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## 1 Introduction

PI3HDX1204B1 HDMI2.0 re-driver can be employed in source, cable as well as sink applications. This user manual describes the components and the usage of PI3HDX1204B1 EVB Rev.A to evaluate PI3HDX1204B1. As PI3HDX1204B1 shares the same demo board with PI3HDX1204-B, pin names in the schematic are based on PI3HDX1204-B.

## 2 Overview

Figure 1 is the block diagram of Pericom PI3HDX1204B1 EVB Rev.A and figure 2 shows the top view of the demo board. One HDMI plug connector (J101) on PI3HDX1204B1 EV board is used for plugging a source device, such as a DVD player. An HDMI cable can be connected between an HDMI receptacle connector (J102) on the EV board and a sink device, such as HDTV. +5V DC can be employed to the EV board via a mini USB female connector (J103) and/or the source device. 3.3V for PI3HDX1204B1 is generated from the 5V-to-3.3V regulator (U102) or by an external power supply via header pin JP108.

I2C mode is enabled via ON/OFF switch (SW101) if the data stored in the I2C bus is used to program PI3HDX1204B1. I2C address can be set via the same ON/OFF switch if I2C mode of PI3HDX1204B1 is selected. Equalization, output linearity and flat gain settings of PI3HDX1204B1 can be adjusted via another ON/OFF switch (SW102).

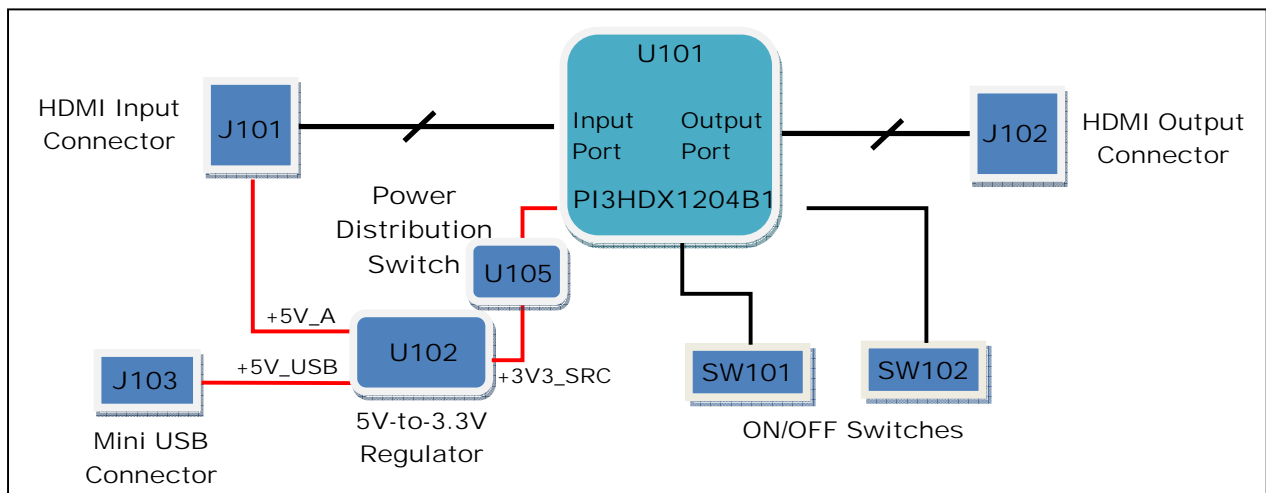


Figure 1: Block Diagram of PI3HDX1204B1 EVB Rev.A

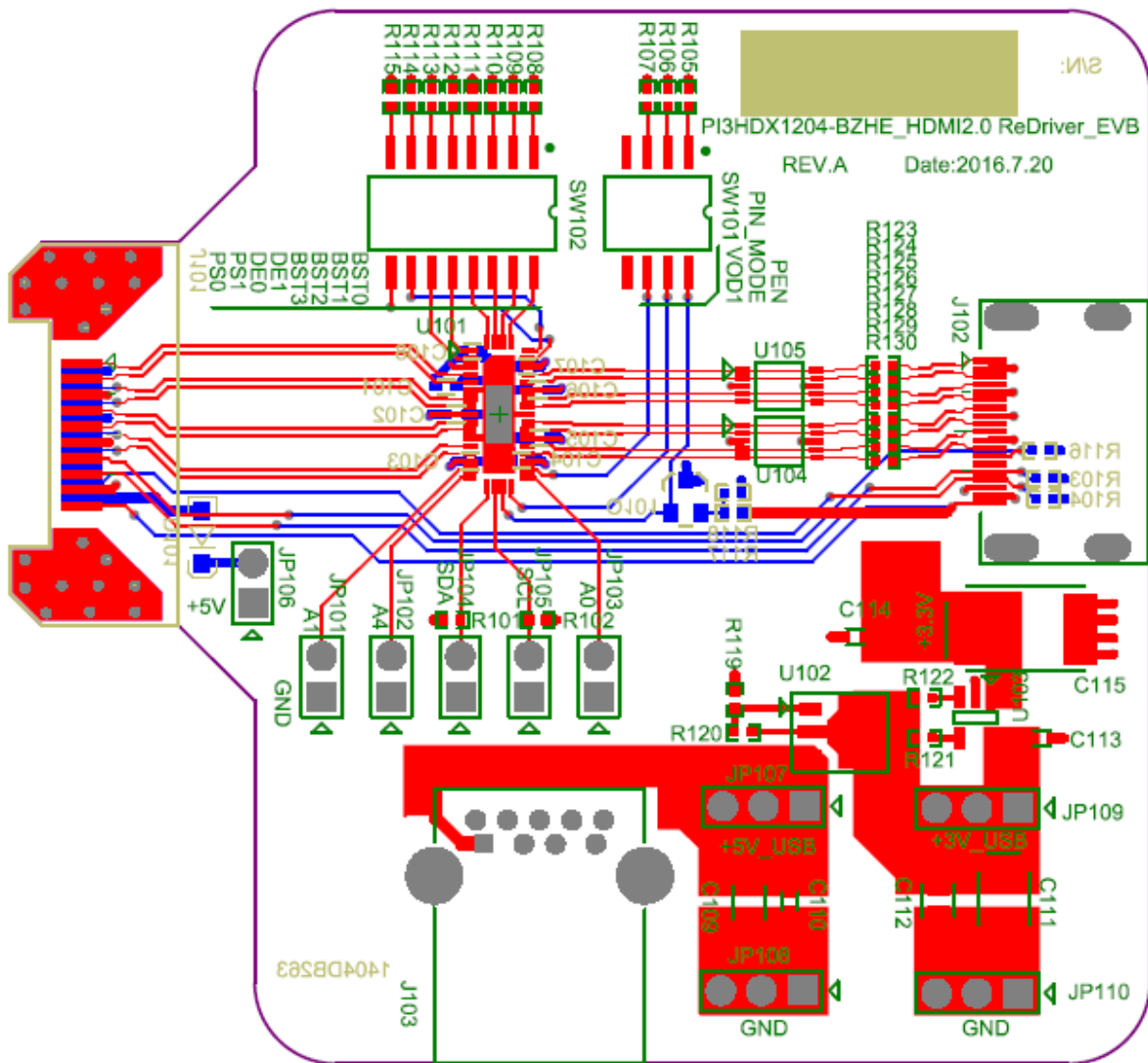


Figure 2: Top View of PI3HDX1204B1 EVB Rev.A

### 3 Quick Start

To start-up the PI3HDX1204B1 EVB Rev.A for evaluating PI3HDX1204B1, complete the following steps:

1. Short JP106 header pin to allow 5V from a source device feeding current to PI3HDX1204B1 ev board; or connect a USB adaptor to J103 mini USB connector to feed 5V to the EV board; or Supply 3.3V to PI3HDX1204B1 by connecting a power supply to header pin JP108 with header pin JP109 as the ground reference;
2. Plug J101 HDMI plug connector to a source device, e.g. graphic card;
3. Connect a sink device, e.g. HDMI monitor, to J102 HDMI receptacle connector via an HDMI cable.

## 4 Circuit Description

### 4.1 Equalization Setting

PI3HDX1204B1 offers several equalization values for covering designs with short and long input PCB traces or cables. The table below provides a reference of EQ settings with various input FR4 trace length.

BST3 (Pin 42)	BST2 (Pin 41)	BST1 (Pin 40)	BST0 (Pin 39)	6Gbps Input	Input FR4 Trace
0	0	0	0	0.25 dB	5" – 10"
0	0	0	1	0.8 dB	
0	0	1	0	1.1 dB	
0	0	1	1	2.2 dB	
0	1	0	0	4.1 dB	
0	1	0	1	7.1 dB	10" – 20"
0	1	1	0	9.0 dB	
0	1	1	1	10.3 dB	
1	0	0	0	11.8 dB	
1	0	0	1	13.9 dB	
1	0	1	0	15.3 dB	20" – 25"
1	0	1	1	16.9 dB	
1	1	0	0	17.9 dB	
1	1	0	1	19.2 dB	
1	1	1	0	20.5 dB	
1	1	1	1	22.2 dB	

Table 1: EQ Setting of PI3HDX1204B1 EVB Rev.A

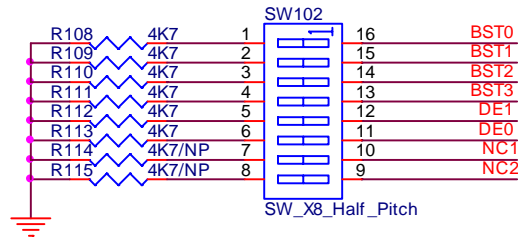


Figure 3: SW102 on PI3HDX1204B1 EVB Rev.A

## 4.2 Output Swing Setting

PI3HDX1204B1 offers four steps of output swing setting in I2C mode. In pin control mode, two output swings can be selected via VOD1 pin while VOD0 pin is high at default. Depending on the output trace length, different differential swings may be picked for individual designs.

VOD1 (Pin 23)	VOD0 (I2C Byte 5)	Differential Swing
0	0	0.8 Vppd
0	1	0.95 Vppd
1	0	1.15 Vppd
1	1	1.3 Vppd

Table 2: Output Swing Setting of PI3HDX1204B1 EVB Rev.A

## 4.3 De-emphasis Settings

Four de-emphasis levels are offered on PI3HDX1204B1. For HDMI source application, 0dB is a desired setting for de-emphasis to pass eye diagram and Vlow tests.

DE1 (Pin 1)	DE0 (Pin 2)	De-emphasis
0	0	0 dB
0	1	-0.7 dB
1	0	-1.4 dB
1	1	-2.1 dB

Table 4: De-emphasis Setting of PI3HDX1204B1 EVB Rev.A

## 4.4 Programming Mode

Pin\_Mode pin of PI3HDX1204B1 is used to select between pin control and I2C modes. It is set via SW101 switch. I2C address at A[4,1-0] pins of PI3HDX1204B1 is set via JP101, JP102 and JP103 pin head.

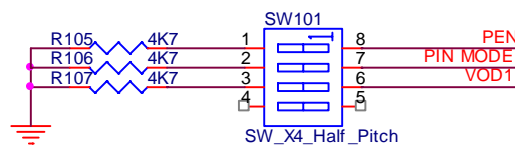


Figure 4: SW101 on PI3HDX1204B1EVB Rev.A

Pin_Mode (Pin 21)	Pins 5 and 12 of SW101	Programming Mode
H	Open	Pin Control Mode
L	Short	I2C Control Mode

Table 5: ENI2C Setting of PI3HDX1204B1 EVB Rev.A

## 4.5 5V/3.3V Power Supply

By shorting header JP107, 5V on PI3HDX1204B1 EVB Rev.A can be fed through three methods.

- Any source connected to input HDMI connector J101 via +5V\_A power rail;

2. Mini-USB adaptor connected to mini USB2.0 connector J103 via +5V\_USB power rail.
3. Supply 3.3V to PI3HDX1204B1 by connecting a power supply to header pin JP108 with header pin JP109 as the ground reference;

3.3V VCC of PI3HDX1204B1 can also be employed through two methods.

1. The 3.3V generated by the 5V-to-3.3V regulator U102;
2. A power supply connected to header JP108 while header JP109 is used as ground reference.

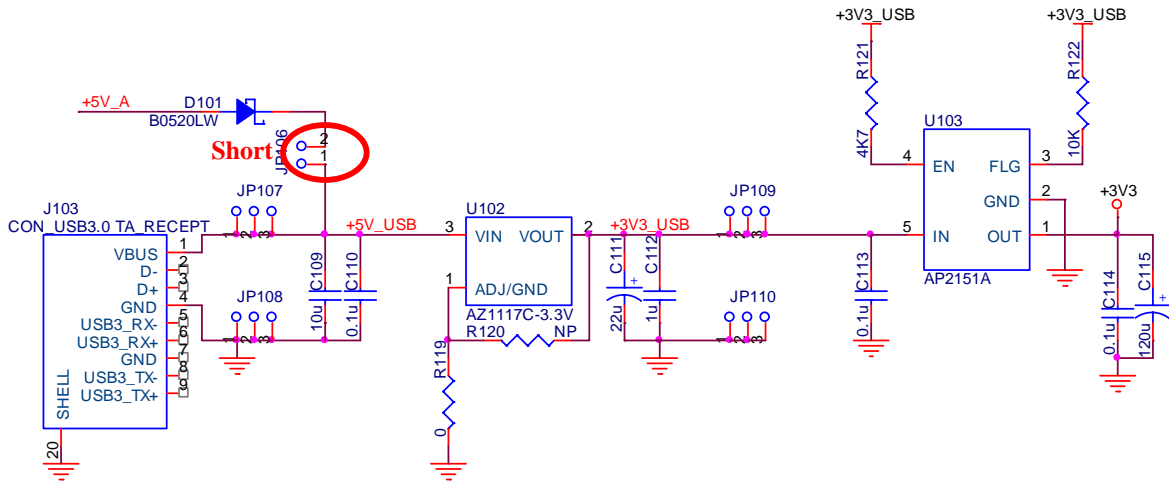


Figure 5: Power Circuit of PI3HDX1204B1 EVB Rev.A

## 4.6 Power Saving Mode

PI3HDX1204B1 can enter power saving mode by setting PEN pin to low voltage level. In the schematic, PEN pin is controlled by HPD pin from the sink device connected to J102 HDMI connector.

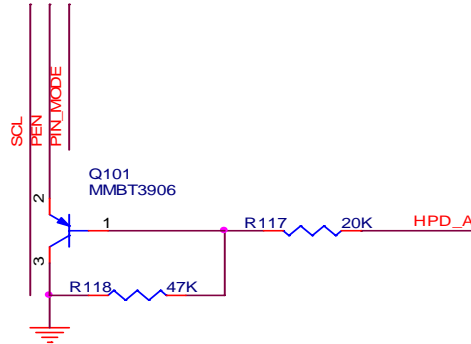


Figure 6: PEN Circuit of PI3HDX1204B1 EVB Rev.A

Alternatively, PEN can be selected via switch SW101.

PEN (Pin 20)	Pins 6 and 11 of SW101	Output TMDS of PI3HDX1204B1
L	Short	Power Saving Mode
H	Open	Normal Mode

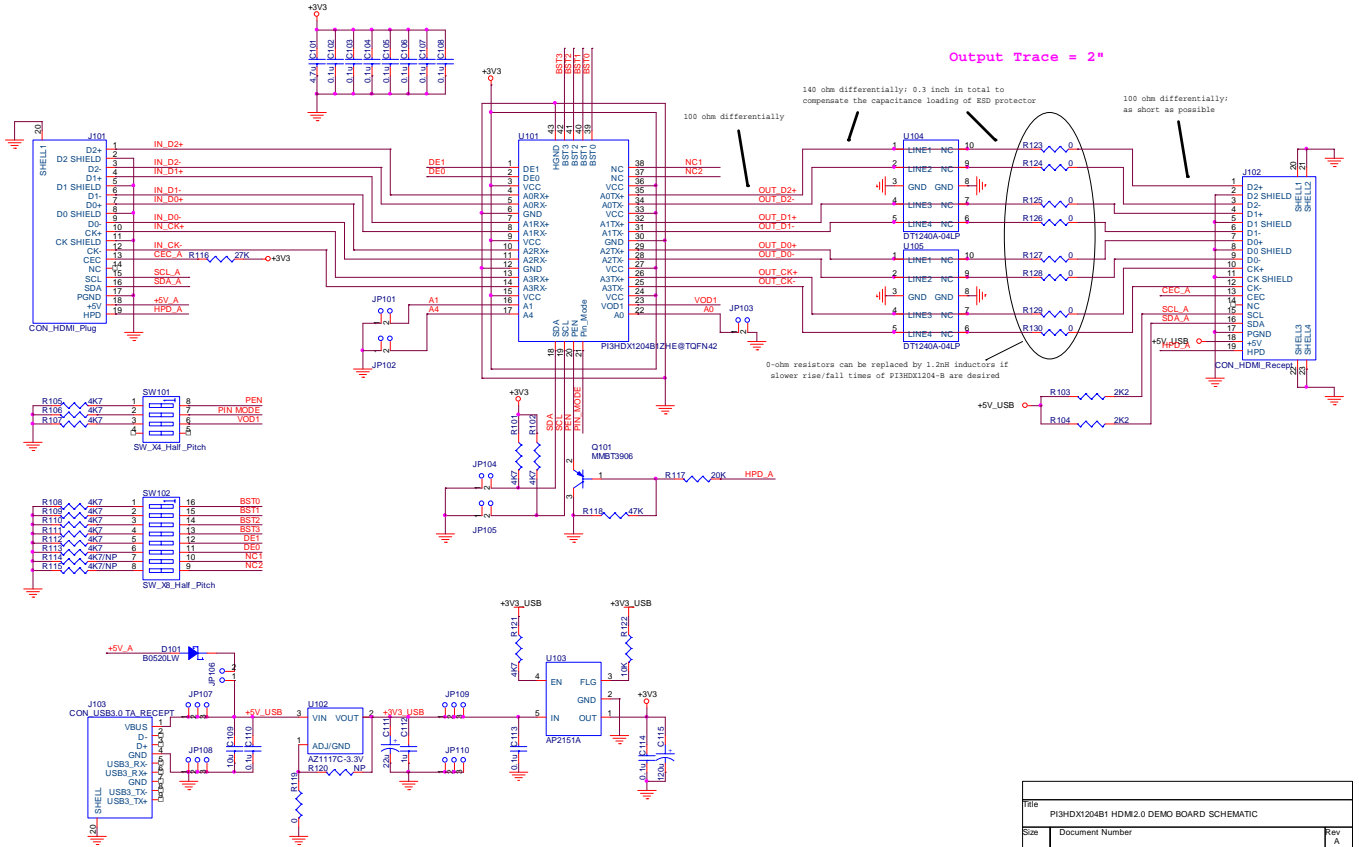
Table 6: PEN Setting of PI3HDX1204D EVB Rev.A

## 5 References

- (1) High-Definition Multimedia Interface Specification Version 2.0, HDMI Forum, September 4, 2013
- (2) High-Definition Multimedia Interface Version 2.0b Compliance Test Specification, HDMI Forum, May 16, 2014
- (3) High-Definition Multimedia Interface Specification Version 1.4b, HDMI Licensing, LLC, October 11, 2011
- (4) High-Definition Multimedia Interface Compliance Test Specification Version 1.4a, HDMI Licensing, LLC, March 4, 2010

## 6 Demo Board

### 6.1 Schematic



Title		
PI3HDX1204B1 HDM2.0 DEMO BOARD SCHEMATIC		
Size	Document Number	Rev A
Date:	Tuesday, November 08, 2016	Sheet 1 of 1



## 6.2 BOM List

Item Number	Value	Part Reference	Package
1	4.7u	C101	0402
2	0.1u, 10pcs	C102,C103,C104,C105,C106, C107,C108,C110,C113,C114	0402
3	10u	C109	0805
4	22u	C111	3528
5	1u	C112	0805
6	120u	C115	3528
7	B0520LW	D101	SOD-123
8	CON_HDMI_Plug	J101	CON_HDMI_Plug
9	CON_HDMI_Recept	J102	CON_HDMI_Recept
10	CON_USB2.0_MiniB_SMT	J103	CON_USB2.0_MiniB_SMT
11	2x1 Pin Header, 6pcs	JP101,JP102,JP103,JP104, JP105,JP106	2x1 Pin Header
12	3x1 Pin Header, 4pcs	JP107,JP108,JP109,JP110	3x1 Pin Header
13	MMBT3906	Q101	SOT-23
14	4K7,12pcs	R101,R102,R105,R106,R107, R108,R109,R110,R111,R112, R113,R121	0402
15	2K2, 2pcs	R103,R104	0402
16	20K	R117	0402
17	47K	R118	0402
18	27K	R116	0402
19	NP	R114,R115,R120	0402
20	10K	R122	0402
21	0, 9pcs	R119,R123,R124,R125,R126, R127,R128,R129,R130	0402
22	SW_X8_Half_Pitch	SW101	SW_X8_Half_Pitch
23	SW_X8_Half_Pitch	SW102	SW_X8_Half_Pitch
24	PI3HDX1204DZHE@TQFN 42	U101	TQFN42
25	AZ1117C-3.3V	U102	SOT223
26	DT1240A-04LP, 2pcs	U104, U105	MSOP 10L
27	AP2151A	U103	SOT25