



# STDP2650

## Advanced DisplayPort to HDMI converter

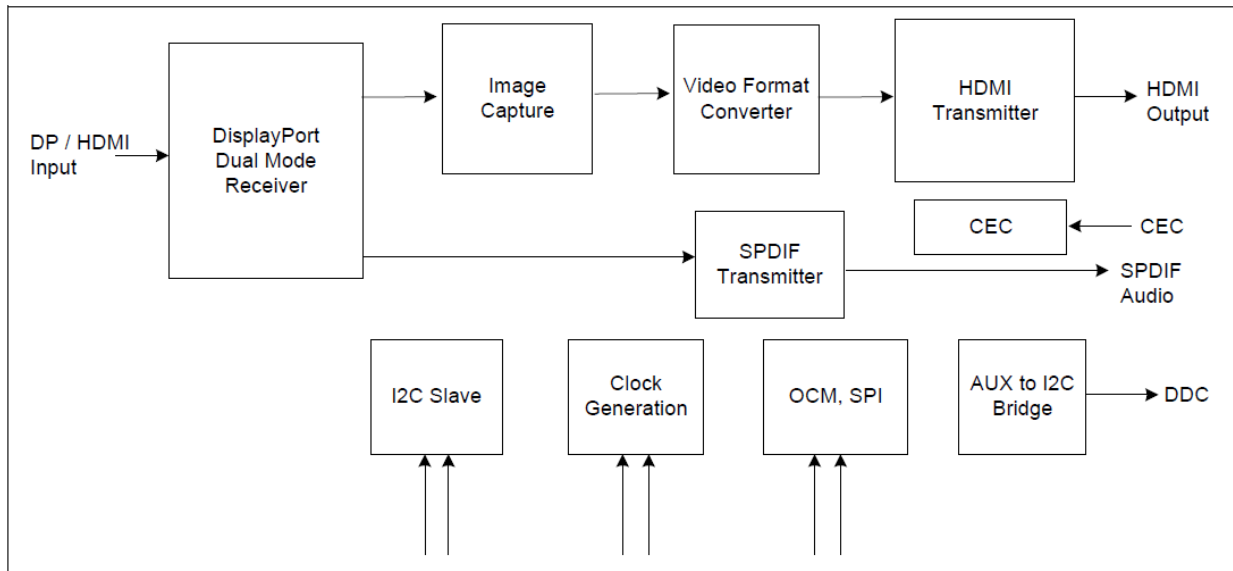
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### Features

- DisplayPort™ (DP) dual-mode receiver
  - DP 1.2a/HDMI 1.4 compliant
  - Link rate HBR2/HBR/RBR
  - 1, 2, or 4 lanes
  - AUX CH 1 Mbps
  - Supports eDP operation
  - DC coupled TMDS input up to 2.97Gbps/data pair
- HDMI 1.4 transmitter
  - Max data rate up to 2.97 Gbps/data pair
  - Color depth up to 48 bits
  - 3D video timings
  - CEC
- Operates as DP-to-HDMI protocol converter or HDMI re-timer
- SPDIF audio output
  - 192 kHz/24 bits
  - Compressed/LPCM
- HDCP repeater with embedded keys
- ASSR -- eDP display authentication option
- AUX to I2C 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 462 mW, standby 21 mW
- Package
  - 81 LFBGA (8 x 8 mm)
- Power supply voltages
  - 3.3 V I/O; 1.2 V core

### Applications

- DisplayPort to HDMI bridge for TVs and projectors
- Audio-video accessory (dongle) for desktop, notebook computers, and tablets



## 1. Description

The STDP2650 is a high-speed DisplayPort-to-HDMI protocol converter or HDMI-to-HDMI re-timer IC for applications such as audio-video cable accessories, docking stations, and TV front-end design. This device includes a VESA DP Standard Ver.1.2a compliant dual-mode receiver and an HDMI 1.4 compliant transmitter. The DisplayPort dual-mode input port comprises four main lanes, AUX CH, and HPD signal. The main lanes can receive either a DP or TMDS signal format. The HDMI output port includes DDC, CEC, and HPD support.

The STDP2650 uses Kinetic's latest generation DisplayPort dual-mode receiver technology that supports HBR2 speed, a data rate of 5.4 Gbps per lane with a total bandwidth of 21.6 Gbps link rate. It can also receive TMDS signal up to 2.97 Gbps per data pair. The HDMI transmitter is capable of supporting link rate up to 2.97 Gbps that corresponds to a pixel rate of 297 MHz, adequate for handling video resolution 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. The STDP2650 allows audio transport from the source to desired audio rendering devices over the HDMI output or through the SPDIF port. The audio signal from the source can be routed simultaneously to HDMI and SPDIF output ports. For example, the STDP2650 allows routing of any two audio channels on the SPDIF port, while transporting up to eight channels on the HDMI port.

The STDP2650 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 AUX-to-I2C translator in the STDP2650 allows the upstream DisplayPort source to access EDID and transfer MCCS commands to a downstream sink over the HDMI interface. This device has an on-chip microcontroller with SPI and I2C host interface for system configuration purposes. The STDP2650 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. STDP2650 in notebook accessory application

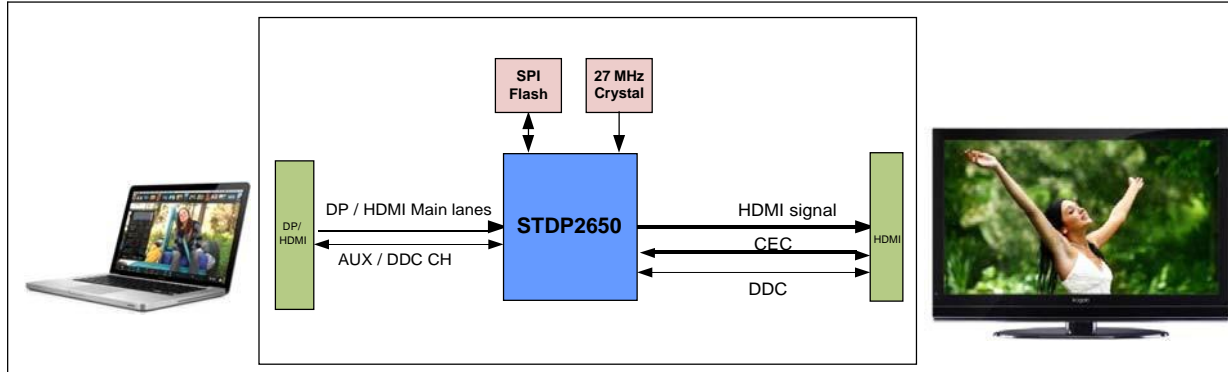
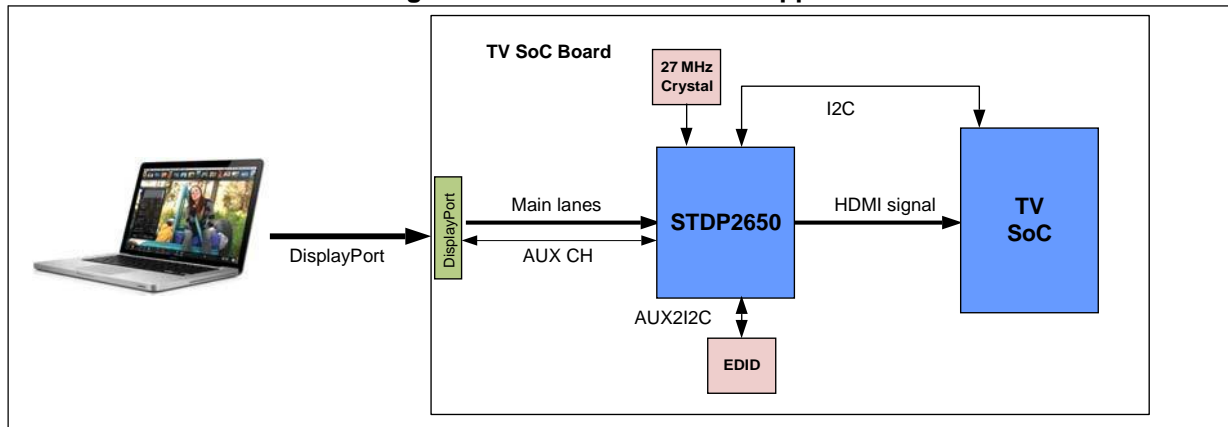


Figure 2. STDP2650 inside TV application



### 3. Ordering information

**Table 1. Order codes**

<b>Part Number</b>	<b>Operating Temperature</b>	<b>Package</b>
STDP2650-AD	0°C to +70°C	81 LFBGA (8 x 8 mm) delivered in trays
STDP2650-ADT	0°C to +70°C	81 LFBGA (8 x 8 mm) delivered in tape and reel