PI3HDMI412AD
PI3HDMI412AD HDMI Application Information

Table of Contents

1 Introduction

PI3HDMI412AD is an 1:2 active HDMI switch capable of splitter mode for transmitting 1920x1080p HDMI or DVI signals from one source device to two sink devices at a time. Input equalization, output swing and output pre-emphasis for both output ports of PI3HDMI412AD can be adjusted via device pins or I2C control. External components in typical application circuit and layout guideline are described in this application information.

2 External Component Requirements

PI3HDMI511A is designed to accept AC-coupled as well as DC-coupled main link signals.

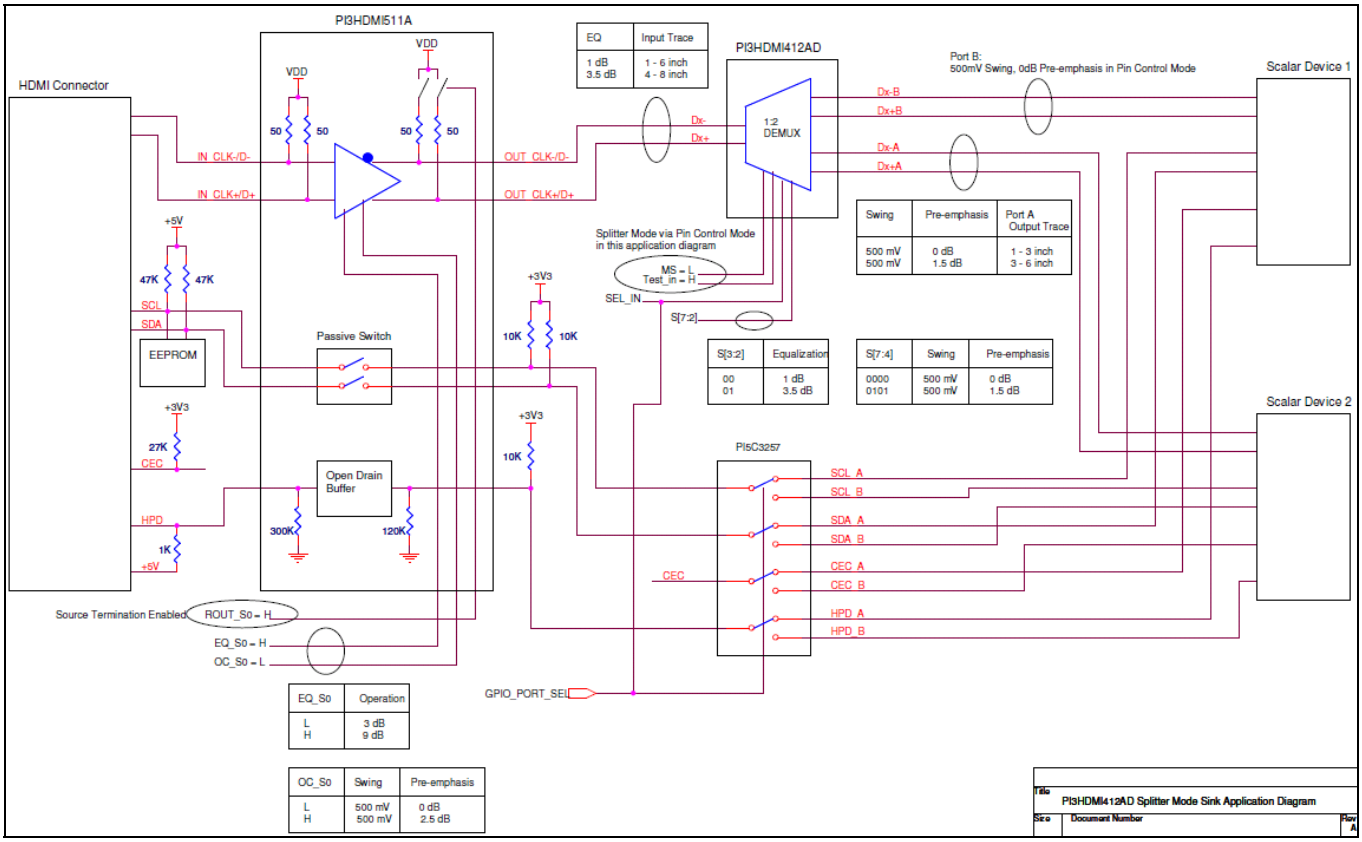

Figure 1: PI3HDMI412AD Splitter Mode in Sink Application

2.1 TMDS Channel

In sink application, there is high possibility of using a long input HDMI cable for connection. Thus, PI3HDMI511A plays an important role of equalizing the input TMDS signal and re-driving it with desired swing and pre-emphasis to the next stage. PI3HDMI511A is followed by PI3HDMI412AD to split the TMDS signal to two sink devices.

2.2 Components on DDC Channel

In sink application, EEPROM has to be asserted. Per HDMI specification version 1.4b, 47kΩ SCL and SDA pull-up resistors at sink connector side are recommended. After PI3HDMI511A, SCL and SDA are pulled to 3.3V via 10kΩ assuming that SCL and SDA of each scalar device are open drain. As 5V-to-3.3V level shifter is implemented in the design, external FET is not required.

As SCL and SDA do not pass through PI3HDMI412AD, PI5C3257 1-to-2 switch is used to do the switching.

2.3 Components on HPD Channel

As HPD_SRC of PI3HDMI511A is an open drain buffer design, external pull-up should be implemented. To be compliant, 1kΩ pull up to +5V should be designed at input HDMI connector end. A 10kΩ pull up to 3.3V is reserved for scalar devices assuming that their HPD pins are open drain. As HPD does not pass through PI3HDMI412AD, PI5C3257 1-to-2 switch is used to do the switching.

2.4 Component on CEC Channel

For HDMI application, CEC should be pulled high to 3.3V via a 27kΩ pull-up resistor. As CEC does not pass through PI3HDMI412AD, PI5C3257 1-to-2 switch is used to do the switching.

3 Layout Design Guideline

Layout guideline especially for high-speed transmission is critical. Please refer to PIxxxx High Speed Layout Guideline, AN345, for detailed recommendations.

4 References

(1) VESA DisplayPort Standard Version 1 Revision 2, Video Electronics Standards Association, January 5, 2010
(2) VESA DisplayPort Dual-Mode Standard Version 1, Video Electronics Standards Association, February 10, 2012
(3) VESA DisplayPort Interoperability Guideline Version 1.1a, Video Electronics Standards Association, February 5, 2009
(4) High-Definition Multimedia Interface Specification Version 1.4b, HDMI Licensing, LLC, October 11, 2011
(5) High-Definition Multimedia Interface Compliance Test Specification Version 1.4a, HDMI Licensing, LLC, March 4, 2010
(6) PCI Express Board Design Guidelines Draft, Intel Corporation, June 2003