TMDS181RGZ Evaluation Module

This document describes how to use and configure the TMDS181RGZEVM (EVM) and provides recommendations for system hardware implementation. These recommendations are only guidelines and it is the designer's responsibility to consider all system characteristics and requirements. Engineers should refer to the datasheet (SLASE75A) for technical details such as device operation, terminal description, and so forth.

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1 Overview

1.1 What is the TMDS181?

The TMDS181 is a digital video interface (DVI) or high-definition multimedia interface (HDMI®) retimer and redriver. The TMDS181 supports four TMDS channels, audio return channel (SPDIF_IN/ARC_OUT), and digital display control (DDC) interfaces. The TMDS181 supports signaling rates up to 6Gbps to allow for the highest resolutions of 4k2k60p 24 bits per pixel and up to WUXGA 16-bit color depth or 1080p with higher refresh rates. The TMDS181 can be configured to support the HDMI2.0 standard. The TMDS181 automatically configures itself as a redriver at low data rate (< 1.0Gbps) or as a retimer above this data rate by default, or it can be set to redriver only or retimer only modes using I²C.

1.2 What is the TMDS181 EVM?

The TMDS181 EVM is a PCB created to help customers evaluate the TMDS181 device for video applications with HDMI interfaces. This EVM can also be used as a hardware reference design for implementation of the TMDS181 in the RGZ package. PCB design/layout files can be provided upon request to provide PCB design illustrations of the routing/placement rules with a TMDS181 component.

Please note that the EVM design supports the TMDS181 debug capabilities, so it contains components that would not be needed by a typical TMDS181 end-application. A separate reference design is available for customers.

1.3 What is Included in the TMDS181 EVM?

The EVM contains the following major components:

- TMDS181RGZ
- Standard HDMI source connector (receptacle)
- Standard HDMI sink connector (receptacle)
- DC power regulators
- I²C programming interface for external I²C host connection
- USB interface (utility available to access registers)

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1.4 What Does This EVM Look Like?

Figure 1 illustrates the TMDS181RGZEVM.

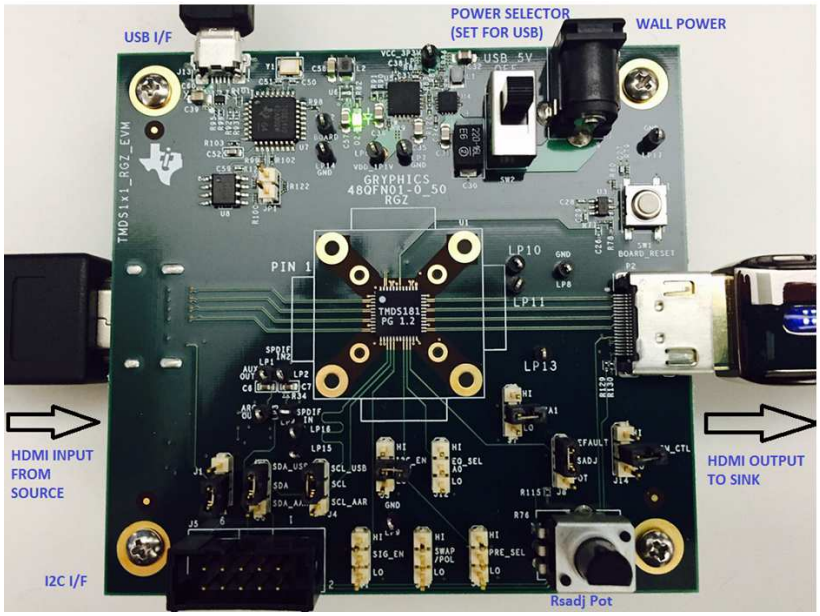


Figure 1. TMDS181RGZEVM

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2 Hardware Description

Figure 2 contains the EVM block diagram.

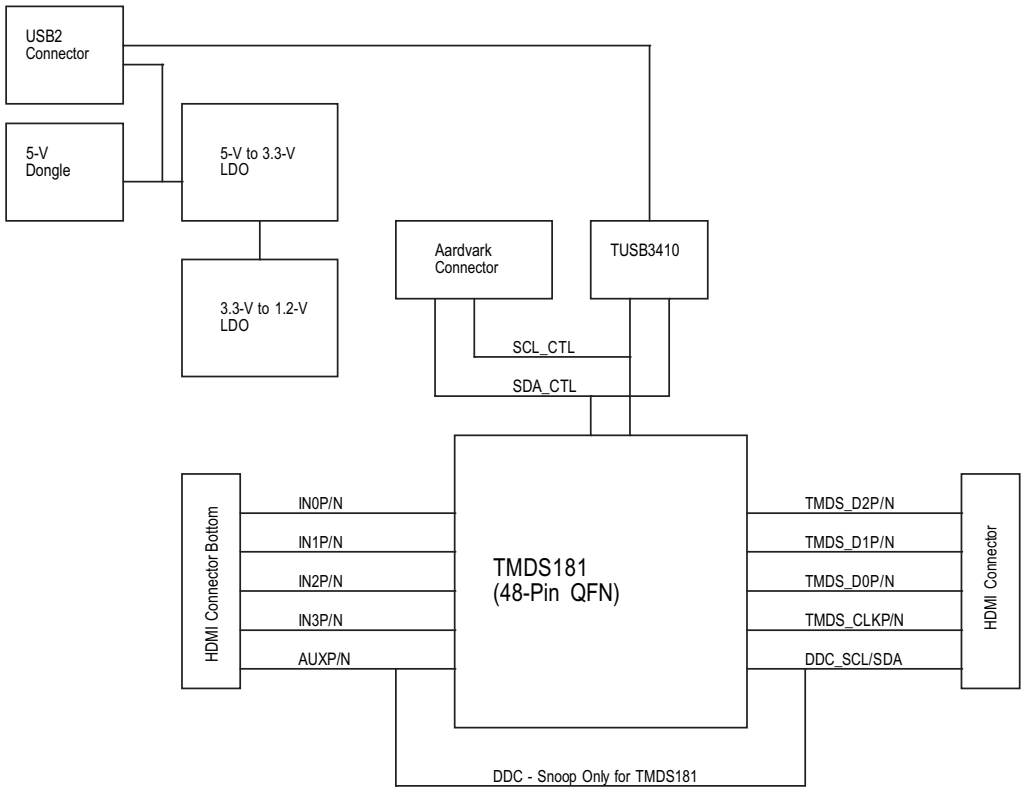


Figure 2. TMDS181RGZEVM Block Diagram

2.1 Video Connectors for TMDS181 Ports

The EVM has two HDMI connections for video. P1 and P2 are standard HDMI connectors (Molex 4715-10001).

2.2 Local I²C Access

Access to TMDS181's local I²C signals is provided via the J5 input connector. Note that I²C signal levels should be at 3.3 V when the I²C interface is accessed through the connector.

A standalone external I²C host can be connected via J5 for debug and control purposes. An example of an external I²C Host controller is the Total Phase Aardvark I²C/SPI host adapter (Total Phase Part#: TP240141). Sample scripts for this I²C host controller are provided by request.

Table 1. Aardvark I²C (J5) Pin-out

J5 pin #	Description	J5 pin #	Description
1	SCL_CTL	2	GND
3	SDA_CTL	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	GND

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Table 2. TMDS181 Target I²C Address

TMDS181 I²C Target Address							
Bit 7 (MSB)	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0 (W/R)
A6	A5	A4	A3	A2	A1	A0	
1	0	1	1	1	1	0	0/1

7 Bit Address = 5Eh

NOTE: The target I²C address for TMDS181 can be modified with the EVM jumper settings.

2.3 Enable/Reset

There are three device enable/reset options to use with the EVM.

(A) Supervisor Circuitry Option

This is the default configuration on the TMDS181 EVM. The enable (EN) signal is held low until the power good (PG) from the 3.3-V voltage regulator reaches a stable high voltage level, then it is released high.

(B) RC Timing Option

C26 external capacitor and internal resistor are used to control the EN ramp time after the device is powered on. C26 is a do not install (DNI) option by default. C26 needs to be installed and R77 needs to be uninstalled to enable this option.

(C) External Control Option

A push button (SW1) is provided for manual control of the TMDS181's EN/OE input.

2.4 Power

A DC power jack (J9) to accept a 5-V wall power adapter is provided on the EVM. The DC power jack (CUI Inc. PJ-202AH) has an inner diameter of 2.1 mm and an outer diameter of 5.5 mm. The tip of the +5-V power supply must be positive. A +5-V power supply of at least 1.5 A that meets the above requirements can be used to power the TMDS181RGZEVM. Power is provided to the EVM when SW2 is set to position 1.

NOTE: Care should be taken not to plug in any power source higher than the configured voltage (5 V).

Alternately, it is possible to power the EVM by connecting a micro-USB cable to a host and setting SW2 to position 3.

Please note that to prevent any back driving of 5 V in the system, TMDS181RGZEVMs have been configured to receive 5 V from the HDMI source connection to drive the Board_5V. This has been done by removing U6 and installing R104 on the EVMs.

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2.5 Jumper Configuration

Jumpers are provided to operate the device/EVM in different configurations.

Table 3. SW1 DIP Switch Setting

DIP SW No	Signal Name	Description	Default Config
J1	HPD_SRC	JP 1-2 for not used JP 2-3 for TMDS181	JP 2-3 Allows for 3.3-V to 5-V transition of HPD_SRC signal
J3	I2_EN_PIN	JP 1-2 for I^2C ENABLE JP 2-3 for pin strap	NC
J4	SCL	JP 1-2 for USB IF TO I^2C JP 2-3 for EXT IF TO I^2C	JP 1-2 USB I^2C Interface
J6	SDA	JP 1-2 for USB IF TO I^2C JP 2-3 for EXT IF TO I^2C	JP 1-2 USB I^2C Interface
J7	A1	JP 1-2 for: • I^2C Addr bit A1 = 1, when I2C_EN = H JP 2-3 for: • I^2C Addr bit A1 = 0, when I2C_EN = H NC for weak internal pulldown (Normal mode)	NC
J8	VSADJ	JP 1-2 for 6.8 kΩ JP 2-3 for adjustable resistance	JP 1-2
J11	SIG_EN	JP 1-2 for Signal Detect Enabled JP 2-3 for Signal Detect Disabled NC for internal pulldown (Signal Detect Disabled)	NC
J12	EQ_SEL_A0	JP 1-2 for: • I^2C Addr bit A0 = 1, when I2C_EN = H • Fixed EQ at 14 dB @ 3G, when I2C_EN = L JP 2-3 for: • I^2C Addr bit A0 = 0, when I2C_EN = H • Fixed EQ at 7.5 dB @ 3G, when I2C_EN = L NC for Adaptive EQ	NC
J14	TX_TERM_CTL	JP 1-2 for no transmit term JP 2-3 for transmit term in 75–150 Ω NC for auto select of term	NC
J15	PRE_SEL	JP 1-2 for not used JP 2-3 for –2.5 dB de-emphasis NC for 0 dB	NC
J17	SWAP_POL	JP 1-2 for RX Polarity Swap (Retimer Mode Only) JP 2-3 for RX Lane Swap NC for normal	NC

2.6 Component Population Configuration

2.6.1 HPD Snoop Option

To accommodate systems that do not properly resend DDC commands after HPD goes low, TI has implemented an HPD snoop mode on the TMDS181RGZEVM. This mode allows the HPD line to be routed around the TMDS181, but remain connected to the TMDS181 on the sink side to allow the TMDS181 to snoop its state. This snoop mode is disabled, by default, on the TMDS181RGZEVMs.

- Pop R131, no pop R129, R130 for HPD on
- No pop R131, pop R129, R130 for HPD snoop only

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2.6.2 DDC Snoop Option

To accommodate systems that do not properly support clock stretching on the DDC lines, TI has implemented a snoop mode on the TMDS181RGZEVM. This mode allows the DDC lines to be routed around the TMDS181, but remain connected to the TMDS181 on the sink side to allow the TMDS181 to snoop the DDC traffic. This snoop mode is enabled on the TMDS181RGZEVMs, by default.

- Pop R16, R17, R24, R25. No pop R123, R124, R125, R126 - TMDS181, DDC on
- No pop R16, R17, R24, R25. Pop R123, R124, R125, R126 - TMDS181, DDC snoop only

3 Quick Start Guide

Use the following steps as a quick-start guide:

1. Apply 5-V power to the EVM, turn on SW2.
2. If using external I^2C configuration instead of pin straps, configure the TMDS181 at this step.
3. Plug in an HDMI source using a standard HDMI cable into P1 (Standard HDMI connector). LED D2 should light up.
4. Plug in an HDMI video sink device into P2 (Standard HDMI connector) using a standard HDMI cable.
5. Video output on HDMI sink should be observed.

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3.1 USB Interface via TUSB3410

Access to the USB interface is provided through the TUSB3410 using a USB TI Utility called Eye Scan. To use the utility:

- Install the Eye Scan software from Texas Instruments
- Set J6 to SDA – SDA_USB
- Set J4 to SCL – SCL_USB
- Connect the USB micro cable from J13 to the USB host and power on the EVM ***prior to installing the HDMI cables***.

  This is required since the HDMI_5V can back drive the 3.3 V on the EVM and cause the USB interface chip not to enumerate correctly on the EVM.
- Start the Eye Scan software

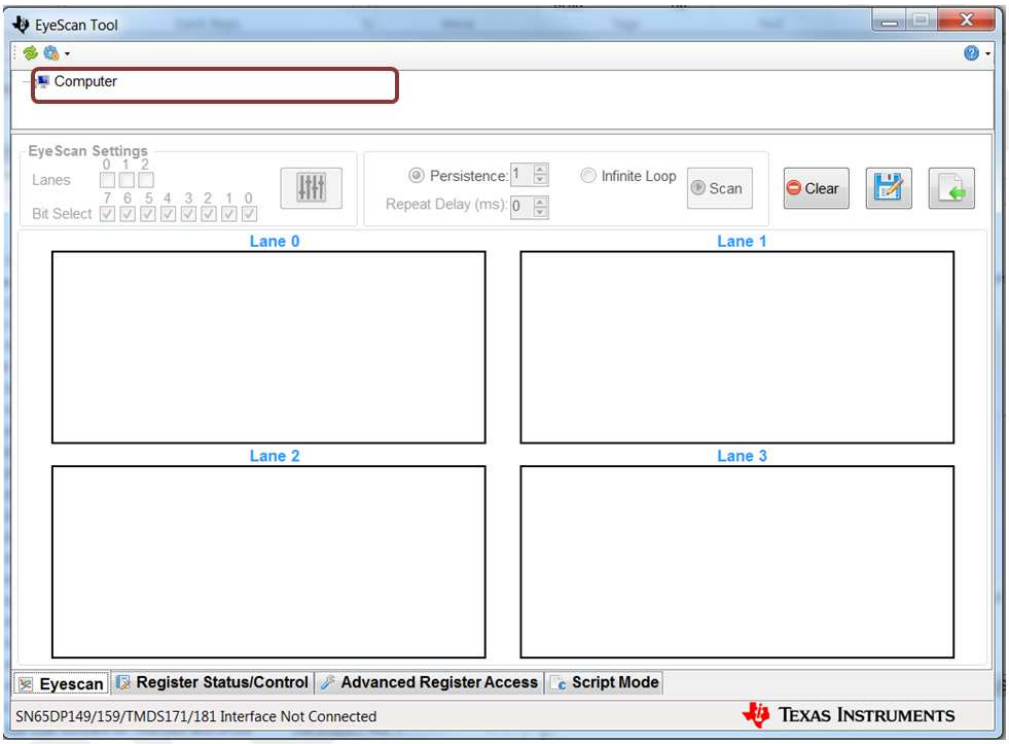


Figure 3. Eye Scan Opening Tab – Device Not Connected

Confirm that the SN65DP149/159/TMDS171/181 interface is present and selected. If it is not, check the USB connection and confirm that the driver is loaded in Device Manager.

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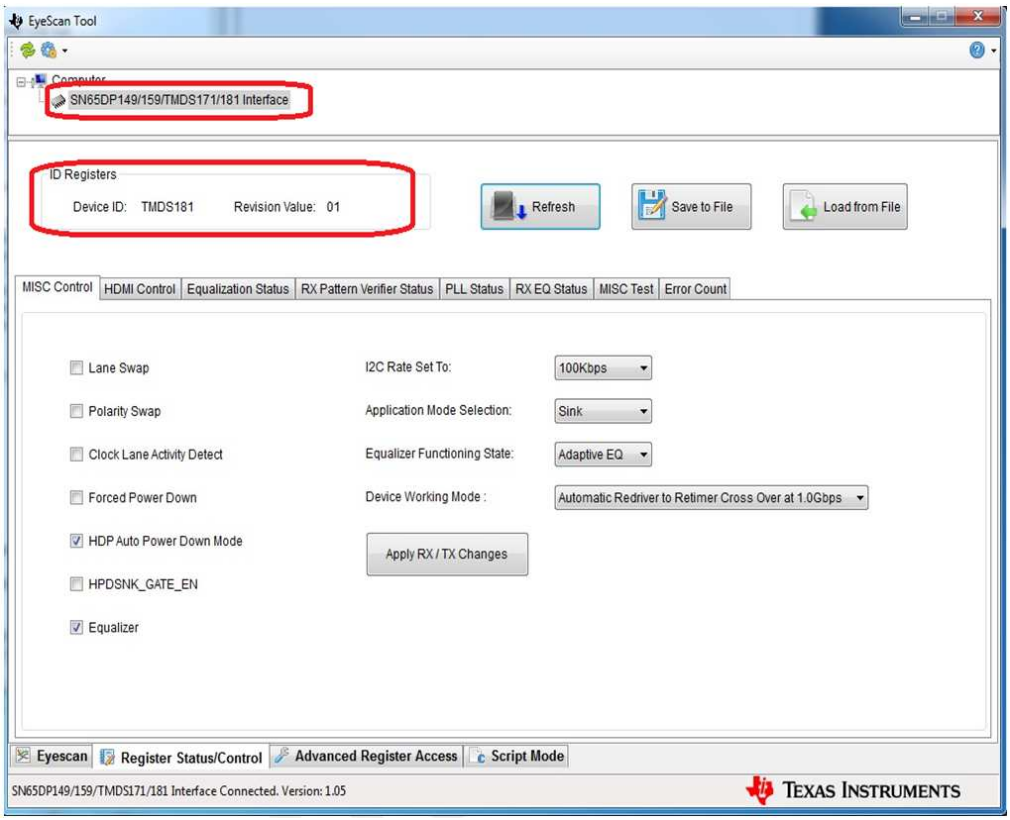


Figure 4. Register Status/Control Tab

Select the *Register Status/Control* tab and hit *Refresh*. TMDS181 should appear in the Device ID field. Various registers can be accessed by selecting the tabs. The Script Mode tab can also be used to both read and write registers

The HDMI Control Tab can be used to determine if the TMDS181 is running at HDMI 1.4B speeds or HDMI 2.0 speeds:

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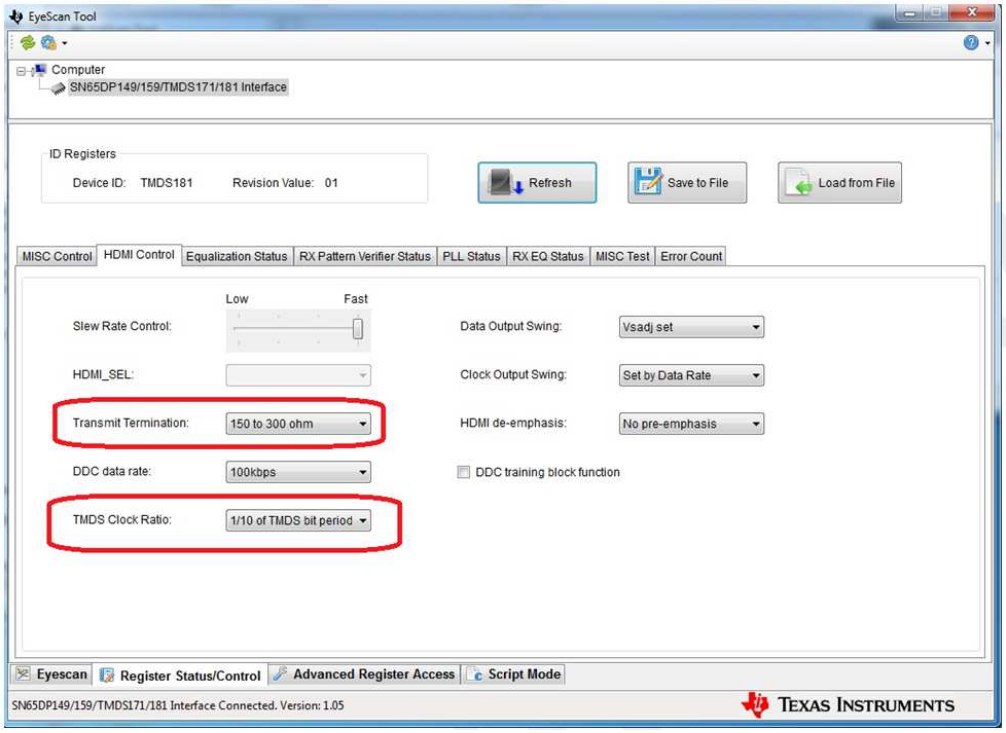


Figure 5. TMDS181 HDMI 1.4B Operation

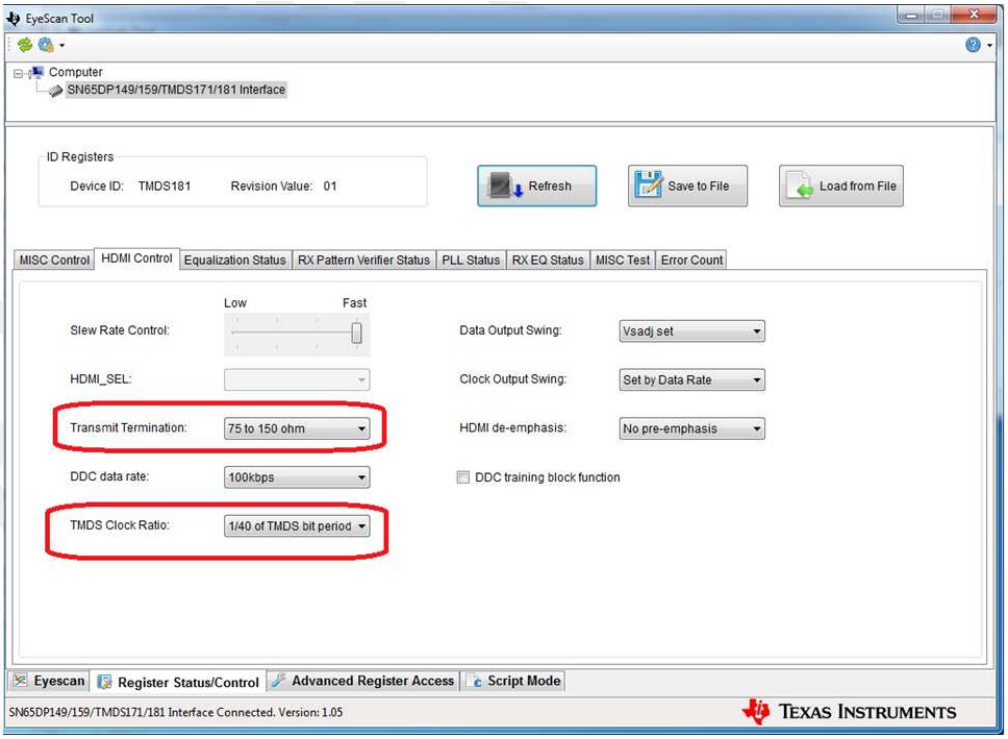


Figure 6. TMDS181 HDMI 2.0 Operation

The Eyescan tab can be used to generate an eye of the signal at the TMDS181 receiver. No eye is generated for the clock lane.

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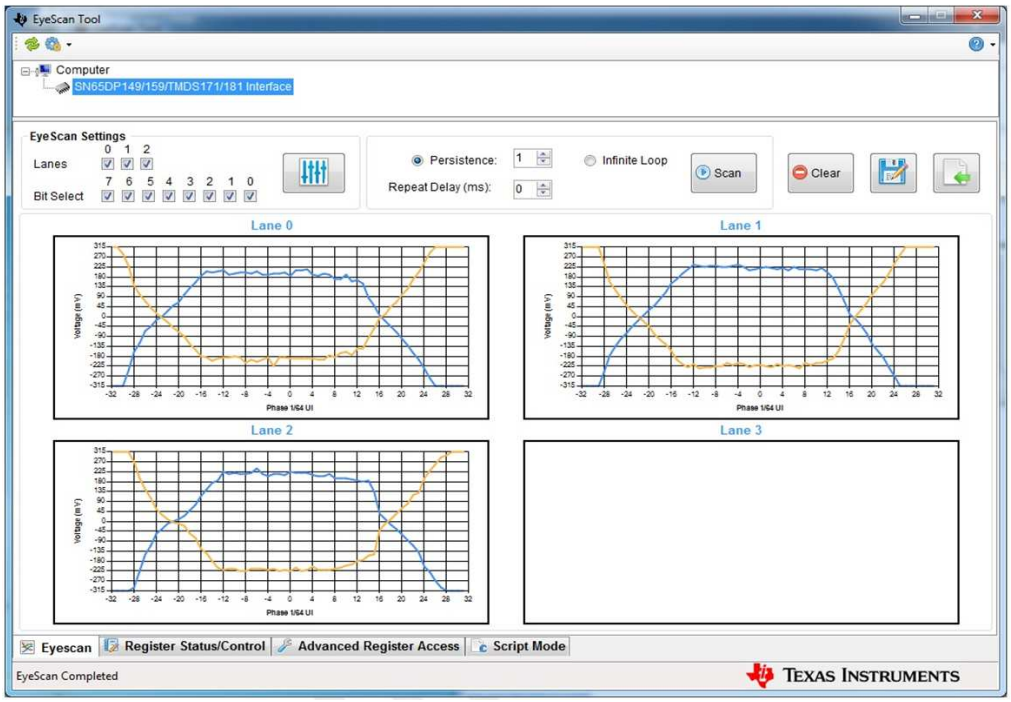


Figure 7. Sample Eyescan at HDMI1.4B

Please note that at HDMI 2.0 speeds there is a bug that causes invalid eyescan results. Results that look like this:



Figure 8. Sample Eyescan at HDMI2.0 Raw

Should be interpreted as this:

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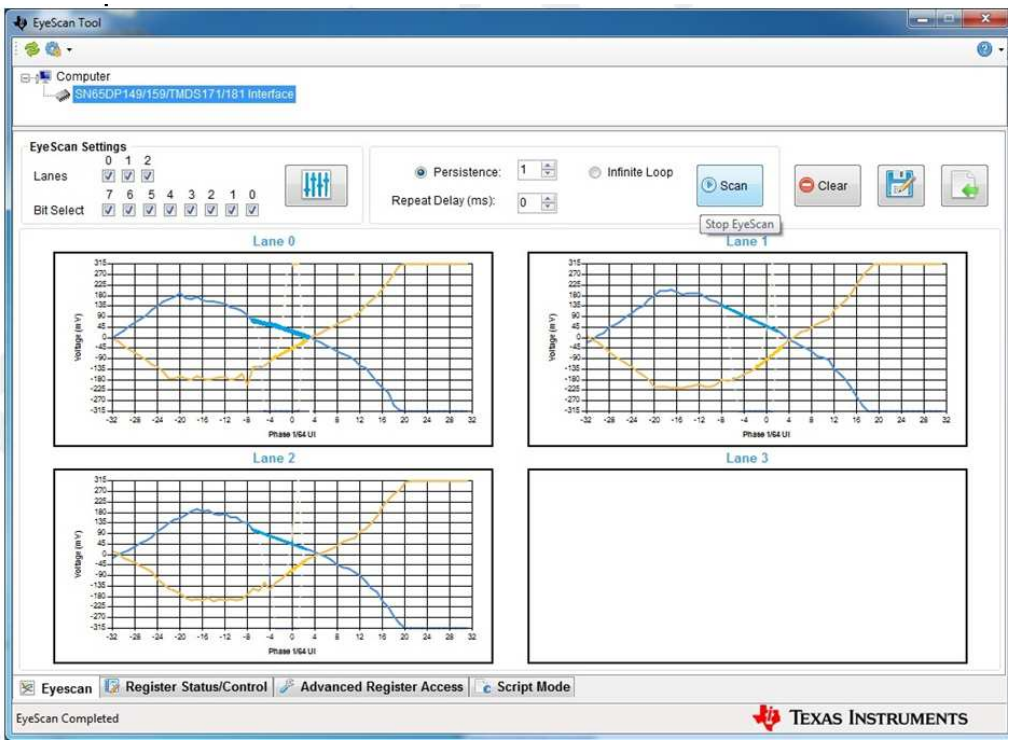


Figure 9. Sample Eyescan at HDMI2.0 Interpreted

4 References

1. TMDS181 Product Preview
2. Aardvark™ Adapter User Manual
3. High-Definition Multimedia Interface Specification Version 1.4b.
4. High-Definition Multimedia Interface Specification Version 2.0.

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5 EVM Bill of Materials

Table 4 lists the EVM BOM.

Table 4. EVM Bill of Materials

Item	Qty	Reference	Part	PCB Footprint	Manufacturer	Part Number	Pkg	Click to Order	Description
1	5	C4,C5,C6,C7,C52	1 uF	603	Taiyo Yuden	LMK107B7105KA-T	603	587-1242-1-ND	CAP CER 1UF 10V 10% X7R 0603
2	12	C9,C10,C17,C18,C19,C21,C23,C29,C40,C46,C59,C60	0.1uF	402	Yageo	CC0402KRX5R6BB104	402	311-1336-1-ND	CAP CERAMIC .1UF 10V X5R 0402
3	5	C8,C20,C35,C36,C57	10uF	805	TDK	C2012X5R1A106K125AB	805	445-7660-1-ND	CAP CER 10UF 10V 10% X5R 0805
4	1	C31	10uF	805	TDK	C2012X5R1C106K085AC	805	445-7644-1-ND	CAP CER 10UF 16V 10% X5R 0805
5	5	C22,C37,C41,C42,C47	0.01uF	402	Murata	GRM155R71H103KA88D	402	490-4516-1-ND	CAP CER 10000PF 50V 10% X7R 0402
6	0	C26 - DNI	DNI_200nF	402	Taiyo Yuden	LMK105BJ224KV-F	402	587-1228-2-ND	CAP CER 0.22UF 10V 10% X5R 0402
7	1	C27	18pF	402	AVX	04025A180JAT2A	402	478-1073-1-ND	CAP CERM 18PF 5% 50V NP0 0402
8	1	C28	220pF	402	Taiyo Yuden	UMK105B7221KV-F	402	587-1218-1-ND	CAP CER 220PF 50V 10% X7R 0402
9	1	C30	220uF	7343	Kemet	T495X337K010ATE060	7343	399-10429-1-ND	CAP TANT 220UF 16V 10% 2917
10	1	C34	3.3 nF	402	Samsung	CL05B332KB5NNNC	402	1276-1552-1-ND	CAP CER 3300PF 50V 10% X7R 0402
11	1	C32	22uF	805	Murata	GRM21BR60J226ME39L	805	490-1719-2-ND	CAP CER 22UF 6.3V 20% X5R 0805
12	2	C39,C58	2.2uF	805	Taiyo Yuden	EMK212BJ225KG-T	805	587-1293-2-ND	CAP CER 2.2UF 16V 10% X5R 0805
13	0	R35,R87,R92,R93,R120, C38, R129, R130, R24,R25,R16,R17 - DNI	DNI	402 / 201					
14	2	C45,C49	22pF	402	Murata	GRM1555C1H220JA01D	402	490-5868-1-ND	CAP CER 22PF 50V 5% NP0 0402
15	2	C50,C51	33pF	402	Murata	GRM1555C1H330JA01D	402	490-5936-2-ND	CAP CER 33PF 50V 5% NP0 0402
16	1	D1	Zener 6V	SOT23	Diodes Inc.	MMBZ5233B-FDICT-ND	SOT23	MMBZ5233B-FDICT-ND	DIODE ZENER 6V 350MW SOT23-3
17	1	D2	LED Green 0805	805	Lite On	LTST-C171GKT	805	160-1423-1-ND	LED GREEN CLEAR THIN 0805 SMD
18	1	JP1	JUMPER	HDR_THVT_1x2_100	3M	961102-6404-AR	HDR2X1	3M9447-ND	CONN HEADER VERT SGL 2POS GOLD
19	11	J1,J3,J4,J6,J7,J8,J11,J12,J14,J15,J17	HDR3X1 M .1	HDR_THVT_1x3_100	3M	961103-6404-AR	HDR3X1	3M9448-ND	CONN HEADER VERT SGL 3POS GOLD
20	1	J5	Header 5x2 0.1" thru-hole	con_thvt_shrd_2x5_100_m	3M	N2510-6002-RB	con_thvt_shrd_2x5_100_m	MHC10K-ND	CONN HEADER 10 POS STRGHT GOLD
21	1	J9	2.1mm x 5.5mm	PJ-202AH	CUI Inc.	PJ-202AH (PJ-002AH)	2.1mm x 5.5mm	CP-202AH-ND	CONN PWR JACK 2.1X5.5MM HIGH CUR
22	1	J13	USB Micro B	USB Micro B	FCI	10103592-0001LF	USB MICRO	609-4048-2-ND	CONN RCPT REV MICRO USB B R/A
23	17	LP1,LP2,LP3,LP4,LP5,LP6,LP7,LP8,LP9,LP10,LP11,LP12,LP13,LP14,LP15,LP16,LP17	LP	TESTLOOP	Keystone Electronics	5006	THRU	36-5006-ND	TEST POINT PC COMPACT .063"D BLK
24	1	L1	2.2 uH	1008	TDK	VLS252010ET-2R2M	1008	445-6629-1-ND	INDUCTOR POWER 2.2UH 1.3A SMD
25	1	L2	1 uH	1008	TDK	NLCV25T-1R0M-EFR	1008	445-17086-1-ND	INDUCTOR POWER 1.0UH 1008
26	1	P1	HDMI_IN	CON_HDMI_RT_19_0p50mm	Molex	471510001	CON_HDMI_RT_19_0p50mm	WM19086CT-ND	CONN RCPT 19POS HDMI RT ANG SMD
27	1	P2	HDMI_OUT	CON_HDMI_RT_19_0p50mm	Molex	471510001	CON_HDMI_RT_19_0p50mm	WM19086CT-ND	CONN RCPT 19POS HDMI RT ANG SMD
28	2	Q1,Q2	FDV301N_NFET_8V	SOT23	Fairchild Semiconductor	FD301N	SOT23	FDV301NCT-ND	MOSFET N-CH 25V 220MA SOT-23
29	1	R5	100	402	Yageo	RC0402FR-07100RL	402	311-100LRCT-ND	RES SMD 100 OHM 5% 1/16W 0402

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Table 4. EVM Bill of Materials (continued)

Item	Qty	Reference	Part	PCB Footprint	Manufacturer	Part Number	Pkg	Click to Order	Description
30	6	R10,R11,R99,R100,R101,R121	1K	402	Yageo	RC0402JR-071KL	402	311-1.0KJRCT-ND	RES SMD 1K OHM 5% 1/16W 0402
31	2	R12,R81	100K	402	Yageo	RC0402JR-07100KL	402	311-100KJRCT-ND	RES SMD 100K OHM 5% 1/16W 0402
32	1	R13	10	402	Yageo	RC0402JR-0710RL	402	311-10JRCT-ND	RES SMD 10 OHM 5% 1/16W 0402
33	5	R34,R123,R124,R125,R126	0	201	Panasonic	ERJ-1GN0R00C	201	P15979CT-ND	RES SMD 0.0 OHM JUMPER 1/20W
34	2	R58,R59	2K	402	Yageo	RC0402JR-072KL	402	311-2.0KJRTR-ND	RES SMD 2K OHM 5% 1/16W 0402
35	8	R77,R80,R83,R84,R89,R104,R122,R131	0	402	Panasonic	ERJ-2GE0R00X	402	P0.0JTR-ND	RES SMD 0.0 OHM JUMPER 1/10W
36	1	R127	500K	402	Yageo	RC0402FR-07499KL	402	311-499KLRTR-ND	RES SMD 499K OHM 1% 1/16W 0402
37	1	R36	75	402	Yageo	RC0402JR-0775RL	402	311-75JRTR-ND	RES SMD 75 OHM 5% 1/16W 0402
38	14	R57,R60,R61,R62,R63,R64,R66,R68,R69,R70,R71,R72,R73,R74	65K	402	Yageo	RC0402FR-0764K9L	402	311-64.9KLRTR-ND	RES SMD 64.9K OHM 1% 1/16W 0402
39	1	R75	7.06K (6.98K OK)	402	Vishay Dale	CRCW04026K98FKED	402	541-6.98KLTR-ND	RES SMD 6.98K OHM 1% 1/16W 0402
40	1	R76	PTV09 10K POT	THRUHOLE	BOURNS	PTV09A-4015F-B103	THRUHOLE	PTV09A-4015F-B103-ND	POT 10K OHM 9MM SQ .05W CARB
41	3	R78,R98,R102	10K	402	Yageo	RC0402JR-0710KL	402	311-10KJRTR-ND	RES SMD 10K OHM 5% 1/16W 0402
42	2	R79,R88	4.7K	402	Yageo	RC0402JR-074K7L	402	311-4.7KJRTR-ND	RES SMD 4.7K OHM 5% 1/16W 0402
43	1	R82	500	402	Vishay Dale	CRCW0402499RDHEDP	402	541-499AVTR-ND	RES SMD 499 OHM 0.5% 1/16W 0402
44	1	R85	750K	402	Vishay Dale	CRCW0402750KJNED	402	541-750KJTR-ND	RES SMD 750K OHM 5% 1/16W 0402
45	1	R86	240K	402	Vishay Dale	CRCW0402240KJNED	402	541-240KJTR-ND	RES SMD 240K OHM 5% 1/16W 0402
46	1	R90	2.21K	402	Yageo	RC0402FR-072K21L	402	311-2.21KLRTR-ND	RES SMD 2.21K OHM 1% 1/16W 0402
47	1	R91	4.42K	402	Stackpole	RMCF0402FT4K42	402	RMCF0402FT4K42TR-ND	RES SMD 4.42K OHM 1% 1/16W 0402
48	1	R94	1.5K	402	Yageo	RC0402JR-071K5L	402	311-1.5KJRTR-ND	RES SMD 1.5K OHM 5% 1/16W 0402
49	2	R95,R96	33	201	Yageo	RC0201JR-0733RL	201	311-33NTR-ND	RES SMD 33 OHM 5% 1/20W 0201
50	1	R103	15K	402	Yageo	RC0402JR-0715KL	402	311-15KJRTR-ND	RES SMD 15K OHM 5% 1/16W 0402
51	3	R45,R46,R115	47K	402	Rohm	MCR01MRTJ473	402	RHM47KCETR-ND	RES SMD 47K OHM 5% 1/16W 0402
52	1	SW1	PB_SWITCH	SW_MOM_2NO	OMRON	B3SN-3012P	SW_MOM_2NO	SW261CT-ND	SWITCH TACTILE SPST-NO 0.05A 24V
53	1	SW2	3POS_SPDT	THRUHOLE_3POS	NKK Switches	MS13ANW03	THRUHOLE_3POS	360-2386-ND	SW SLIDE SPDT 6A SILVER STR 125V
54	1	U1	TMDS181RGZ	48_RGZ	TI		48_RGZ		
55	1	U3	TPS3808G30DBVT	6DBV	TI	TPS3808G30DBVT	6DBV	296-26944-1-ND	IC VOLT SUPERVISOR 3.0V SOT23-6
56	1	U4	TPS62150A	RGT16	TI	TPS62150ARGTT	RGT16	296-36472-1-ND	IC REG BUCK SYNC ADJ 1A 16QFN
57	0	U6 - DNI	TPS61240 - DNI	6DRV	TI	TPS61240DRVT	6DRV	296-24519-1-ND	IC REG BOOST SYNC 5V 0.45A 6SON
58	1	U5	TPS74201RGWT	RGW20	TI	TPS74201RGWT	RGW20	296-19891-1-ND	IC REG LDO ADJ 1.5A 20VQFN
59	1	U7	TUSB3410	LQFP32	TI	TUSB3410VF	LQFP-32	296-12699-ND	IC CONV SERIAL-TO-USB 32-LQFP
60	1	U8	24LC256	8SOIC	ON Semiconductor	CAT24C256W	8SOIC	CAT24C256WI-GT3OSCT-ND	IC EEPROM 256KBIT 400KHZ 8SOIC
61	1	Y1	12 MHz Crystal	ECX-32	ECS Inc.	ECS-120-20-33-TR	4-SMD	XC1808CT-ND	CRYSTAL 12MHZ 20PF SMD
62	1	U16	TPD2E001	drl_5pin	TI	TPD2E001	drl_5pin	296-21883-2-ND	TVS DIODE 5.5VWM 100VC SOT5
63	4	EVM Assembly	0.75" Standoff	4-40 - F/F	Keystone Electronics	2029	OD 0.187"	36-2029-ND	ROUND STANDOFF 4-40 ALUM 3/4"
64	4	EVM Assembly	0.25"- Stainless Steel Screws	4-40 Phillips Panhead	Building Fasteners	PMSSS 440 0025 PH	OD 0.187"	H703-ND	MACHINE SCREW PAN PHILLIPS 4-40

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Table 4. EVM Bill of Materials (continued)

Item	Qty	Reference	Part	PCB Footprint	Manufacturer	Part Number	Pkg	Click to Order	Description
65	4	Shunts	Shunt	SHUNT	3M	969102-0000-DA	SHUNT	3M9580-ND	SHUNT JUMPER .1" BLACK GOLD
66	1	PCB	TMDS181RGZEVM						

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6 EVM Schematics

Figure 10 to Figure 16 illustrate the EVM schematics.

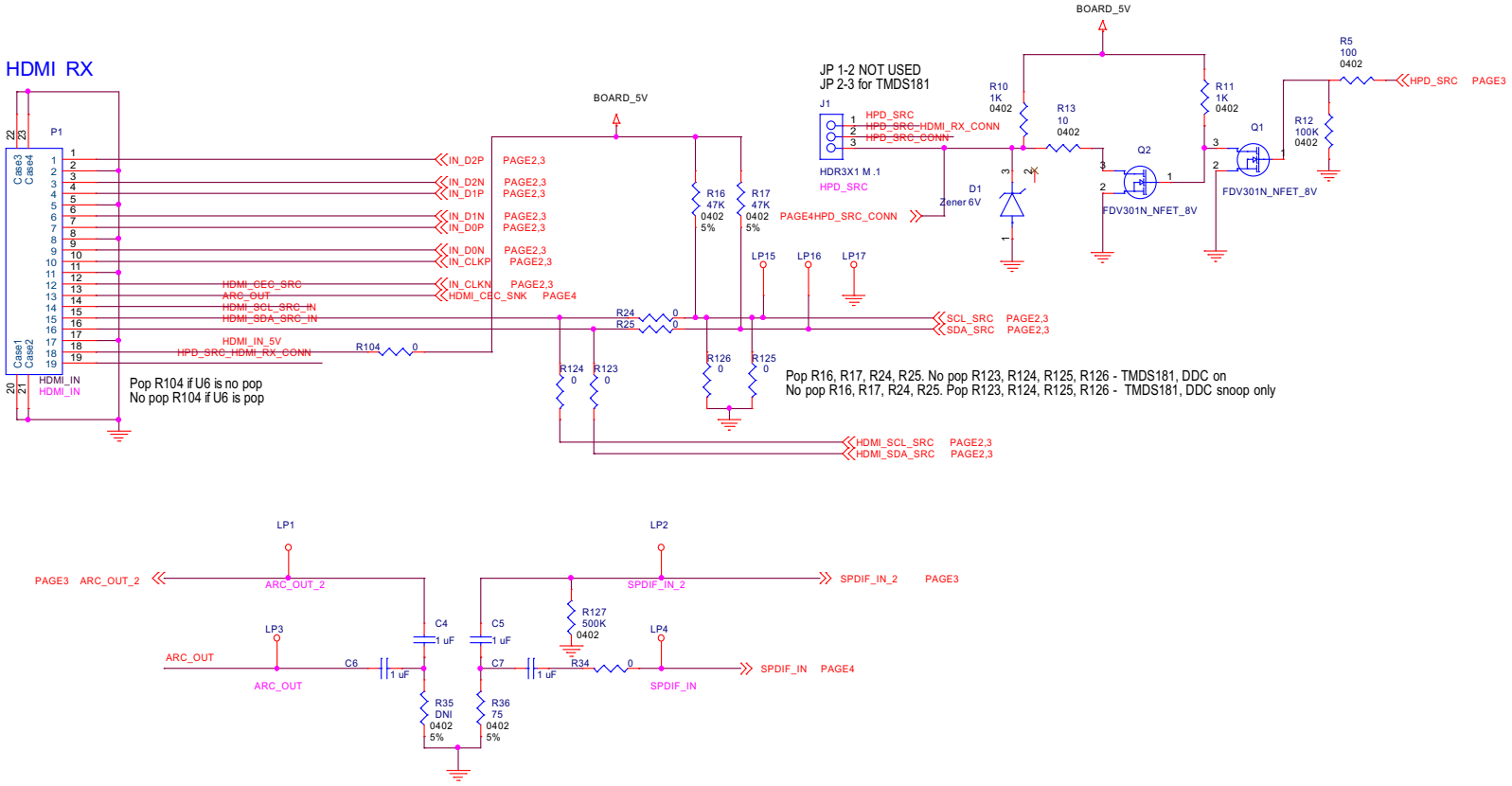
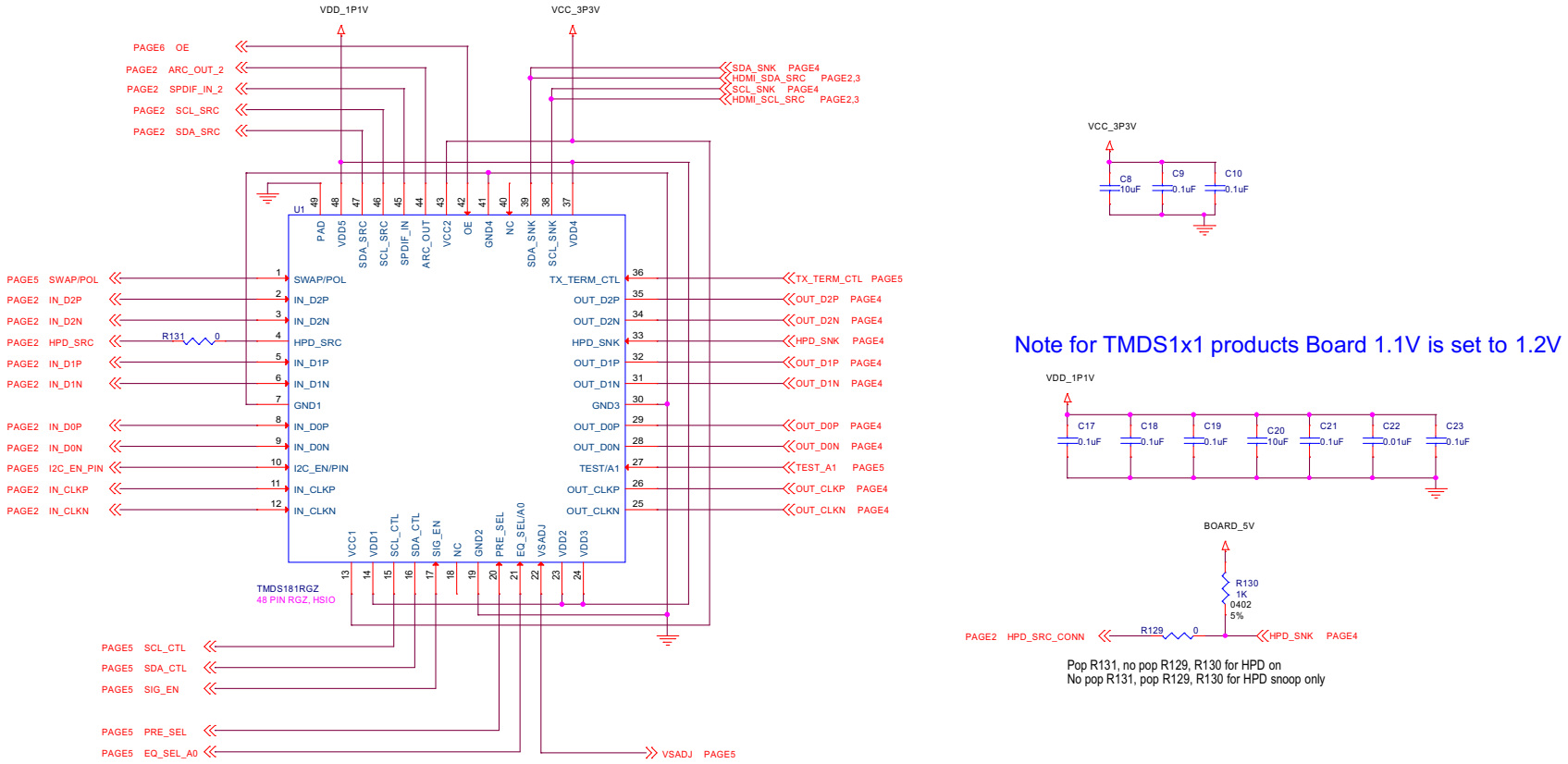


Figure 10. HDMI Input

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Note for TMDS1x1 products Board 1.1V is set to 1.2V

Pop R131, no pop R129, R130 for HPD on
No pop R131, pop R129, R130 for HPD snoop only

Figure 11. EVM Pin

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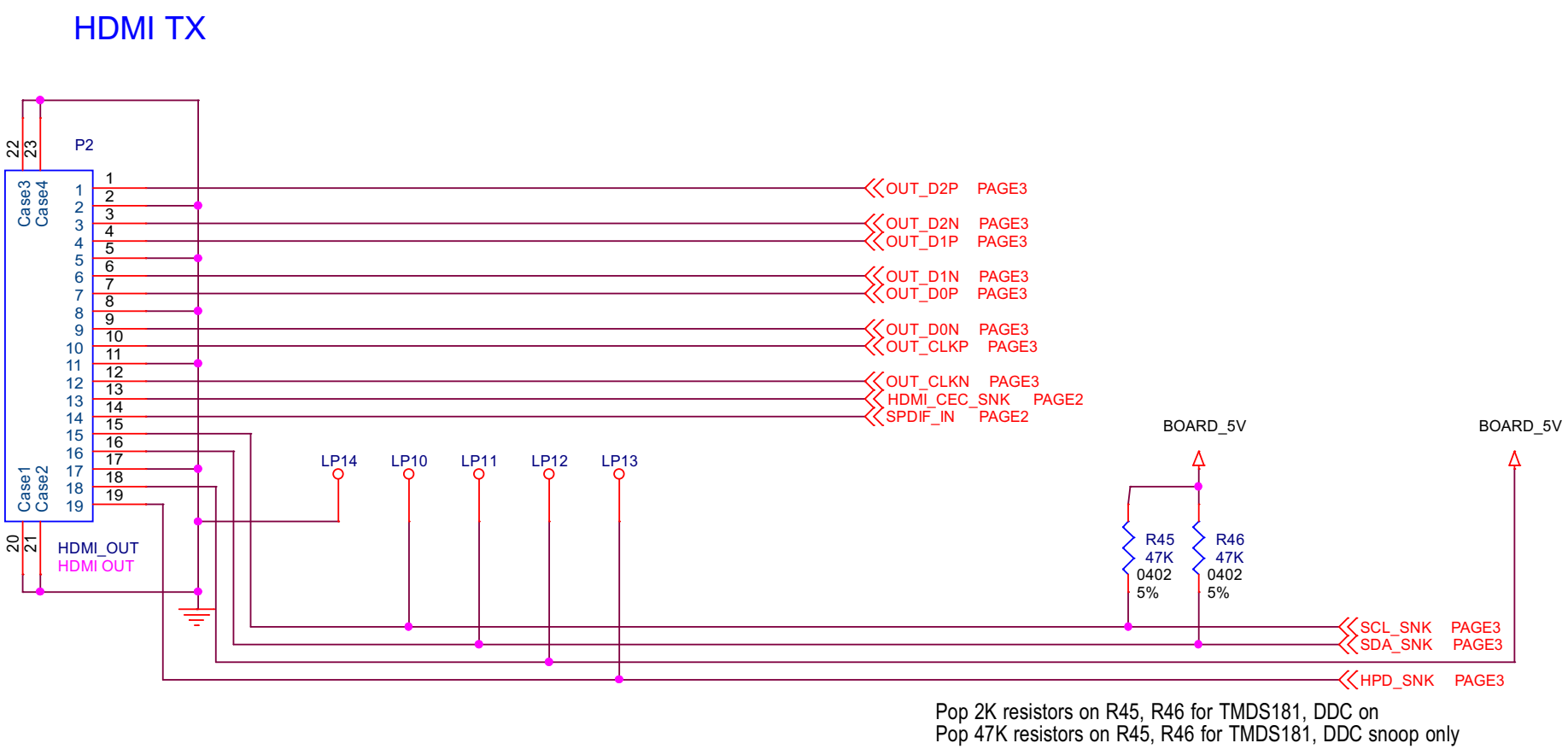


Figure 12. HDMI TX Connector

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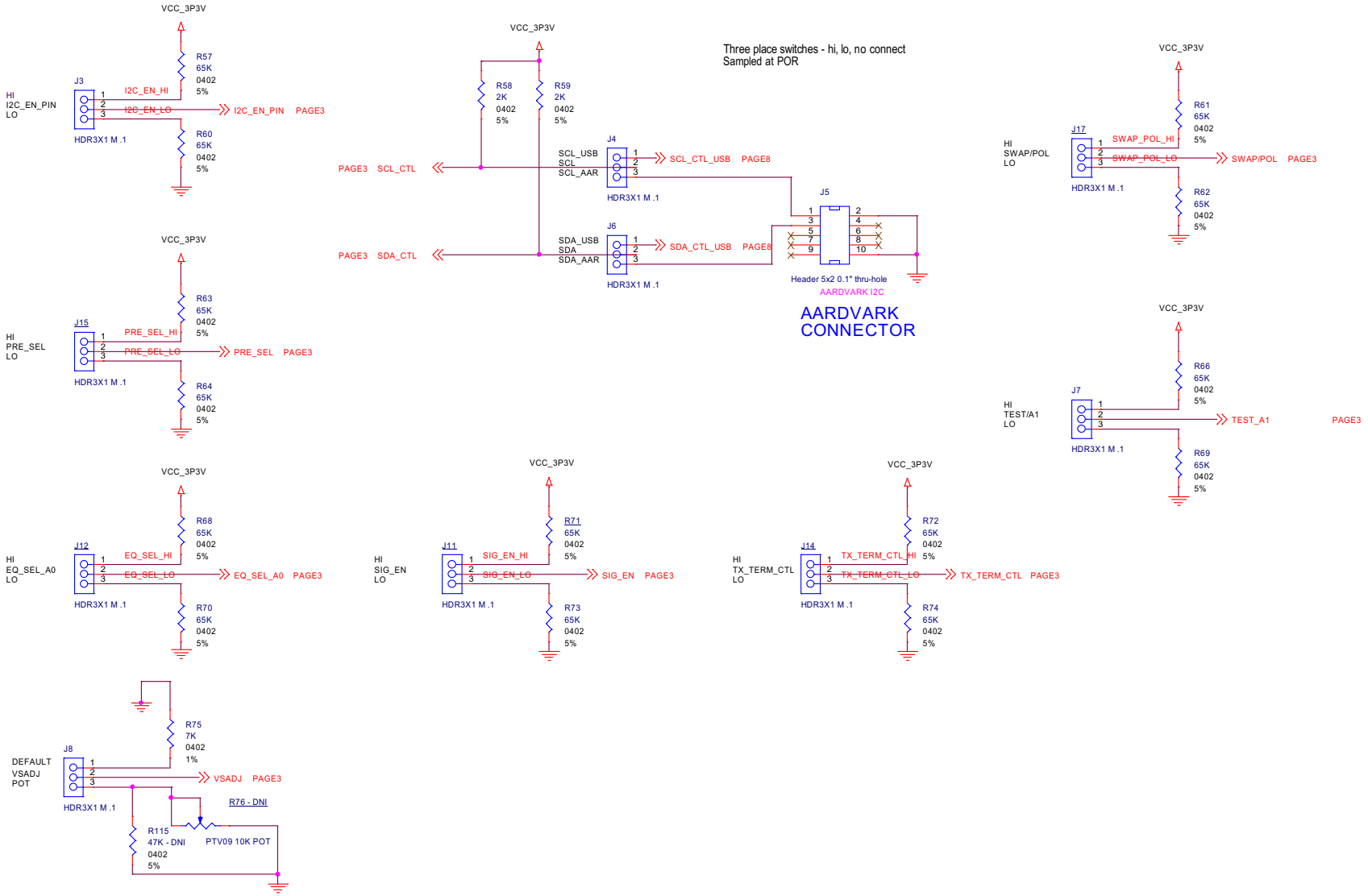


Figure 13. Select Options

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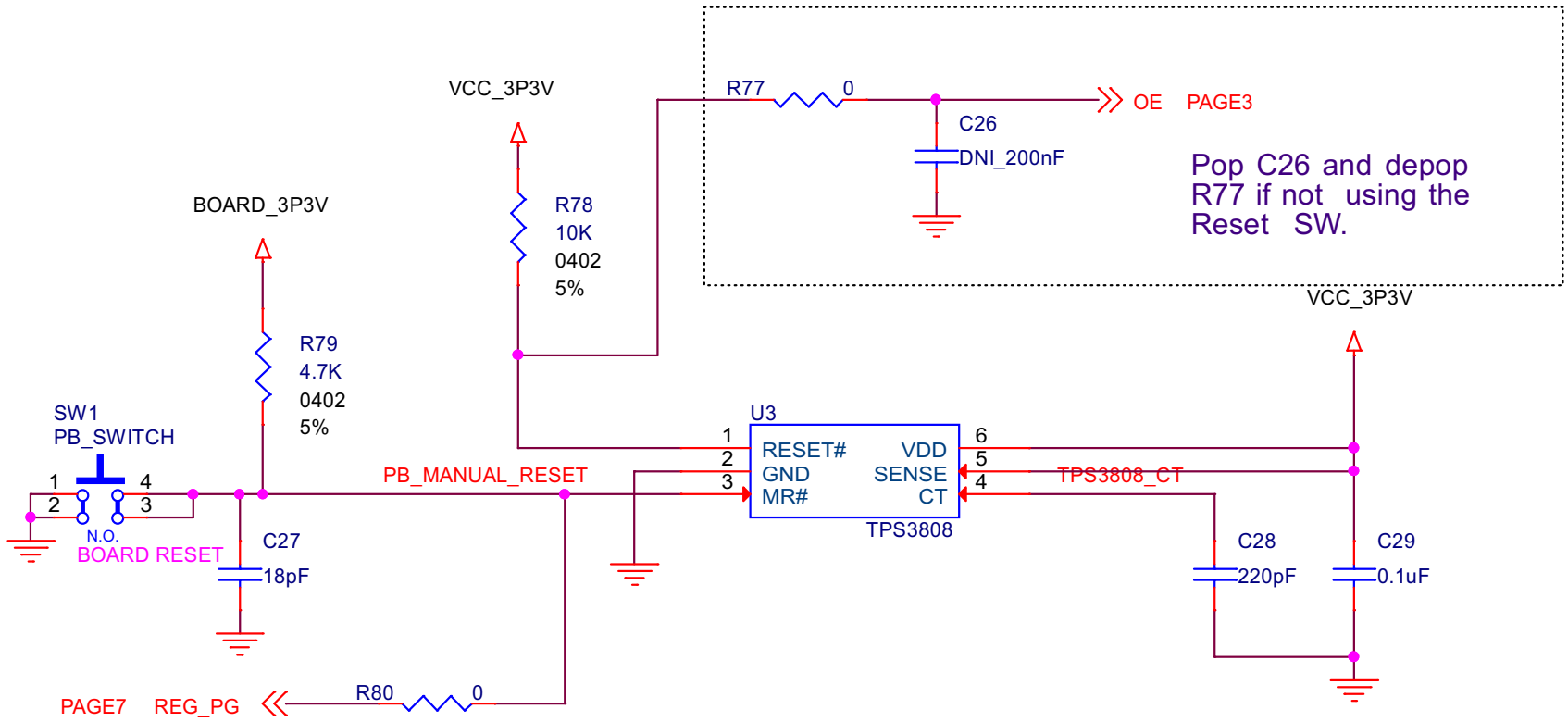


Figure 14. RESET

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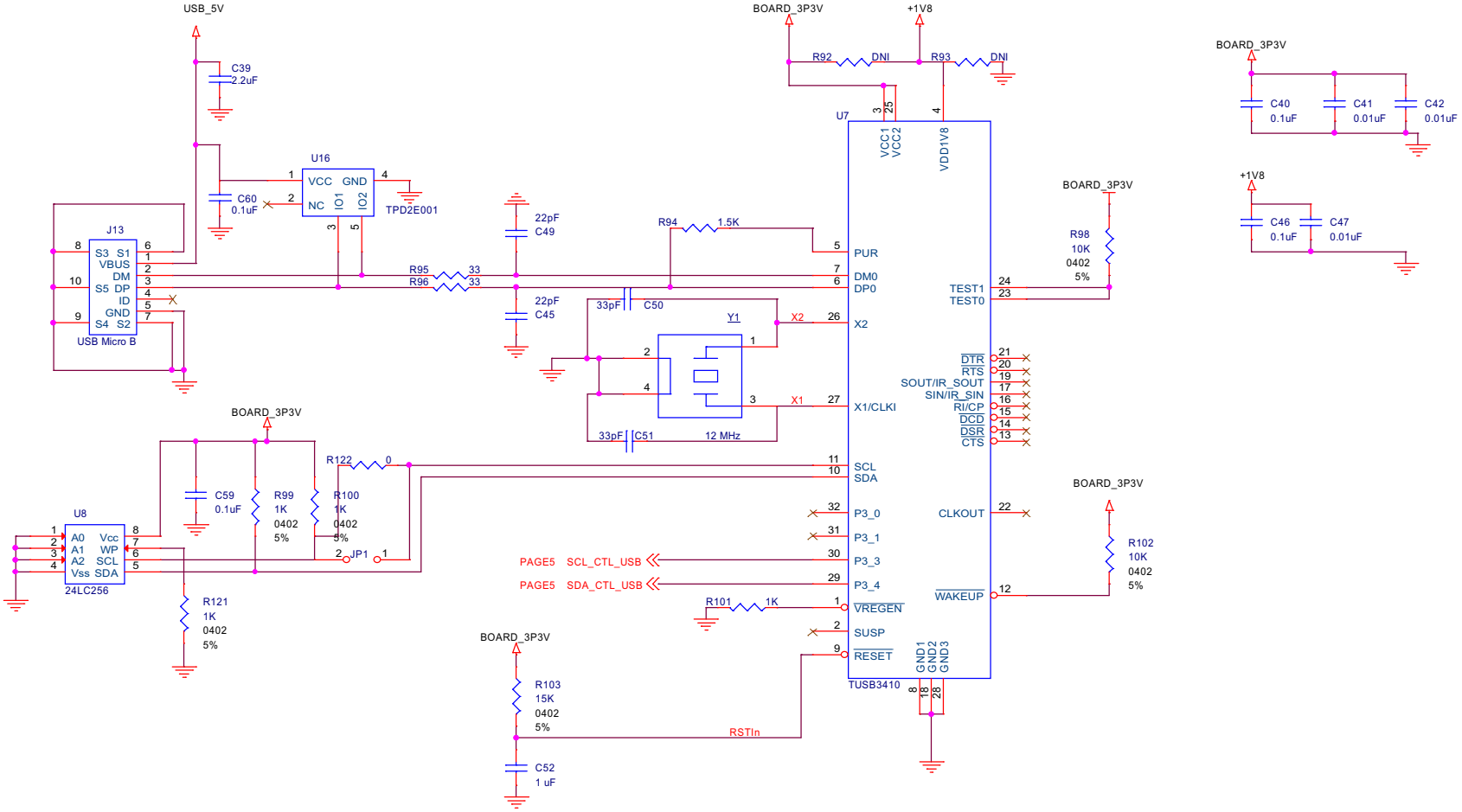


Figure 15. Regulators

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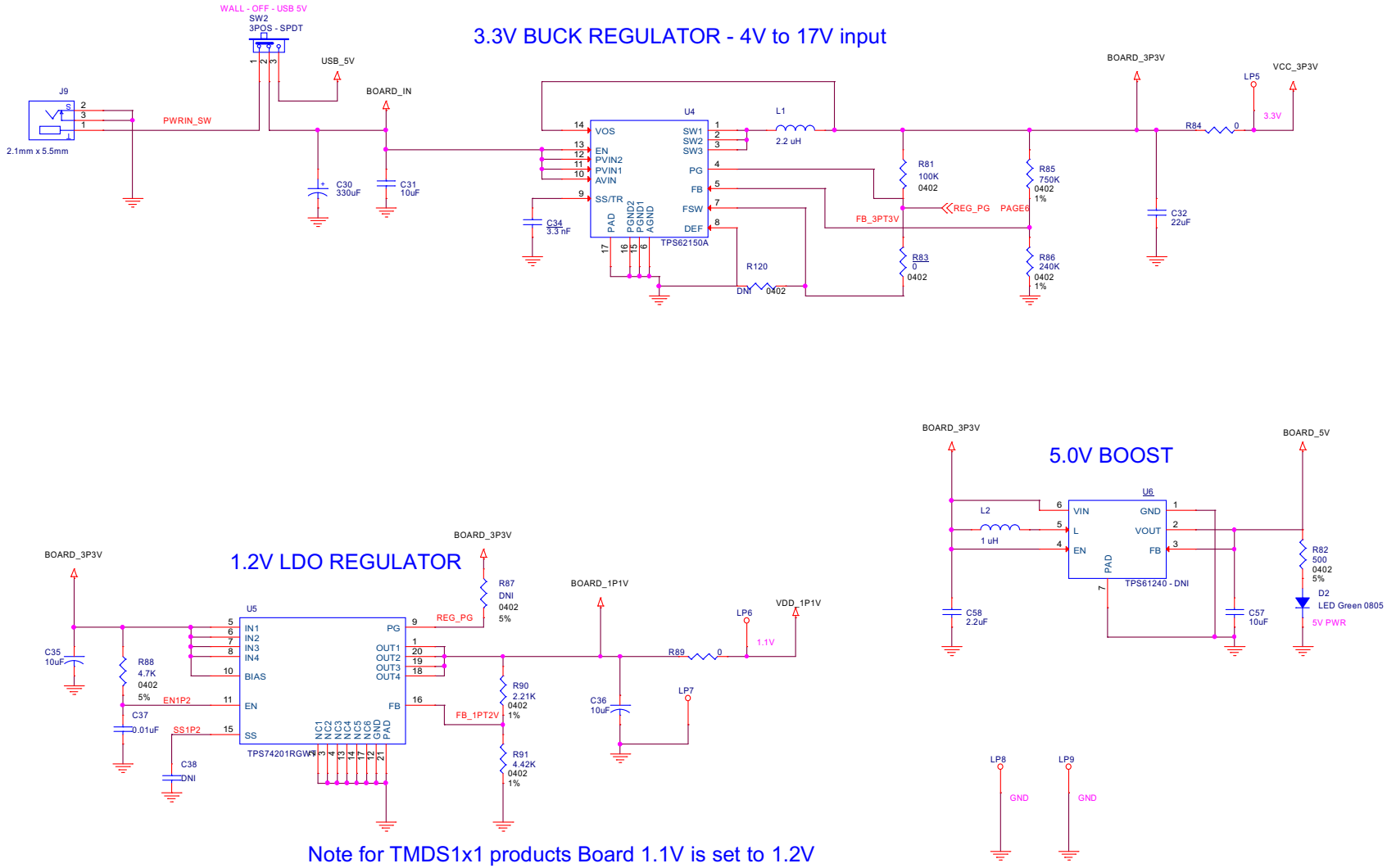


Figure 16. TUSB3410

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7 EVM Layout

Figure 17 through Figure 22 contain illustrations of the EVM PCB layout.

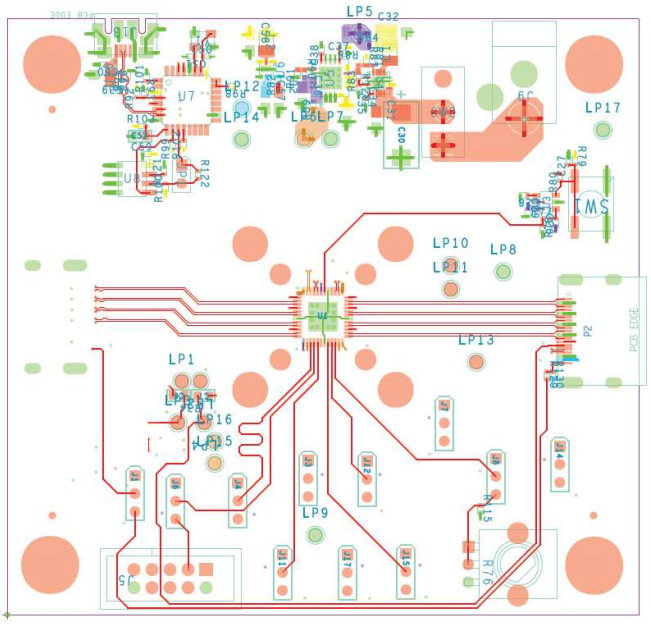


Figure 17. Layer 1 (Top)

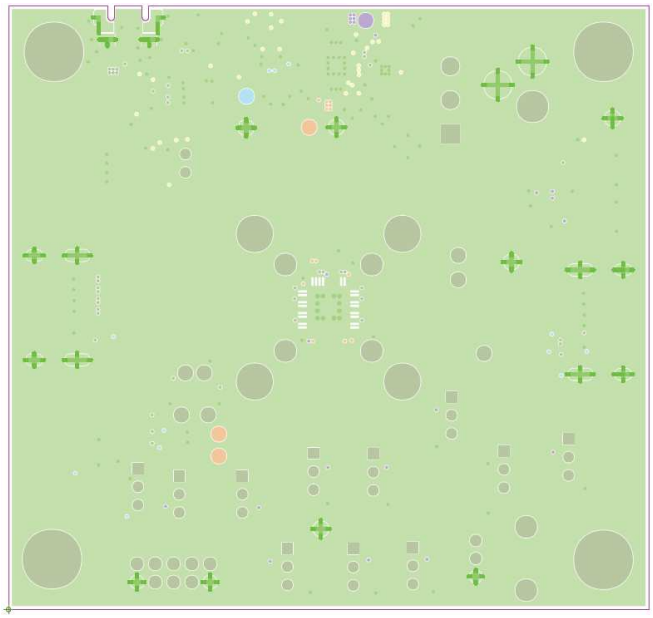


Figure 18. Layer 2 (GND)

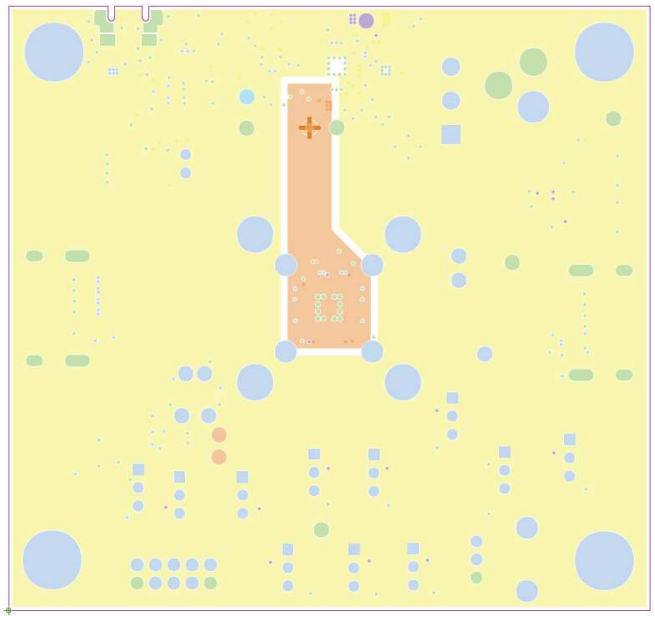


Figure 19. Layer 3 (Power)

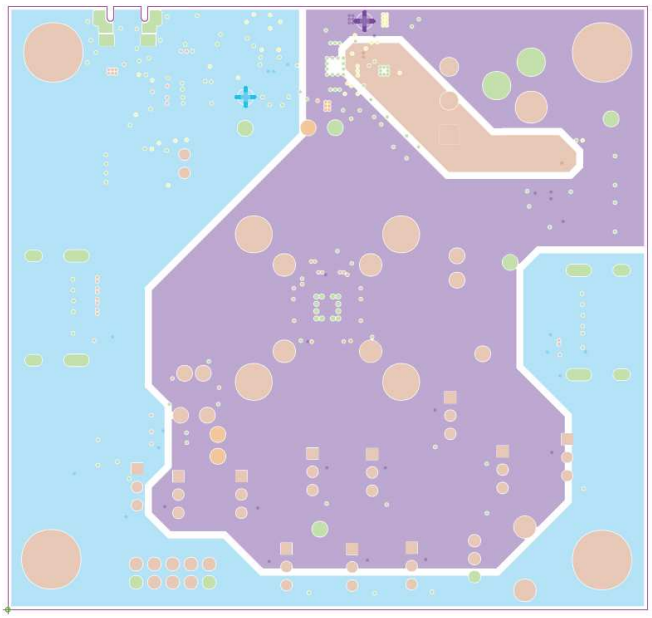


Figure 20. Layer 4 (Power)

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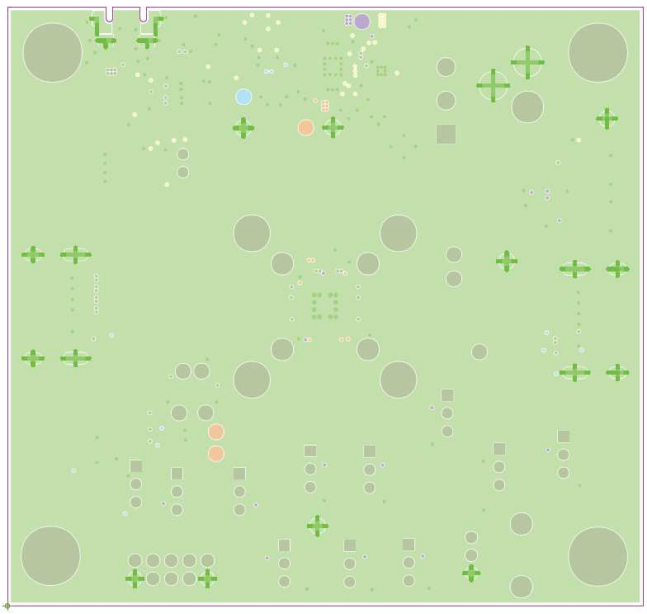


Figure 21. Layer 5 (GND)

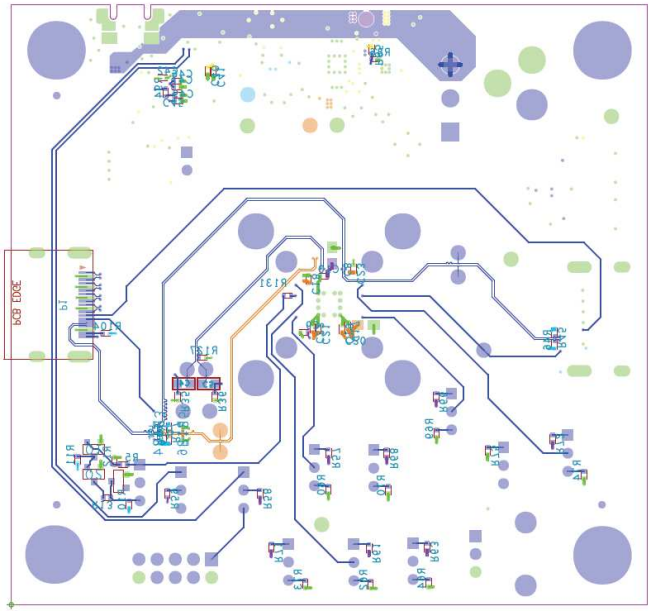


Figure 22. Layer 6 (Bottom)

8 Total Phase Aardvark I²C Host Adapter Scripts

Please request the latest scripts from your TI representative.

Revision History

Changes from Original (October 2015) to A Revision	Page
• Changed device EVM name to TMDS181RGZEVM throughout the document.	1
• Removed references to DP159 in the *What is the TMDS181 EVM?* section.	2
• Changed board image in Figure 1.	3
• Removed reference to DisplayPort in the *Video Connectors for TMDS181 Ports* section.	4
• Removed reference to *exceeding USB compliance requirements for power consumption* in the paragraph following the NOTE.	5
• Changed *SW1 DIP Switch Setting* table.	6
• Removed paragraph and table in the *Component Population Configuration* section.	6
• Updated for *Component Population Configuration* Rev B.	6
• Moved *USB Interface via TUSB3410* section.	7
• Expanded *Quick Start Guide* section.	7

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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      3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

      CAUTION

      This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

      FCC Interference Statement for Class A EVM devices

      NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

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Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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