDMI signals. The HDMI signal level varies from MAX (strongest) to MIN (weakest) for respective transmission length from longest possible range to short distance. Please adjust the signal level from MIN to MAX 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!

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

IR Receiver: Infrared 3.5mm socket for plugging in the extension cable of IR receiver

IR Blaster: Infrared 3.5mm socket for plugging in the extension cable of IR blaster

IR Extenders

IR Blaster   IR Receiver

IR Sockets

IR Blaster: plug in the IR blaster to emit all IR command signals received from the IR receiver from the other enf to control the devices corresponding to the IR signals.

IR Receiver: plug in the IR receiver to receive all IR command signals from the IR remote controls of the corresponding devices.
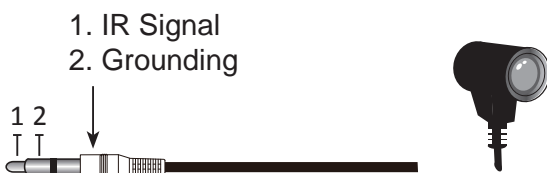
> **CAUTION!**
> *Incorrect placement of IR Blaster and Receiver may result in the failure of the IR extenders. Please check carefully before plugging in the IR extender to the respective IR sockets. Warranty will not cover the damage.*

Definition of IR Earphone Jack

IR Blaster   IR Receiver

1. IR Signal
2. Grounding

1. IR Signal [20-60 kHz]
2. Grounding
3. Power

> *You can buy any IR extension cables in the market that are compatible to the definition of the IR sockets for the matrix if necessary for replacement use. However, IR cables longer than 2m (6-ft) may not work.*

HARDWARE INSTALLATION

1. Connect a HDMI or DVI source (such as a Blu-ray Disc player) to the transmitting unit HDMI-C5S4IR-TX.

2. Connect a HDMI or DVI display (such as a LCD TV) to the receiving unit HDMI-C5S4IR-RX.

3. Connect IR Blaster/Receiver to both TX and RX units.

4. Connect a Cat-5/5e/6 cable between the transmitting and receiving units.

5. Make sure this Cat-5/5e/6 cable is tightly connected and not loose.

6. Plug in 5V DC power supply unit to the power jack of the receiving unit HDMI-C5S4IR-RX.

7. Plug in 5V DC power supply unit to the power jack of the transmitting unit HDMI-C5S4IR-TX.

8. 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 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!

EDID LEARNING

1. Turn off HDMI-C5S4IR-TX and disconnect the Cat.5/5e/6 between HDMI-C5S4IR-TX and HDMI-C5S4IR-RX.

2. Connect the HDMI display to "**HDMI IN**" on the HDMI-C5S4IR-TX with a HDMI cable.

3. Set "**MODE**" on the transmitting unit HDMI-C5S4IR-TX at **H**.

4. Turn on the HDMI-C5S4IR-TX.

5. The LED on the RJ45 of HDMI-C5S4IR-TX will dim and light again, which indicates the EDID learning procedure is complete.

6. Unplug the HDMI cable from the display and follow the instruction in [Hardware Installation] to set up the HDMI-C5S4IR and enjoy the experience.
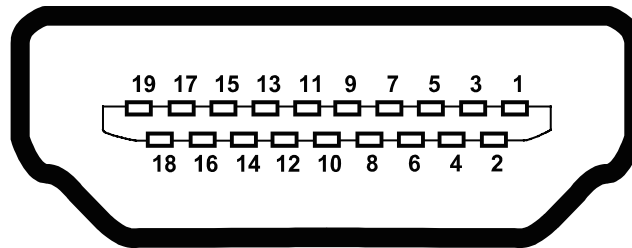
HDMI

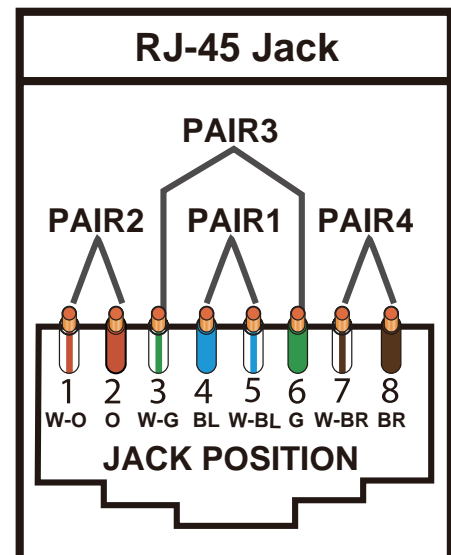**Type A (Receptacle) HDMI**

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

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+

RJ-45 Jack

PAIR3

PAIR2 PAIR1 PAIR4

1 2 3 4 5 6 7 8
W-O O W-G BL W-BL G W-BR BR

JACK POSITION

1. When adjusting the signal level on the Receiving unit, please dial the rotary control switch from MIN to MAX 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!

2. Wrongly insert IR blaster and IR receiver to wrong 3.5mm infrared sockets may result in the failure of the IR extenders. Please check carefully before plugging in the IR extender to the respective IR sockets.

3. If the DVI or HDMI device requires the EDID information, please use EDID Reader/Writer to retrieve and provide DVI or HDMI display EDID information.

4. All HDMI over CAT5 transmission distances are measured using Belden 1583A CAT5e 125MHz UTP cable and ASTRODESIGN Video Signal Generator VG-859C & VG-870B.

5. The transmission length is largely affected by the type of Cat-5/5e/6 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 [1,000ft] 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.

6. EIA/TIA-568-B termination (T568B) for Cat-5/5e/6 cables is recommended for better performance.

7. To reduce the interference among the unshielded twisted pairs of wires in Cat-5/5e/6 cable, one can use shielded STP cables to improve EMI problems, which is worsen in long transmission.

8. Because the quality of the CAT5/6 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.

9. 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)	★★★★	★★★★	★★★★★
Solid	Shielded (STP)	★★★	★★★	★★★★
Stranded	Unshielded (UTP)	★	★★	★★
Stranded	Shielded (STP)	★	★	★★
Termination		Please use **EIA/TIA-568-B** termination (**T568B**) at any time		