

## DisplayPort transmitter

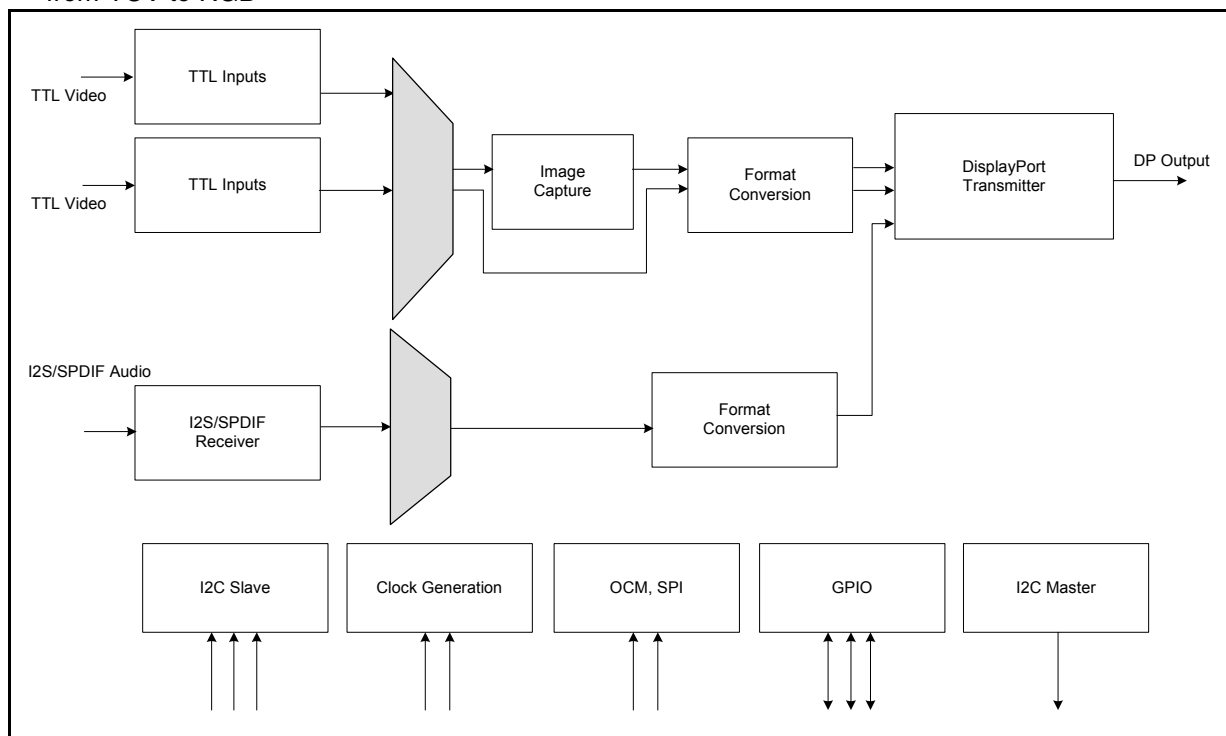
Data Brief

### Features

- DisplayPort™ 1.1a compliant transmitter
- HDCP 1.3 support
- DisplayPort link comprising four main lanes and one auxiliary channel
- Output bandwidth sufficient to transmit AV streams up to WQXGA or Full HD@120 Hz along with multi-channel 24-bit audio streams @192 kHz sampling rate
- 60-bit LVTTTL input configurable as single port or dual port with single pixel per clock or two pixels per clock
- RGB or YCbCr input color format  
RGB / YCbCr 4:4:4 - 1x60, 1x48, 1x30, 1x24  
YCbCr 4:2:2 - 1x24, 1x20, 1x16
- Color space conversion from RGB to YUV and from YUV to RGB
- I2S (8 channel) or SPDIF audio input ports compliant with IEC60958 and IEC61937 formats
- I2C host interface
- General purpose inputs/outputs (Total of 28)
- Energy Spectrum Management® (ESM®)
- Package: 160-pin PQFP

### Applications

- Interface for the digital transmission of secure, high-bandwidth, uncompressed audio-visual streams in TV and PC applications
- Applications that require high bandwidth and long reach cables, such as projectors



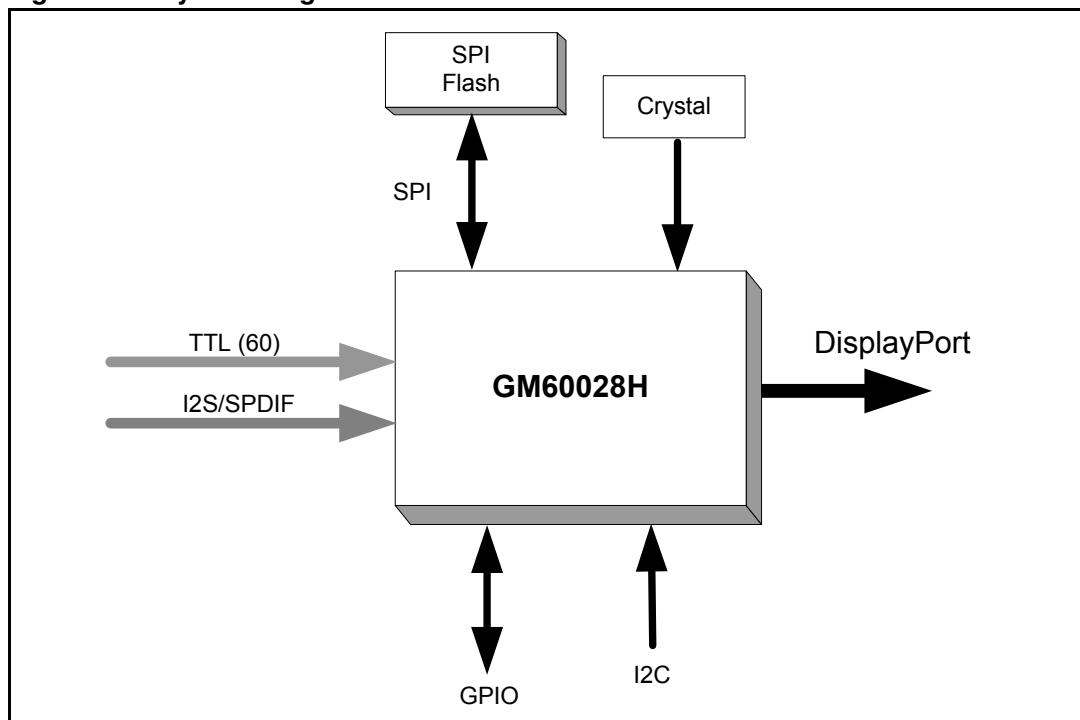
# 1 Description

The GM60028H is a DisplayPort transmitter IC designed for the transmission of secure, high-bandwidth, uncompressed digital audio-video content for next-generation TV, projector, and PC display systems. It has a single link DisplayPort output comprising four main lanes and one auxiliary channel. The total available link bandwidth is 10.8 Gbps, which is suitable for transmission of high resolution digital video and audio content. The DisplayPort link bandwidth supported by GM60028H can transmit full HD video (1080p 30-bit color per pixel) @ 120 Hz or support 2560 x 1600 @ 60 Hz graphics, along with corresponding audio streams. Unlike conventional display interfaces, DisplayPort link bandwidth can be freely traded between video resolution, refresh rate, and pixel bit depth. The auxiliary channel is a 1 Mbps bidirectional, half-duplex interface dedicated for link and device management.

The GM60028H supports RGB and YUV video color formats with a color depth of 12 (YUV 4:2:2 only), 10, and 8 bits. The GM60028H also supports both compressed and uncompressed audio formats. The 60-bit LVTTTL input ports on GM60028H can be mapped to receive video data streams either in two pixels per clock or single pixel per clock of chosen color depth. The audio signal is connected through multi-channel I2S or SPDIF ports. The received video signal is mapped onto DisplayPort main link, along with corresponding audio signal. The GM60028H supports HDCP 1.3 content protection scheme (HDCP 1.3) for secure transmission of digital audio-video content.

The GM60028H can be configured by an external Host through the I2C host interface. This device also includes general purpose inputs/outputs that can be used for controlling system components. The GM60028H features color space converter (RGB to YUV and YUV to RGB) and sample structure converter (4:4:4 to 4:2:2 and 4:2:2 to 4:4:4) for flexible interface with external video processing devices.

**Figure 1. System diagram**



## 2 Benefits

- Proven interoperability with all major DisplayPort vendors
- HDCP 1.3 support
- On-chip Microprocessor enables stand-alone operation for customized applications
- Flexible interface to ease system design – DP 1, 2, 4 lane configuration, 60/48/30/24 TTL port, YUV/RGB color format
- Low EMI
- Low power

### 3 Feature attributes

- DisplayPort 1.1a compliant transmitter offering 10.8 Gbps bandwidth over 4 lanes
- 60-bit LVTTTL input configurable as single port or dual port with single pixel per clock or two pixels per clock
- Supports RGB or YCbCr input color format:
  - RGB 444/YCbCr 444 with 60 or 48 bits using Display input Port A & B combined; with 30 or 24 bits using either Port A or Port B.
  - YCbCr 4:2:2 with 24, 20, or 16 bits using either Port A or Port B.
- I2S (channel) or SPDIF audio input ports compliant with IEC60958 and IEC61937 audio format
- Color space conversion from RGB to YUV or YUV to RGB
- Dithering support (10-bit to 8-bit)
- SPI interface with external Serial Flash for storing firmware and system configuration data
- Secured HDCP key storage using proprietary scheme
- General purpose inputs/outputs
- 2-wire host interface
- Standard UART interface
- 3.3V IO, 1.8V Core
- 160-pin PQFP

## 4 Ordering information

Table 1. Order codes

Part number	Description
GM60028H	160-pin PQFP

## 5 Revision history

**Table 2. Document revision history**

Date	Revision	Changes
18-Nov-2008	1	Initial release.

**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 AN AUTHORIZED ST REPRESENTATIVE, 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.

© 2008 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

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

[www.st.com](http://www.st.com)