

## Advanced HDMI to DisplayPort (dual mode) converter

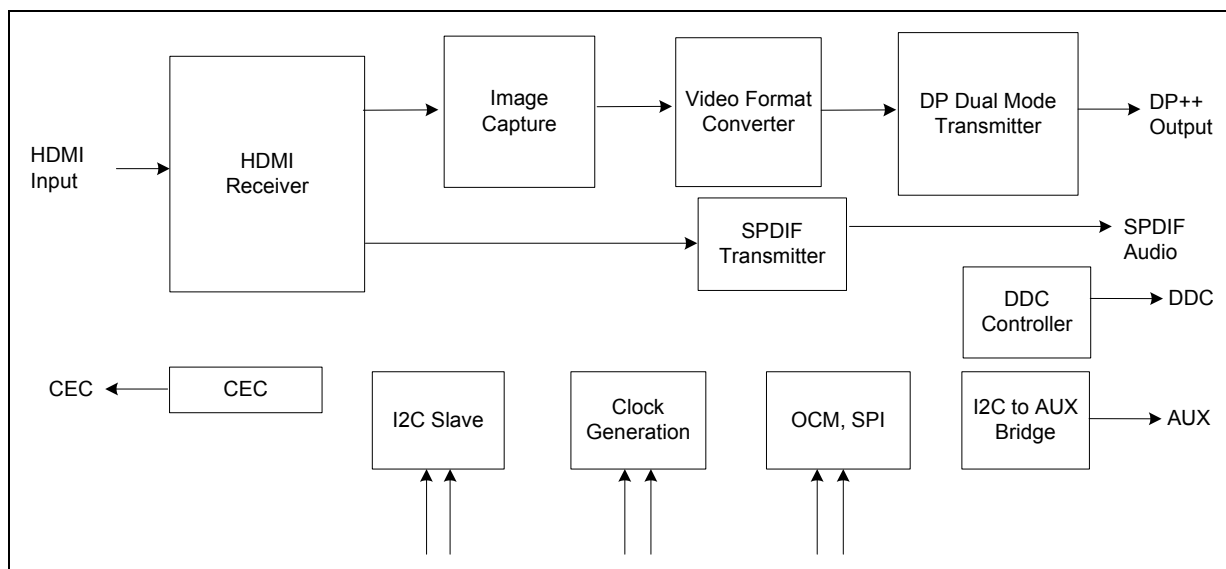
Data brief

### Features

- DisplayPort® (dual mode) transmitter
  - DP 1.2a compliant
  - Link rate HBR2/HBR/RBR
  - 1, 2, or 4 lanes
  - AUX CH 1 Mbps
  - Supports eDP operation
  - HDMI / DVI operation with level translator
- HDMI 1.4 receiver
  - Link rate up to 2.97 Gbps/data pair
  - Color depth up to 48 bits
  - 3D video timings
  - CEC
- SPDIF audio output
- HDCP repeater with embedded keys
- ASSR–eDP display authentication option
- I2C to AUX bridge for EDID/MCCS pass through
- Device configuration options
  - SPI Flash
  - I2C host interface
- Spread spectrum on DisplayPort interface for EMI reduction
- Deep color support
  - RGB/YCC (4:4:4) – 16-bit color
  - YCC (4:2:2) – 16-bit color
  - Color space conversion – YUV to RGB and RGB to YUV
- Bandwidth
  - Video resolution up to 4K x 2K @ 30 Hz; 1920 x 1080 @ 120 Hz
  - Audio 7.1 Ch up to 192 kHz sample rate
- Low power operation; active 450 mW, standby 21 mW
- Package
  - 81 BGA (8 x 8 mm)
- Power supply voltages
  - 3.3 V I/O; 1.2 V core

### Applications

- Audio-video accessory (dongle) for PC/notebooks and docking stations



# 1 Description

The STDP2600 is a high-speed HDMI to DisplayPort converter IC targeted for applications such as audio-video accessories, docking stations, notebook motherboard designs, etc. This device includes an HDMI 1.4 compliant receiver and a VESA DP Standard Ver. 1.2a compliant dual mode transmitter, implementing a single link DisplayPort output port comprising four Main lanes, AUX CH, and HPD.

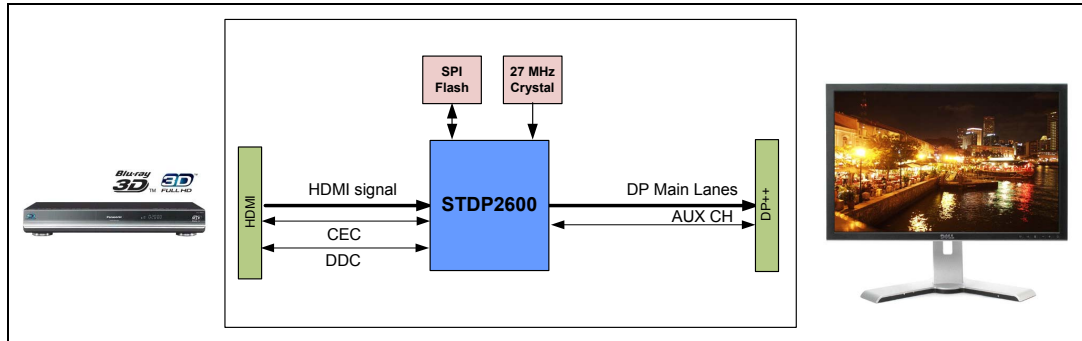
The STDP2600 uses ST's latest generation DisplayPort dual mode transmitter technology that supports both DisplayPort and TMDS signal formats (DP++). DisplayPort transmitter supports HBR2 speed, a data rate of 5.4 Gbps per lane with a total bandwidth of 21.6 Gbps link rate. The transmitter is also capable of supporting HDMI or single link DVI output through a passive level translator (dongle). The HDMI receiver unit supports link rate up to 2.97 Gbps that corresponds to a pixel rate of 297 MHz, adequate for handling video timings up to FHD 120 Hz 3D formats. This device delivers deep color video up to 16-bits per color at 1080p 60 Hz and lower video resolutions. STDP2600 allows audio transport from the source to desired audio rendering devices over the DP++ output or through the SPDIF port. The audio signal from the source can be routed simultaneously to DP++ and SPDIF output ports. For example, STDP2600 allows routing of any two audio channels on the SPDIF port, while transporting up to eight channels on the DP++ port.

The STDP2600 supports RGB and YCbCr colorimetric formats with color depth of 16, 12, 10, and 8 bits. This device features HDCP 1.3 content protection scheme with an embedded key option for secure transmission of digital audio-video content. It also operates as an HDCP repeater for the downstream sink. The eDP authentication option ASSR (Alternative Scrambler Seed Reset) is supported for embedded application.

The I2C-to-AUX translator in STDP2600 allows the upstream HDMI source to access EDID and transfer MCCS commands to a downstream DisplayPort sink device over the DisplayPort interface. This device has an on-chip microcontroller with SPI and I2C host interface for system configuration purposes. STDP2600 can be configured with an external SPI Flash for custom applications. In addition, it allows register level configuration from an external host controller through I2C interface.

## 2 Application overview

Figure 1. STDP2600 in BD player/game console accessory application



## 3 Feature attributes

### 3.1 Input interface

- HDMI standard Ver. 1.4 compliant (DC coupled)
- Link rate: 2.97 Gbps/data pair max
- Video: HDMI 1.4 primary and secondary timing formats, as well as CEA861 timing formats with pixel repetition for lower resolutions
- Deep color encoding up to 48 bits/pixel in 444 and 422; encoding in 601, 709, and IEC61966 color spaces
- Audio: IEC60958 L-PCM and IEC61937 streams up to 24 bits/sample from 32 kHz to 192 kHz
- DDC slave port
- HPD assertion

### 3.2 Output interface

- DP++ interface featuring
  - AC coupled DisplayPort Ver. 1.2a compliant transmitter; supports eDP
  - AC coupled HDMI 1.4 transmitter (with external level shifter)
- DP main link configuration (SST format only, no MST format support)
  - HBR2/HBR/RBR link rate
  - 1, 2, or 4 lanes
- AUX CH: Manchester transaction format
- HPD: IRQ\_HPDP assertion
- Video: EDID 1.4 and CEA861 video timing and formats from 24 to 48 bits/pixel in RGB or YCC422 or YcC444 colorimetry
- Audio: DisplayPort 1.2a standard info frame packets and IEC60958/61937 type audio stream packets ranging from 16 to 24 bits/sample, 32 to 192 kHz sample rates
- HDMI link rate: 2.97 Gbps/data pair max

### 3.3 Deep color support

- RGB/YCC (4:4:4) – 16-bit color
- YCC (4:2:2) – 16-bit color
- Color space conversion – YUV to RGB and RGB to YUV

### 3.4 Supported video timings

- 4096 x 2160 (4K x 2K) 24 Hz/30 Hz; 24 bits/pixel
- 1920 x 1080 (FHD) 120 Hz: 24 bits/pixel
- 2560 x 1600 (WQXGA) 60 Hz: 24 bits/pixel
- Up to 1920 x 1080 (FHD) 60 Hz, 48, 36, 30 bits/pixel
- All compatible 3D formats defined in DP 1.2a and HDMI 1.4 specifications
- All standard CEA861 timing formats

### 3.5 Supported audio timings

- All audio formats as specified in DP 1.2a and HDMI 1.4 specifications
- SPDIF; 2-Ch LPCM, AC3, DTS, bit depth up to 24 bits, sample rate up to 192 kHz

### 3.6 Control channel interfaces

- AUX CH, I2C host interface, SPI (optional), and UART (UART for test/debug purposes only)

### 3.7 HDCP 1.3 support

- Key sets for HDMI RX and DP/HDMI TX integrated in one-time programmable ROM (OTP)
- Standalone HDCP repeater capability
- Supports eDP display authentication option ASSR (Alternate Scrambler Seed Reset)

### 3.8 Package

- 81 BGA (8 x 8 mm), 0.8 ball pitch

### 3.9 Power supply voltages

- 3.3 V I/O; 1.2 V core

### 3.10 ESD

- 2 KV HBM, 500 V CDM

## 4 Ordering information

Table 1. Order codes

Part number	Description
STDP2600-AC	81 BGA (8 x 8 mm) delivered in trays
STDP2600-ACT	81 BGA (8 x 8 mm) delivered in tape and reel

### 4.1 ECOPACK<sup>®</sup>

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

## 5 Revision history

**Table 2. Document revision history**

Date	Revision	Changes
05-Jun-2012	1	Initial release.
07-May-2013	2	Changed DP1.2 to DP1.2a throughout. Added eDP and ASSR feature in first page, Features, Description, and Feature attributes sections. Updated Ordering information section.

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