

PI3HDMI201
PI3HDMI201 in Source Application
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1 Introduction

Switching between two sources, e.g. chipset and graphic card, is a common HDMI source application. A 2:1 active HDMI switch, PI3HDMI201, supports deep color and up to 25m cable length application. With various selections of equalization settings, PI3HDMI201 allows user to place the source up to 24 inches away from the switch device on PCB. It is a suitable device to handle the switching in a notebook.

2 PI3HDMI201 in Source Application

PI3HDMI201 can be employed in HDMI source application to perform re-driver function with optimized pre-emphasis and equalization settings. Assuming that the PI3HDMI201 is located close to HDMI output connector, optimum output swing, pre-/de-emphasis and equalization settings are recommended in this application note. Reference designs are also provided.

3 Equalization Setting

PI3HDMI201 offers various equalization settings for different input trace lengths. EQ_S1 and S0 control pins are used to select desired EQ setting.

Input PCB Trace Length	Recommended EQ	EQ_S1	EQ_S0
4 – 8 inch	3dB	0	1
8 – 16 inch	8dB	1	0
12 – 18 inch	Optimized EQ (12dB)	1	1
16 – 24 inch	15dB	0	0

Table 1: Recommended EQ Setting for Source Application

As 100kΩ internal pull-up resistors are implemented in EQ pins of PI3HDMI201, only external pull-down resistors are required to adjust equalization settings.

4 Swing and Pre-emphasis Settings

PI3HDMI201 offers various swing and pre-emphasis settings for source and sink applications through OC_S[2:0] control pins. If PI3HDMI201 is used in source application, two swing and pre-emphasis settings are recommended in order to fulfill the swing and VLOW requirements in HDMI Compliance Specification.

Output PCB Trace Length	Recommended Swing	Recommended Pre-emphasis	OC_S2	OC_S1	OC_S0
1 – 2 inch	500mV	0dB	0	1	1
3 – 4 inch	500mV	1.5dB	0	1	0

Table 2: Recommended OC Setting for Source Application

As 100kΩ internal pull-up resistors are also implemented in OC pins of PI3HDMI201, only external pull-down resistors are required.

5 Reference Design for Source Application

Below is a reference design of PI3HDMI201 in source application.

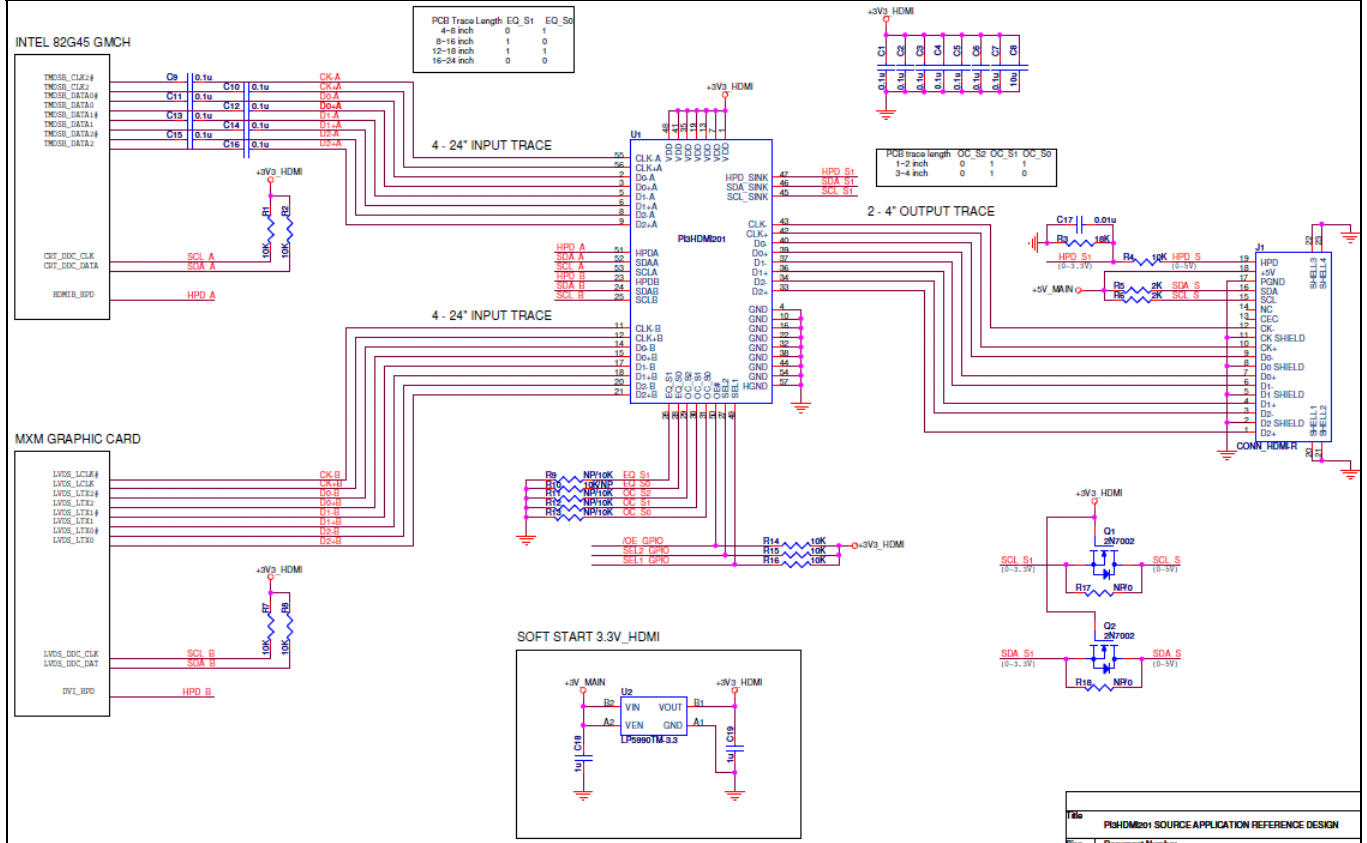


Figure 1: Reference Design of PI3HDMI201 Source Application

Intel's 82G45 north bridge and MXM's graphic card are used as sources in the reference design above. TMDs output of Intel 82G45 GMCH is SDVO interface but PI3HDMI201 has integrated 50Ω termination resistor at each TMDs input; AC coupling capacitor has to be added between each TMDs output of 82G45 and TMDs input of PI3HDMI201 to prevent SDVO from being damaged.

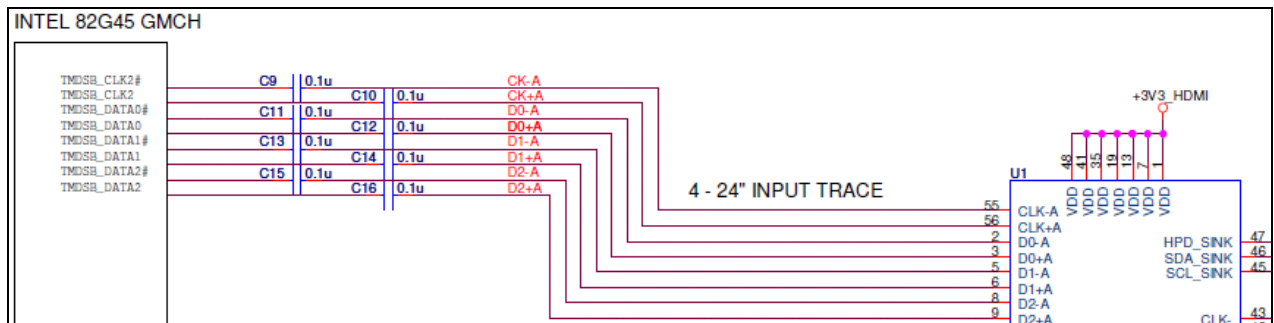


Figure 2: AC Coupling Capacitors between 82G45 TMDs Output and PI3HDMI201 TMDs Input

In addition to AC coupling implementation, VDD of PI3HDMI201 has to be soft started to avoid inrush current charging up the capacitor and avoid overshoot creation.

SOFT START 3.3V_HDMI

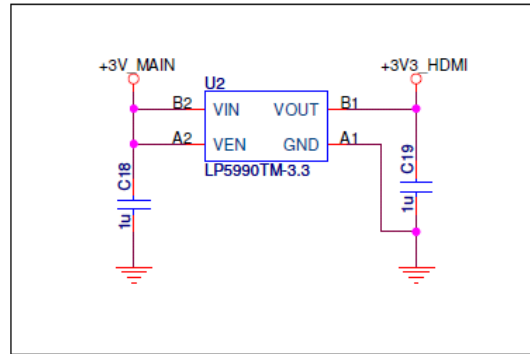


Figure 3: Soft Start Circuit of PI3HDMI201 VDD

To level shift the high level of DDC lines from 3.3V to 5V for external connection, 2N7002 FET is implemented in each DDC line.

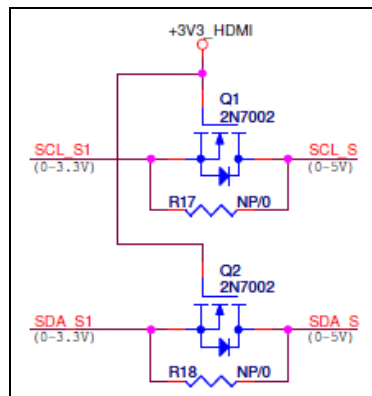


Figure 4: DDC Level Shifter of PI3HDMI201

To offer more flexibility to customers, all TMDS+ and – of PI3HDMI201 are swappable. Also, CLOCK and DATA channels are interchangeable. However, there is a trade off for interchanging CLOCK and DATA channels: the equalization setting has to be fixed to 3dB as the EQ of TMDS CLK input is fixed to 3dB by design. Below is an example.

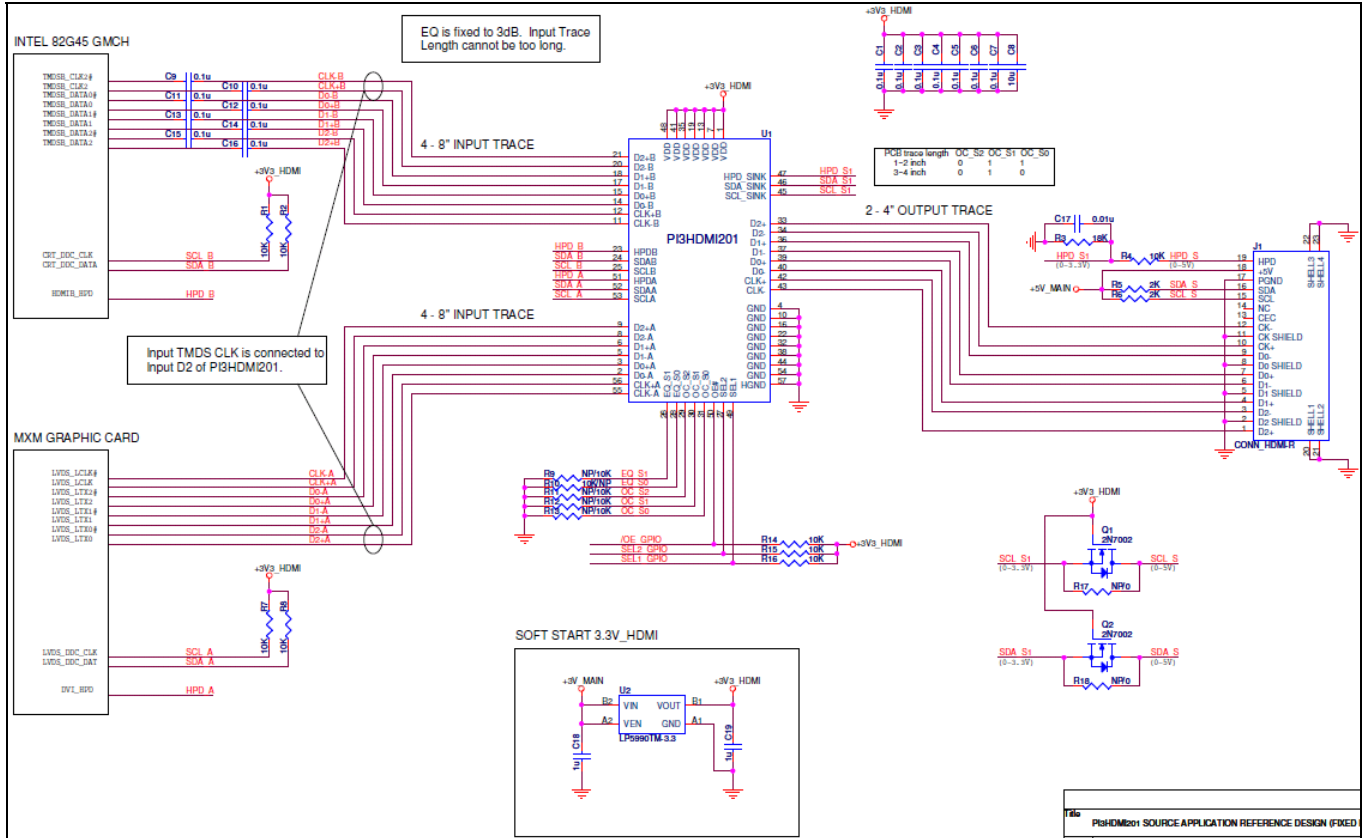


Figure 5: Reference Design of PI3HDMI201 Source Application with Interchanged CLOCK and DATA