

Paugge



CHD21-ADP

USB C to HDMI CONVERTER

DATASHEET

1. General Description

Paugge USB C to HDMI 2.1 converter adapter combines a DisplayPort input interface and a digital High-Definition Multimedia Interface (HDMI) output.

2. Features

General

- VESA DisplayPort™ (DP) v1.4 compliant receiver
- HDMI specification v2.1 compliant transmitter, data rate up to FRL mode up to 12-Gbps per channel and TMDS mode up to 6-Gbps.
- Embedded MCU
- Support both HDCP1.4 & HDCP2.3 with on-chip keys to support HDCP repeater.
- Support RGB 4:4:4 8/10bit bpc and YCbCr 4:4:4 , 4:2:2 ,4:2:0 8/10-bit bpc
- Support DSC v1.2a encoder, decoder, and pass-through mode
- Support max. resolution/timing up to 8K@60p / 4K@240Hz
- Support 3D stereo video format transport
- Support Variable Refresh Rate (VRR)
- Support Color Space Conversion
- Support LPCM audio format with max audiosample rate up to 8-channel 192KHz
- Support HBR audio format up to 2-channel 768KHz
- Support 3D audio format up to 16-channel 96KHz
- Support CEC over AUX channel
- Support High Dynamic Range (HDR-10)
- Support VESA Monitor Control Command Set (MCCS)
- Support Digital Signature Application for FW security storage/programming

Embedded MCU

- Industrial standard 8051 core
- Support I2C Master and Slave up to 400-KHz.

Package

- QFN88 (10x10mm)
- 3.3/ 1.1V system voltage

DisplayPort (DP) Digital Input

- VESA DisplayPort™ v1.4 compliant. Support 1/2/4 lanes up to HBR3 (8.1-Gbps) input.
- Built-in high-performance adaptive equalizer.
- Support 1-MHz AUX channel
- Support Hot Plug Detect (HPD)
- Support DSC v1.2a and backward compatible with the former version
- Support DSC decoder and pass-through mode
- Support max. resolution/timing up to 8K@60p / 4K@240Hz
- Support CEC over AUX channel
- Support LPCM audio format with max audiosample rate up to 8-channel 192KHz
- Support HBR audio format up to 2-channel 768KHz
- Support 3D audio format up to 16-channel 96KHz

HDMI Output Interface

- HDMI specification v2.1 compliant transmitter, data rate up to FRL mode up to 12-Gbps per channel and TMDS mode up to 6-Gbps
- Audio stream handling
- LPCM and Compressed Audio encoding formats
- Support LPCM audio format with max audio sample rate up to 8-channel 192KHz
- Support HBR audio format up to 2-channel 768KHz
- Support 3D audio format up to 16-channel 96KHz
- Support DSC v1.2a and backward compatible with the former version
- Support DSC encoder and pass-through mode
- Support max. resolution/timing up to 8K@60p / 4K@240Hz
- Support Variable Refresh Rate (VRR)
- Support CEC over AUX channel

3. Interfaces and Capability

31 USB C Input

Paugge USB C to HDMI 2.1 converter adapter combines consists of four-lane Main Link differential pair, one AUX channel differential pair, and one HPD signal.

1- Main Link

2/4 lanes differential pair capable of operating HBR3 (8.1Gbps), HBR2 (5.4Gbps), HBR (2.7-Gbps) and RBR (1.62-Gbps) data rates for high definition uncompressed video transmission. The main link is fully compliant with the DisplayPort™ v1.4 specification.

2- AUX Channel

A differential half-duplex bi-directional channel used for side-band communication between the DisplayPort™ source and sink devices. The bandwidth of this link is up to 1-Mbps.

3- Hot Plug Detect (HPD)

The HPD signal is fully compliant with the DisplayPort™ v1.4. This includes all input voltage requirements and generation of hot-plug and IRQ_HPDP events.

32 HDMI output (Transmitter)

Paugge USB C to HDMI 2.1 converter adapter is fully compliant to the High-Definition Multimedia Interface Specification, Version 2.1 with the FRL link rate up to 12-Gbps per channel or TMDS link rate up to 6-Gbps, allowing display up to 7680 x4320 (8K4K) at 60Hz refresh rate with 8/10-bit color depth

Support a monitor hot-plug detection signal to detect the attachment and presence of a monitor, as well as a DDC channel for retrieval of the EDID information from the monitor.

Audio output support consists of up to 8 channels of LPCM at 32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz,192kHz sample rate and audio sample size of 16, 20 and 24-bits per sample.

33 HDCP repeater

The High-bandwidth Digital Content Protection (HDCP) provides a secure audio and video content on DisplayPort™ receiver and HDMI/DVI transmitter interfaces, it also provides appropriate security measures to prevent discovery and nullification of the HDCP keys stored within Paugge USB C to HDMI 2.1 converter adapter. CHD21-ADP is compliant with both HDCP version 1.4 & 2.3 specifications. The features of HDCP are summarized as below: The DisplayPort™ receiver performs upstream HDCP function including HDCP authentication and HDCP decryption. The HDMI/DVI transmitter performs downstream HDCP function including HDCP authentication and HDCP encryption. HDCP repeater function interfacing with both upstream and downstream HDCP authentication engine is implemented.

4. Power Consumption

Table 1 Power Consumption

Operation / Standby	Min	Typ	Max	Unit
Operation mode 8K4K @60Hz with 10bpc, RGB/YUV444, DP: 4-lane HBR3, HDMI: FRL 12G, HDR10, and DSC (Enc + Dec)		3,300		mW
Operation mode 8K4K @60Hz with 10bpc, YUV420, DP: 4-lane HBR3, HDMI: FRL 10G, HDR10, and DSC (Dec)		2,200		mW
Operation mode 8K4K @30Hz with 10bpc, RGB/YUV444, DP: 4-lane HBR3, HDMI: FRL 8G, HDR10, and DSC off		2,000		mW
Operation mode 4K2K @60Hz with 8bpc, RGB/YUV444, DP: 4-lane HBR2, HDMI: TMDS 6G, SDR, and DSC off		950		mW
Stand-by mode		42.5		mW

Note: In practice, the measured power consumption might be slightly different from the tables above due to the different video content and the different measurement equipment