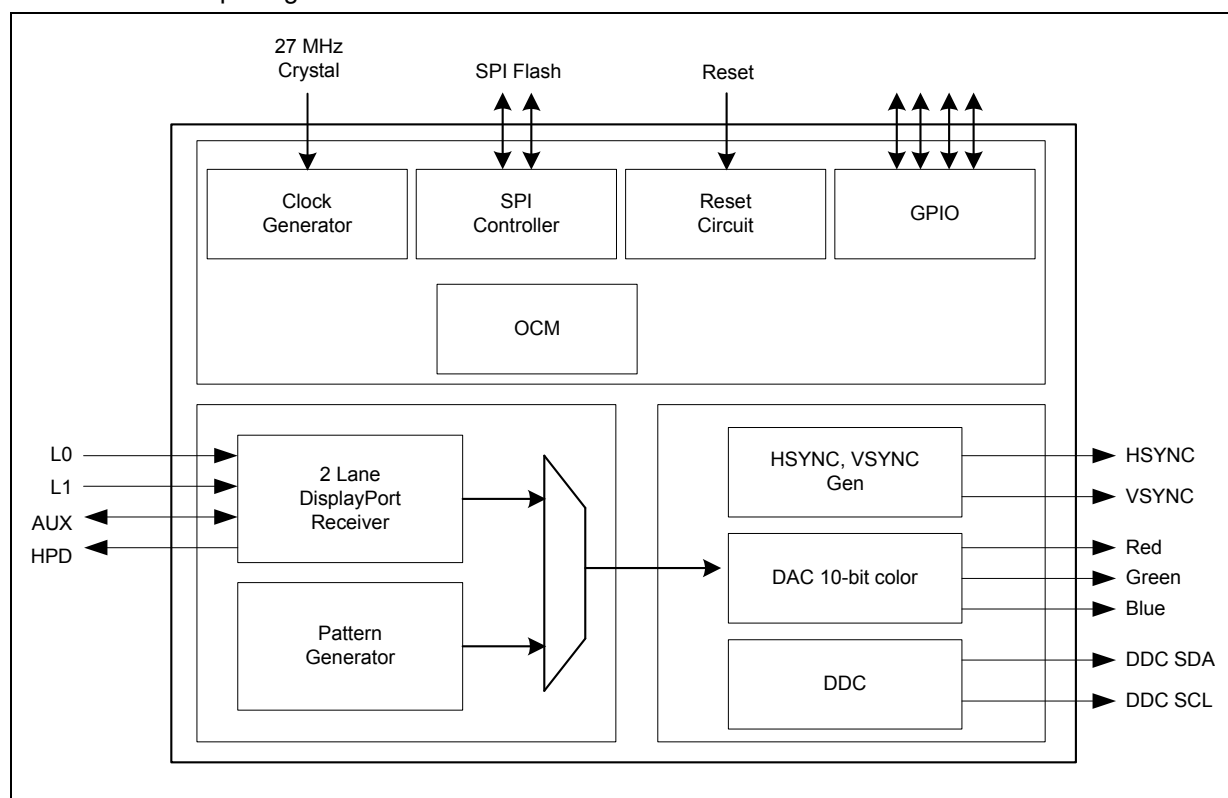# STDP3150

DisplayPort to VGA converter

Features

- Two lane DisplayPort® 1.2a receiver
- Triple 10-bit video DAC
  - 162 MSPS throughput rate
  - VSIS compatible
  - RGB output with 0 to 700 mV range
- 3.3 V HSYNC, VSYNC
- Resolution through WUXGA
- EDID, MCCS pass-through support
- 3.3 V DDC output signals
- Sink detection logic
- Low power operation – Active 400 mW, standby mode 15 mW
- Package: 64-pin QFN, 6 x 6 mm

Applications

- DisplayPort to VGA dongle as an attachment to notebook and desktop PCs
- DisplayPort to VGA conversion for notebook and desktop PC motherboard applications

www.st.com

1 Description

STDP3150 is a DisplayPort to VGA signal format converter for interfacing DisplayPort based PC, notebook, tablet, and smart phones with conventional VGA displays. DisplayPort offers a unified, scalable, and cost effective interface for embedded and external display applications. As desktop and notebook PCs are increasingly transitioning from conventional analog type interfaces to DisplayPort, STDP3150 facilitates the transition by offering seamless connectivity between new DisplayPort PC, notebooks, and the installed base VGA monitors and projectors. Besides the dongle application, STDP3150 is also a perfect fit for the notebook and desktop motherboard designs based on new generation Intel, AMD CPU/GPU architecture. STDP3150 is a highly integrated converter featuring a DisplayPort receiver, video DAC, clock form generator, test pattern generator, and sink detection block. In addition, STDP3150 includes EDID and MCCS pass-through features, forming a fully transparent operation between the PC and display. Active power consumption of this device is as low as 400 mW, and thus it can be powered by the DisplayPort source when used in a dongle application. The device has a built-in sink detection feature that determines the active and standby state. The device enters into standby (low power) state whenever the VGA cable is disconnected and returns to normal operation when the cable is connected back.

STDP3150 supports video resolutions from VGA through WUXGA. The input DisplayPort interface consists of two main lanes, AUX channel, and HPD signal that maps directly to a standard DisplayPort connector via two layers PCB. The output interface consists of analog R, G, B video, Hsync, Vsync, and DDC signals. Analog video signal amplitude ranges from 0 to 700 mV from a 10-bit video DAC with maximum sampling frequency of 162 MHz. The VGA output signal interface conforms to the VSIS standards with separate Hsync and Vsync control signals. The DDC_SDA and DDC_CLK signals are driven from an I2C master, which controls I2C traffic between the DisplayPort AUX channel and external slave device.

STMicroelectronics offers an STDP3150 designers kit with complete reference hardware and firmware.

Figure 1.   System diagram
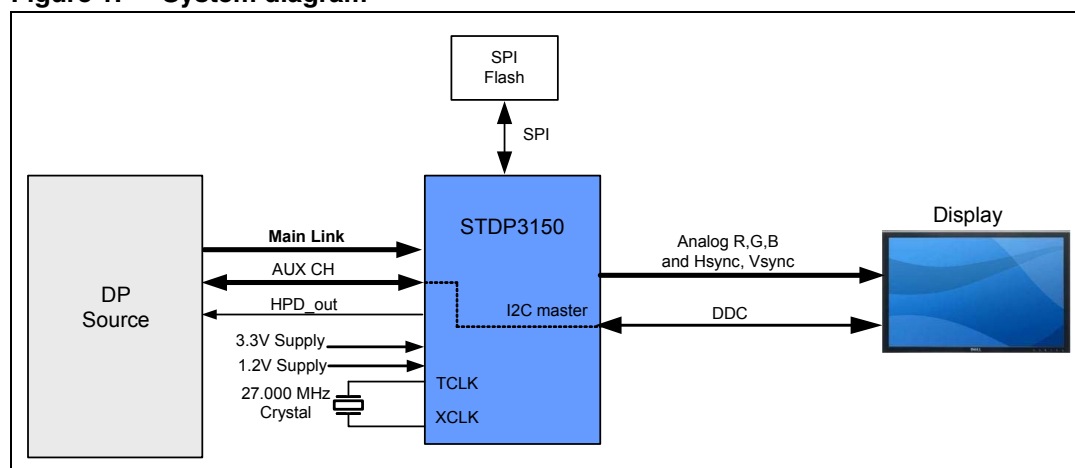
2 Benefits

- Production-proven DisplayPort receiver from the DisplayPort leader
- Comprehensive feature set for DisplayPort to VGA dongle and for notebook embedded application
- Proven interoperability with DisplayPort sources from all major graphics vendors
- Cost savings due to optimized BOM, low power, low EMI, and small form factor
- DisplayPort CTS compliant
- Windows based software tool for factory/field upgrade – programs over DP AUX channel

3 Feature attributes

- DisplayPort 1.2a compliant receiver offering 5.4 Gbps bandwidth over two lanes
- Integrated triple 10-bit, 162 MHz video DAC for analog VGA signal output
- Supports up to 1080p, 1920 x 1200 reduced blanking video resolution
- EDID and MCCS pass-through from PC source to display
- Spread spectrum (de-spreading) for EMI reduction
- Automatic sink detection
- Low power standby mode operation initiated based on sink detection status
- SPI interface with external Serial Flash for storing firmware and system configuration data for customization purposes
- Optional two-wire host interface for device configuration using external controller
- UART interface for chip debug and development purpose
- ISP over DP AUX channel
- General-purpose I/O pins for system usage
- Powered from DisplayPort source
- 3.3 V IO, 1.2 V Core
- 64-pin QFN (6 x 6 mm) package

4   Ordering information

Table 1.   Order codes

Part number	Description
STDP3150-AB	64-pin QFN (6 x 6 mm)

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

5 Revision history

Table 2. Document revision history

Date	Revision	Changes
22-Nov-2012	1	Preliminary release.
30-Nov-2012	2	Updated silicon revision in Section 4: Ordering information.
25-Jan-2013	3	All instances of DisplayPort 1.1a changed to DisplayPort 1.2a.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com