



# AcePro-CE88-1

HDMI 2.0 HDBaseT Extender with RS-232 & IR/PoC

Quick Installation Guide



Transmitter



Receiver

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Made in Taiwan

AP4-0097B

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## INTRODUCTION

The AcePro-CE88-1 HDMI 2.0 HDBaseT Extender with RS-232 & IR/PoC boosts up your video/audio transmission distance to 60m (198ft) in HDTV 1080p with 36-bit color depth and 35m (114ft) at 4K-HDR. AcePro-CE88-1 has new generation technology which makes sure the HDBaseT extender can support HDMI2.0a and HDCP2.2. AcePro-CE88-1 also supports the most advanced 3D video format compliant with HDMI 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, PS4, 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 or Dolby TrueHD audio, and HDCP supports and compatibility are all further insured. AcePro-CE88-1 is also equipped with bi-directional IR pass-through path and RS-232 serial port control. These bonus features allow users to boost RS-232 and IR control distance up to 60m (198ft) through only single Cat.5/5e/6 cable with HDMI signals. In addition, AcePro-CE88-1 also supports PoC (Power over Cable) which can power both units from either TX or RX with power supply.

The AcePro-CE88-1 includes two units: transmitting unit AcePro-CE88-1-TX and receiving unit AcePro-CE88-1-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 and serial control signals. AcePro-CE88-1 offers the most convenient solution for digital signage with long distance A/V transmission path.

## FEATURES

- HDMI 2.0a compliant
- Supports 4K2K@60 4:4:4 8bits
- Supports HDR<sup>1</sup>, which is 4K2K@60 4:2:0 10bits<sup>2</sup>
- Extends HDMI signal up to 60m (198ft) from the HDMI source at Full HD 1080p 36-bit, 35m (114ft) at 4K2K@60 444 (4K-HDR Technology)
- Supports PoC (Power over Cable) which can power both units from TX or RX side with power supply
- HDCP 2.2/1.4<sup>3</sup> & EDID Bypass
- CEC support
- Auto equalization
- 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
- Supports full frequency IR signal from 20KHz to 60KHz
- Bi-directional IR path-through
- Full Duplex RS-232 control up to 115,200 bps through connector
- Wall mounting housing design for easy and robust installation
- Video latency less than 20 us.



1. HDR = High Dynamic Range.
2. The video bandwidth of 4K2K@60 4:2:0 10bits (HDR) is 384 MHz, and the 4K2K@60 4:4:4 8bits is 594MHz.
3. HDCP 2.2 & HDCP 2.3 are equivalent to end users



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.

## PACKAGE CONTENTS

- 1x HDMI 2.0 HDBaseT Extender (AcePro-CE88-1 [TX & RX])
- 1x IR blaster
- 1x IR receiver
- 1x DC 12V 2A in-line with C7 power cord
- 2x 3-pin Terminal Block Connector
- 4x Screw
- 1x User Manual

# SPECIFICATIONS

Model Name	AcePro-CE88-1	
<b>Technical</b>		
Role of usage	Transmitter [TX]	Receiver [RX]
HDMI compliance	HDMI 2.0a	
HDCP compliance	HDCP 2.2 & 1.4	
Video bandwidth	Single-link 594MHz [18Gbps]*	
Video support	HDR 4K2K@60 (4:2:0 10bits) / 4K2K@60 (4:4:4 8bits)	
HDMI over UTP	1080p@60 60m (198ft) [CAT5e]	
Audio support	Surround sound [up to 7.1ch] or stereo digital audio	
Equalization	Auto	
Input TMDS signal	1.2 Volts [peak-to-peak]	
Input DDC signal	5 Volts [peak-to-peak, TTL]	
ESD protection	[1] Human body model — ± 15kV [air-gap discharge] & ± 8kV [contact discharge]	
PCB stack-up	6-layer board [impedance control — differential 100Ω; single 50Ω]	
IR pass-thru	Bi-directional	
RS-232 support	Yes	
PoC support	Yes	
Input	1x HDMI / 1x 3.5mm	1x RJ-45 / 1x 3.5mm
Output	1x RJ-45 / 1x 3.5mm	1x HDMI / 1x 3.5mm
In / Out	1x RS-232	1x RS-232
HDMI source control	Controllable via IR pass-through from RX to TX with IR extenders	
HDMI connector	Type A [19-pin female]	
Min DIN connector	DIN-9	
RJ-45 connector	WE/SS 8P8C(Reverse Mode)	
Rotary control switch	None	
3.5mm connector	IR receiver / IR blaster	IR receiver / IR blaster
<b>Mechanical</b>		
Housing	Metal enclosure	
Dimensions	113 x 94 x 30mm [4.4" x3.7" x1.2"]	113 x 94 x 30mm [4.4" x3.7" x1.2"]
Weight	151g[6.3 oz]	154g[6.3 oz]
Fixedness	Wall-mounting case with screws	
Power supply	12V DC	
Power consumption	3 Watt [max]	7 Watt [max]
Operation temperature	0~40°C [32~104° F]	
Storage temperature	-20~60°C [-4~140° F]	
Relative humidity	20~90% RH [no condensation]	

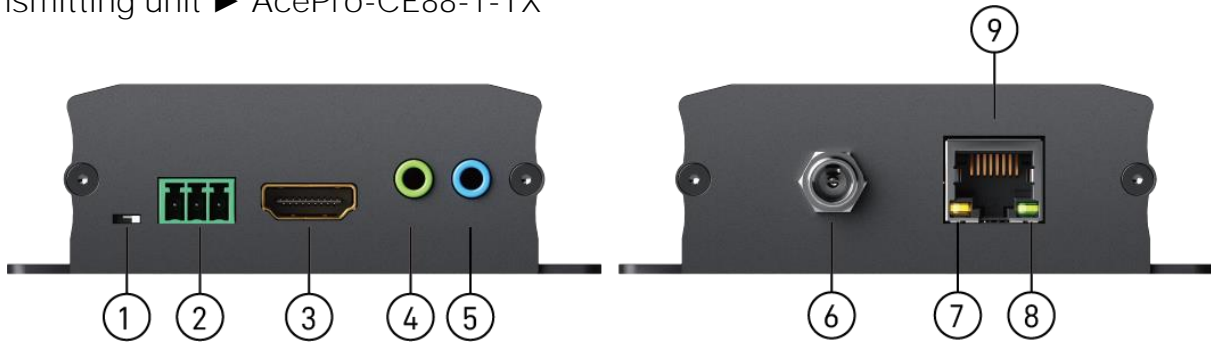


\*Not support 533MHz

Due to the higher power consumption on the receiving unit, we strongly suggest you plugging power adapter from the transmitting unit to avoid system at higher temperature level.

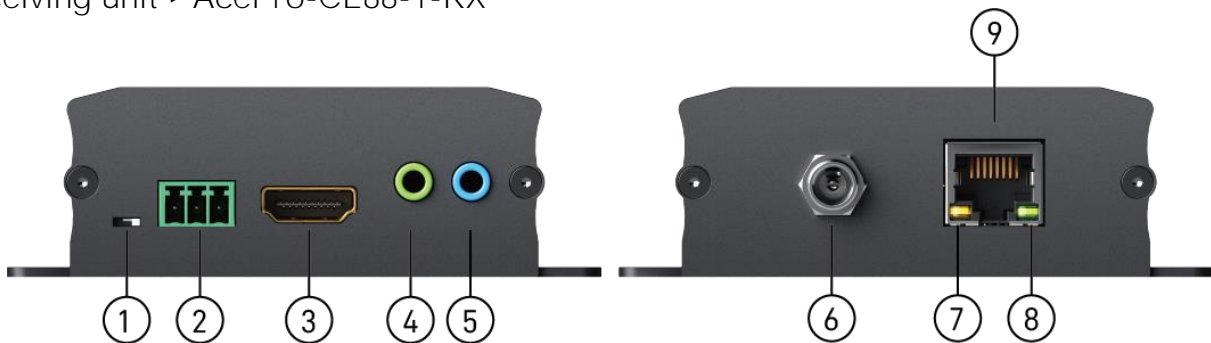
# PANEL DESCRIPTIONS

Transmitting unit ► AcePro-CE88-1-TX



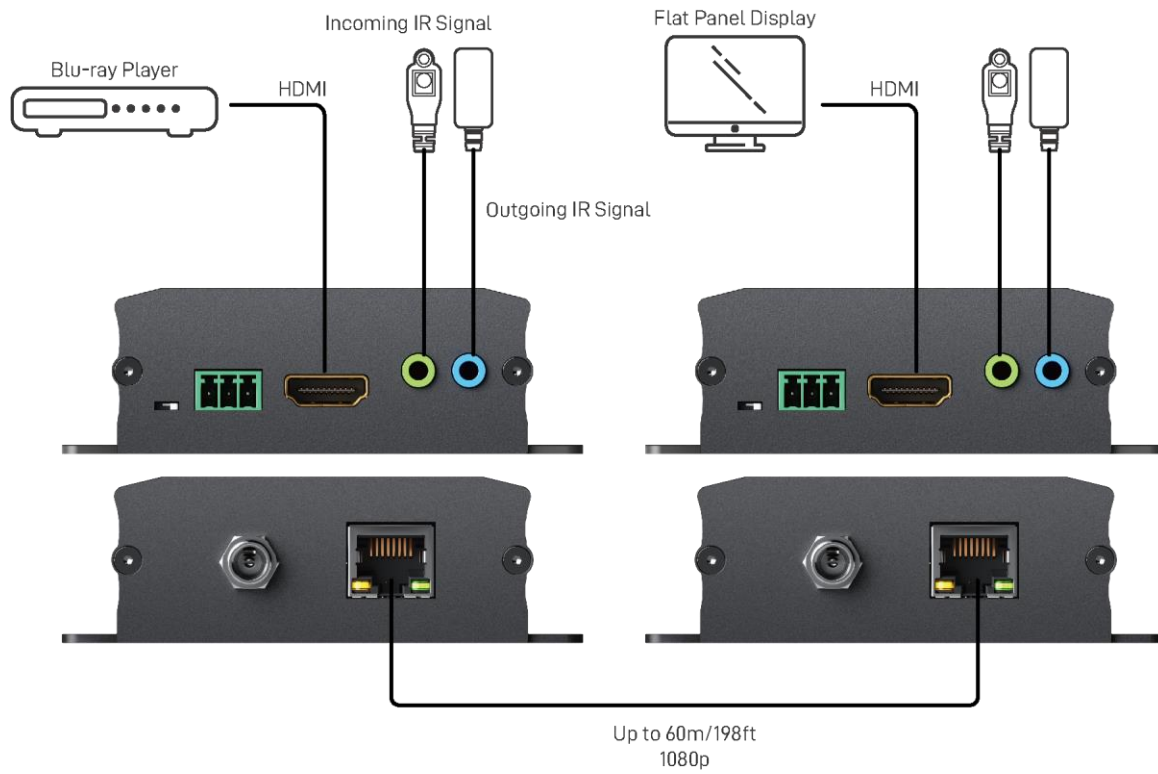
1. **Slide Switch:** for F/W update ([Left] Normal Mode; [Right] F/W update Mode)
2. **RS-232(terminal block format):** The order of RS-232 pin are TX, RX, GND (from the left side to the right)
3. **HDMI IN:** Connects to a HDMI source with HDMI male-male cable
4. **IR Receiver:** Infrared 3.5mm socket for plugging in the extension cable of IR receiver
5. **IR Blaster:** Infrared 3.5mm socket for plugging in the extension cable of IR blaster
6. **Latch-locking power jack:** Connect to 12V DC power supply
7. **Power LED:** Power indicator LED
8. **Link LED:** Link indicator LED
9. **RJ45:** Plug in a Cat-5/5e/6 cable that needs to be linked to the receiving unit AcePro-CE88-1-RX

Receiving unit ► AcePro-CE88-1-RX



1. **Slide Switch:** for F/W update ([Left] Normal Mode; [Right] F/W update Mode)
2. **RS-232(terminal block format):** The order of RS-232 pin are TX, RX, GND (from the left side to the right)
3. **HDMI OUT:** Connects to a HDMI display with HDMI male-male cable
4. **IR Receiver:** Infrared 3.5mm socket for plugging in the extension cable of IR receiver
5. **IR Blaster:** Infrared 3.5mm socket for plugging in the extension cable of IR blaster
6. **Latch-locking power jack:** Connect to 12V DC power supply
7. **Power LED:** Power indicator LED
8. **Link LED:** Link indicator LED
9. **RJ45:** Plug in a Cat-5/5e/6 cable that needs to be linked to the transmitting unit AcePro-CE88-1-TX

# CONNECTION DIAGRAM



# IR PASS-THROUGH

[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 end 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.

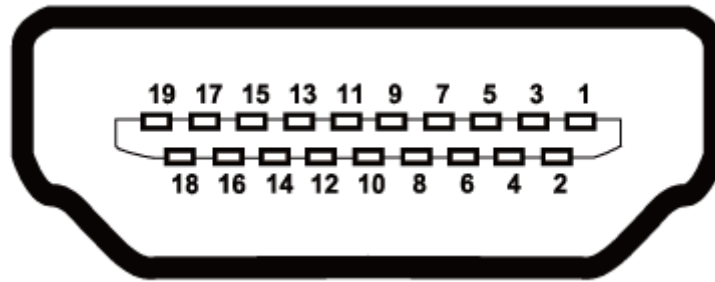
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You can buy any IR extension cables in the market that are compatible to the definition of the IR sockets for the extender if necessary for replacement use. However, IR cables longer than 2m (6-ft) may not work.



# HDMI PIN DEFINITION



Type A (Receptacle) HDMI

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

## HARDWARE INSTALLATION

1. Connect a HDMI or DVI source (such as a Blu-ray Disc player) to the transmitting unit AcePro-CE88-1-TX.
2. Connect a HDMI or DVI display (such as a LCD TV) to the receiving unit AcePro-CE88-1-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.
6. Plug in 12V DC power supply unit to the power jack of the receiving unit AcePro-CE88-1-RX or the transmitting unit AcePro-CE88-1-TX.

## NOTICE

1. All HDMI over CAT5 transmission distances are measured using Belden 1583A CAT5e 125MHz UTP cable and ASTRODESIGN Video Signal Generator VG-859C & VG-870B.
2. 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.
3. 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.
4. EIA/TIA-568-B termination (T568B) for Cat-5/5e/6 cables is recommended for better performance.
5. 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.
6. 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.
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.

## WARRANTY

The AceProAV warrants the AcePro-CE88-1 HDMI 2.0 HDBaseT Extender with RS-232 & IR/PoC free from defects in the material and workmanship for 1 year from the date of purchase from the AceProAV or an authorized dealer. Should this product fail to be in good working order within 1 year warranty period, The AceProAV, at its option, repair or replace the unit, provided that the unit has not been subjected to accident, disaster, abuse or any unauthorized modifications including static discharge and power surge. This warranty is offered by the AceProAV for its BUYER with direct transaction only. This warranty is void if the warranty seal on the metal housing is broken.

Unit that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for 90 days from the day of reshipment to the BUYER. If the unit is delivered by mail, customers agree to insure the unit or assume the risk of loss or damage in transit. Under no circumstances will a unit be accepted without a return authorization number.

The warranty is in lieu of all other warranties expressed or implied, including without limitations, any other implied warranty or fitness or merchantability for any particular purpose, all of which are expressly disclaimed.

Proof of sale may be required in order to claim warranty. Customers outside Taiwan are responsible for shipping charges to and from the AceProAV. Cables and power adapters are limited to a 30 day warranty and must be free from any markings, scratches, and neatly coiled.

The content of this manual has been carefully checked and is believed to be accurate. However, The AceProAV assumes no responsibility for any inaccuracies that may be contained in this manual. The AceProAV will NOT be liable for direct, indirect, incidental, special, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. Also, the technical information contained herein regarding the AcePro-CE88-1 features and specifications is subject to change without further notice.

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