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PEX 8505RDK
Hardware Reference Manual

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Hardware Reference Manual

Version 1.1

October 2007

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PREFACE

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ABOUT THIS MANUAL

This document describes the PLX PEX 8505RDK, a Rapid Development Kit, from a hardware perspective. It contains a description of all major functional circuit blocks on the board and also is a reference for the creation of software for this product. This manual also includes complete schematics and bill of materials.

REVISION HISTORY

Date	Version	Comments
May 2007	0.90	Hardware Reference Manual initial release.
June 2007	1.0	Minor content update.
October 2007	1.1	Fixed note in schematic.

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FIGURES

TABLES

1. General Information

The PLX PEX 8505RDK is a Rapid Development Kit based on the PEX 8505, a 5-lane, 5-port PCI Express switch. The PEX 8505RDK provides a complete hardware and software development platform to facilitate getting designs up and running quickly, lowering risk and reducing time-to-market.

An RDK Port Expansion Kit is included, which is used to convert the PEX 8505RDK into a bench top platform that supports the full 5-port/5-lane configuration. When mated to the RDK Port Expander, the upstream port is connected to a PCI Express x1 Cable connector. The Expansion Kit includes a 1-meter cable and adapter card, which allows the PEX 8505's upstream port to connect to any standard PC. See the RDK Port Expansion Kit Hardware Reference Manual for more details.

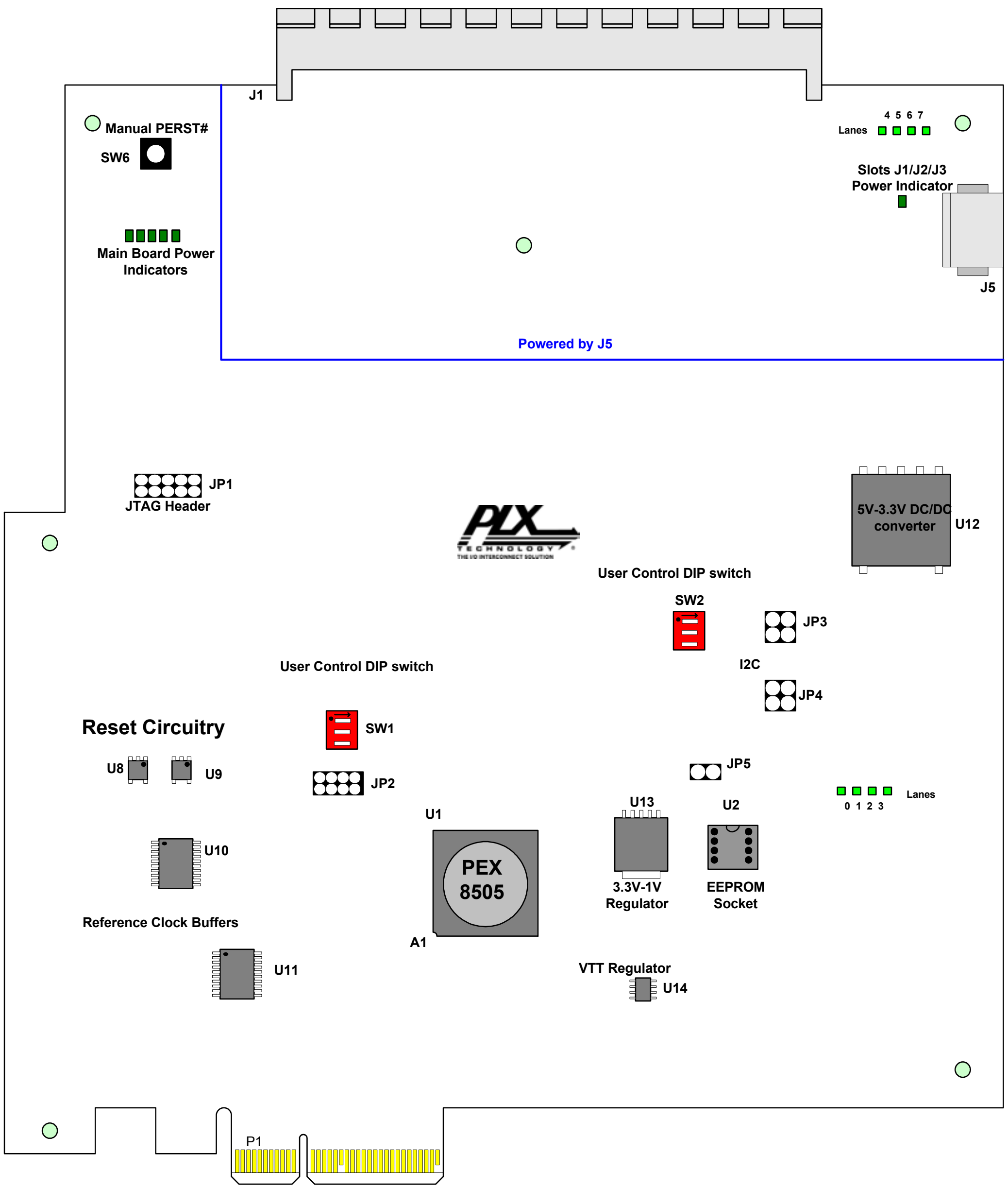

Figure 1-1. PEX 8505RDK Component Side View

1.1 PEX 8505 Features

- 5-lane, 5-port (maximum) PCI Express switch
- PCI Express Base Specification revision 1.1 and PCI Standard Hot-Plug Controller and Subsystem Specification, revision 1.0 compliance
- Five PCI Express lanes provide 25 Gbps aggregate bandwidth
- Cut-thru Packet latency of 210ns (x1 to x1)
- Non-blocking internal crossbar architecture supports full wire speed
- Out of band communication/initialization interfaces (Serial EEPROM and I2C)
- Maximum Payload Size up to 1024 bytes
- Performance tuning
- Up to 5-ports (Up to 4 possible port configurations)
- PCI Express Standard Hot Plug Controller for three ports
- Allows any port to be designated as upstream port
- Configuration with strapping pins and/or EEPROM
- Sideband INTA# (PEX_INTA#) and FATAL ERROR (FATAL_ERR#) signaling
- Lane reversal

1.2 PEX 8505RDK Features

- PLX PEX 8505 PCI Express switch in a 196-ball PBGA package
- Form factor based on PCI Express Card Electromechanical (CEM) Specification 1.1
- Four downstream PCI Express Slot connectors
- DIP switches for hardware configuration of PEX 8505 and on-board clock circuitry
- Support for Spread Spectrum Clocking (SSC).
- One Hot Plug controllable slot
- Socketable Serial EEPROM (3.3V)
- Standard 0.1” headers to connect up to I2C
- Manual push-button PERST# capability
- Lane Status indicator LEDs for visual inspection of link status
- Auxiliary ATX Hard disk connector for supporting additional power requirements for add-in cards

1.3 RDK Port Expansion Kit Features

- Provides a 4-lane/4-port breakout for PEX 8505 RDKs
- Upstream Connection via standard PCI Express x1cable
- Three downstream PCI Express Slot connectors
- Support for Spread Spectrum Clocking (SSC).
- Standard 0.1” headers to connect up to SM bus
- Manual push-button PERST# capability
- Auxiliary ATX Hard disk connector for supporting additional power requirements for add-in cards

1.3.1 RDK Port Expansion Kit Components

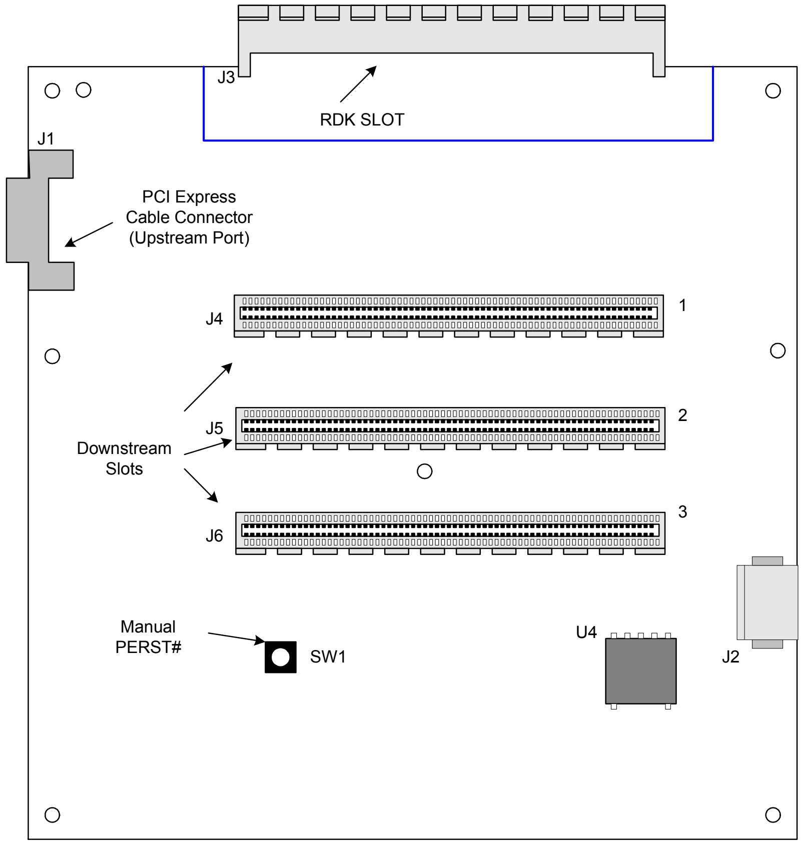

Figure 1-2. RDK Port Expander

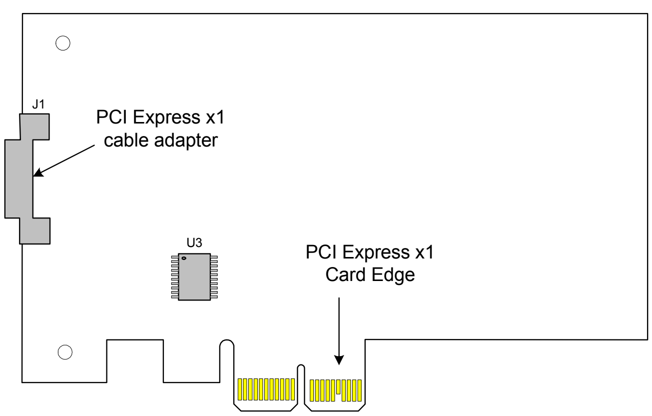

Figure 1-3. PCIe Cable Adapter

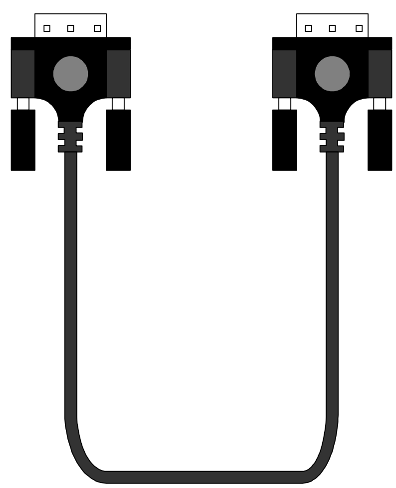

Figure 1-4. PCIe 1-meter x1 cable

2. PEX 8505RDK Hardware Architecture

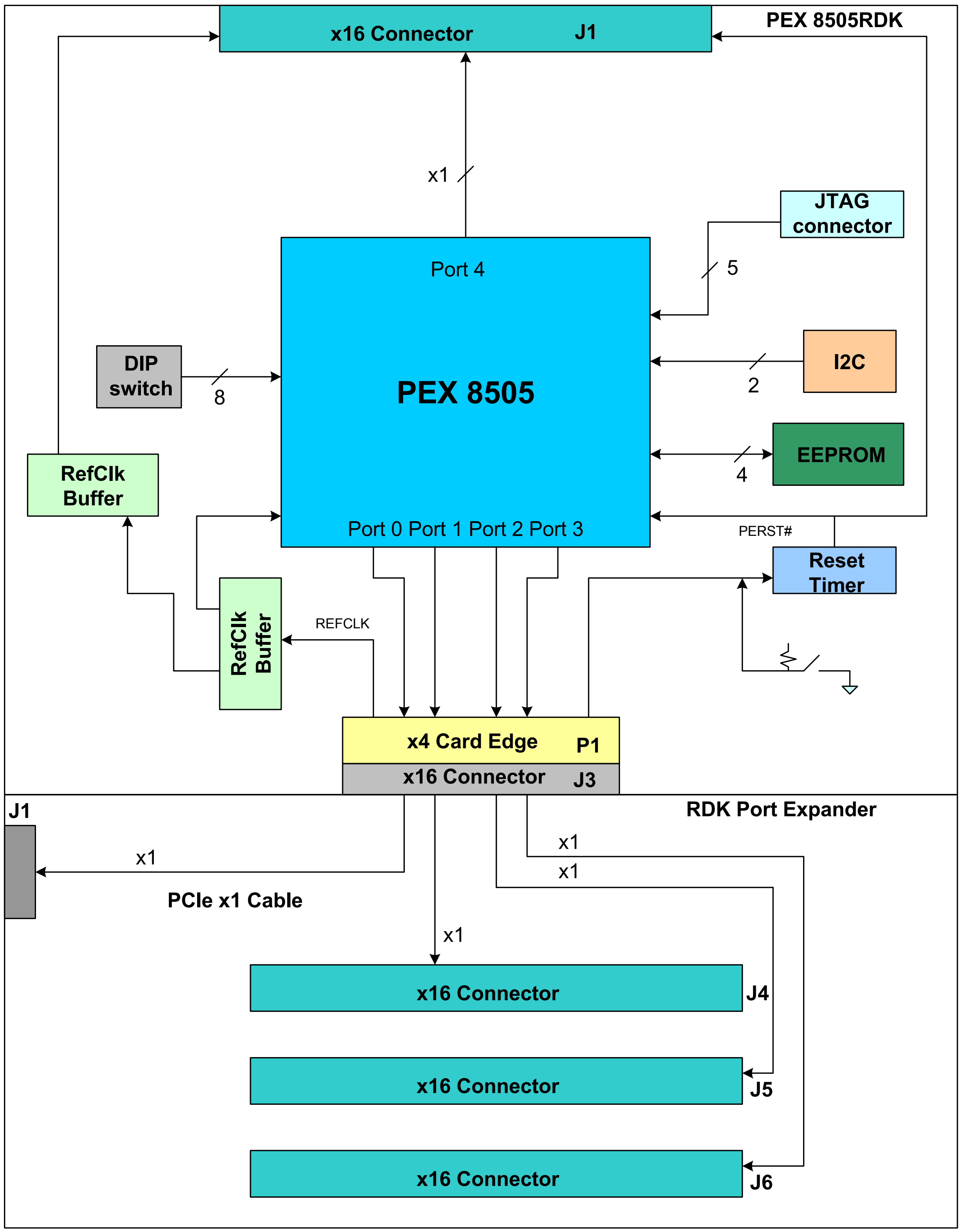

Figure 2-1. PEX 8505RDK Hardware Architecture

2.1 PEX 8505 PCI Express Switch

The PEX 8505 is a 5-lane, 5-port (maximum) PCI Express switch, which can be configured using strap pins or EEPROM. The RDK's onboard PEX 8505 is set up as a 5-port switch, with one x1 upstream port (Port 0) and four x1 downstream ports (Ports 1 - 4). Ports 0 - 3 connects to the card edge (P1), while Port 4 connects to x16-sized slot connectors (J1). The PEX 8509RDK plugs into an RDK Port expander which breaks out four lanes connected to P1 into a PCI Expressx1 cable connector and three downstream slots.

2.2 PCI Express Card Edge P1

The RDK form factor is based on the PCI Express CEM 1.1 specification. The board can directly plug into the RDK Port Expander, which in turn provides a break out of the lower four lanes. All four lanes from the The default configuration of the PEX 8505RDK sets Port 0 to be the upstream port.

2.3 PCI Express Connector J1

Connector J1 is a straddle-mount (SMT), x16 PCI Express connector. Cards plugging into this slot will be in-line with the RDK. Port 1 connects one lane (x1) to the lower four lanes of connector J1. The upper fifteen lanes are unconnected. Power is provided to connector J1 from the ATX hard disk connector J5.

2.4 Reference Clock Circuitry

Two Cypress CY28400-2 1-to-4 PCI Express clock buffers (U10 and U11) provide on-board REFCLK distribution to the PEX 8505 and the downstream slot (J1). The first CY28400-2 (U11) input is sourced by the card edge P1. U11 provides two differential CML (current mode logic) clock outputs. One pair drives the PEX 8505's PEX_REFCLKP/N input. This pair is AC-coupled (C74 and C75). This is required to block the DC information of the transmitter from the PEX 8505 clock receiver, which has on-chip biasing and termination circuitry. The other pair drives the input of a second CY28400-2 (U10), which is used drive the downstream slot.

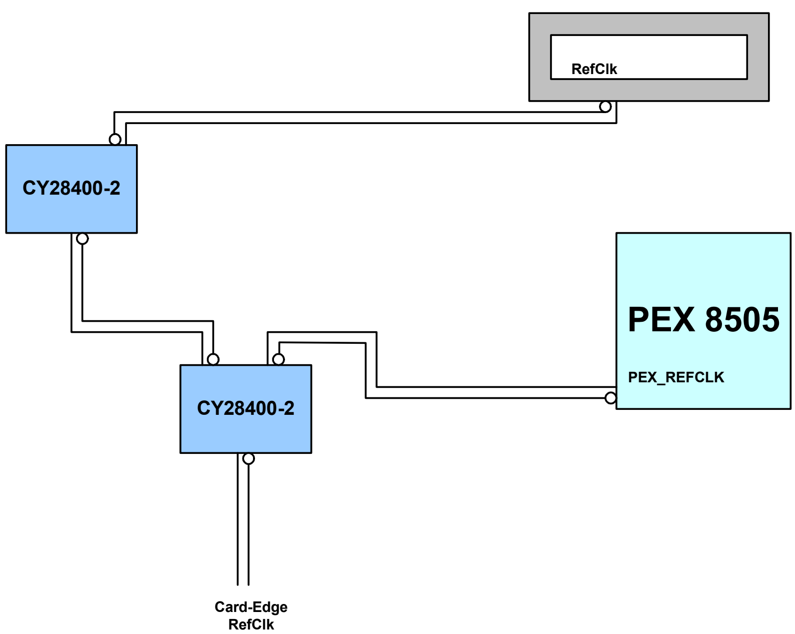

Figure 2-2. PEX 8505RDK Reference Clock Circuit

2.5 Reset Circuitry

The PEX 8505RDK reset circuitry includes a MAX6420 adjustable reset timer (U9) and manual reset push-button switch (SW6). The reset timer accepts PERST# from the card edge (P1) and from SW6 (logical-OR via U8). The MAX6420 has the capability of adjusting the reset timeout period by changing the value of C63 (0.001 µF ~= 3 ms).

2.6 Serial EEPROM

The PEX 8505RDK contains an 8-pin DIP socket for a serial EEPROM (U2). The board is populated with a blank Atmel AT25080A 8-Kbit device. To use the serial EEPROM, place a shunt between pins 1 and 2 of JP2 (see section 3.4 for more details). The AT25080A device can directly interface to the PEX8505.

2.7 I2C Interface

The PEX 8505 implements an I2C slave interface, which allows an external I2C master to read and write device registers through an out-of-band mechanism. The PEX 8505 I2C interface is accessible via a 7-bit address, at data rates up to 400kbits/sec. The RDK provides two cascaded 2x2, 0.1" pitch headers (JP3 and JP4), which interface to the PEX 8505's I2C port. This allows for cascading multiple RDKs together using standard ribbon cable, or connecting various 3rd party I2C test equipment such as the Total Phase Aardvark I2C controller.

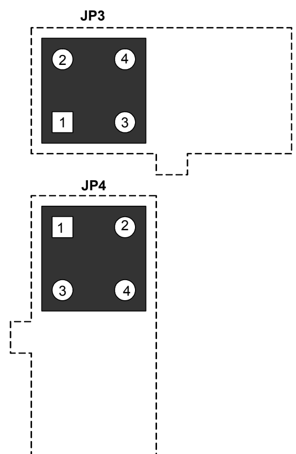

Figure 2-3. I2C Connector Orientation for Aardvard I2C Controller

2.8 Power Distribution

2.8.1 Power Generation/Conversion

The PEX 8505RDK has two sources for DC power. The first source is the card edge connector (P1), which gets it's power from the RDK Port Expander. Card edge power is intended to power only RDK board components. Slot J1 receives power via a 4-pin ATX hard disk connector (J5).

PEX8505 core and SerDes +1.0V supply is derived from the +3.3V rail through a Micrel MIC49150 LDO regulator (U13). The PEX 8505's +3.3V I/O supply receives power directly from the +3.3V card edge power rail. The VTT supply for the PEX8505 PCI Express transmitters, is regulated from the +3.3V card edge power via a Maxim MAX1806 adjustable LDO regulator (U14). The regulator output voltage is normally set to +1.50V, but can be adjusted by changing the values of R98 and R102.

The ATX 4-pin connector provides +12V and +5V DC power. The +5V is converted down to +3.3V for slot J1 through a Bel S7AH-08B330/-08E1A0 non-isolated DC/DC converter (U12). The +12V power rail is used directly.

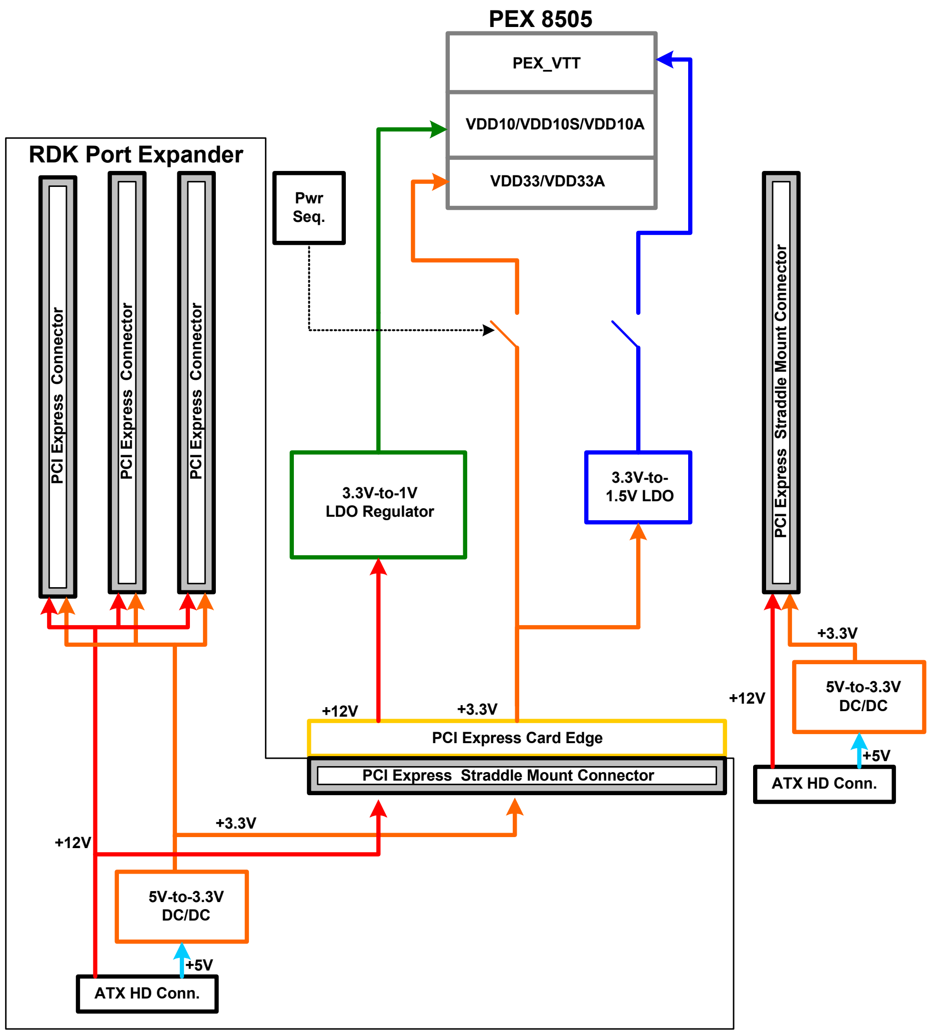

Figure 2-4. PEX 8505RDK Power Subsystem

2.8.2 Power Sequencing

The PEX 8505 device requires that the 1.0V power rails are supplied before the 1.5V and 3.3V rails are powered. This power sequencing is accomplished via three bipolar transistors (Q3, Q4, Q6), biasing resistors and one power MOSFET (Q5).

2.9 LED Indicators

The PEX 8505RDK provides a number of LED indicators including power-on indication, PEX 8505 lane status indication, and Hot Plug status indication. Table 2-1 provides a quick explanation of the various board indicators.

Table 2-1. PEX 8505RDK LED Indicator descriptions

Indicator Type	Locations	LED On	LED Off
Board Power indication	D16, D15, D17, D18	1.0V, 1.5V, 12V, 3.3V power on	1.0V, 1.5V, 12V, 3.3V power off
Slot J1 Power Fault	D14	+12V or +3.3V power to slot J1 had dropped below -15% on either supply.	+12V and +3.3V power to slots J1 is good.
J5 Power indication	D20	ATX Hard disk connector is currently supplying power	ATX hard disk connector is not supplying power

Indicator Type	Locations	LED On	LED Off
PEX 8505 Port 0 Lane Status	D1	Port 0 link is up	If LED is off, Port 0 link is down
PEX 8505 Port 1 Lane Status	D4	Port 1 link is up	If LED is off, Port 1 link is down
PEX 8505 Port 2 Lane Status	D5	Port 2 link is up	If LED is off, Port 2 link is down
PEX 8505 Port 3 Lane Status	D8	Port 3 link is up	If LED is off, Port 3 link is down
PEX 8505 Port 4 Lane Status	D2	Port 4 link is up	If LED is off, Port 4 link is down
PEX 8505 Fatal Error Indication	D9	PEX 8505 detected a fatal error.	No fatal errors reported
PEX 8505 INTA#	D19	PEX 8505 has asserted sideband interrupt	Interrupt is not asserted

3. On-Board Connectors, Switches, and Jumpers

3.1 DIP Switches

The PEX 8505RDK contains four user controllable DIP switches (SW1, SW2, SW3 and SW4) for selecting various functionality. Each DIP switch position can be either ON (0b) or OFF (1b). The gray squares in Figures 3-1 through 3-4 indicate which way the switch position is connected.

3.1.1 Upstream Port Selection (SW1)

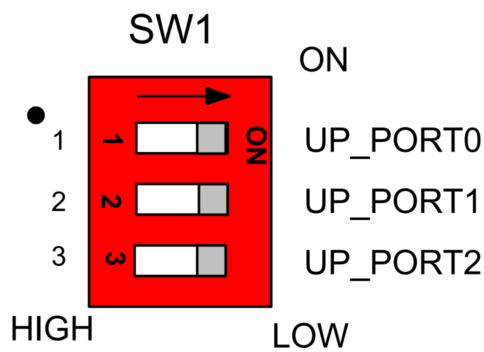

Figure 3-1. Switch SW1 Default Settings

Table 3-1. Switch SW1 Description

<table>
<tr><th>SW1 Functional Description</th><th colspan="2">Switch Position Settings</th></tr>
<tr><td rowspan="10">STRAP_UPSTRM_PORTSEL [2:0]
Selects the PEX 8505 Upstream Port.
Default setting is 000b.</td><td colspan="2">1: STRAP_UPSTRM_PORTSEL[0]
2: STRAP_UPSTRM_PORTSEL[1]
3: STRAP_UPSTRM_PORTSEL[2]</td></tr>
<tr><th>Bus Encodings [2:0]</th><th>Upstream Port</th></tr>
<tr><td>000b</td><td>0</td></tr>
<tr><td>001b</td><td>1</td></tr>
<tr><td>010b</td><td>2</td></tr>
<tr><td>011b</td><td>3</td></tr>
<tr><td>100b</td><td>4</td></tr>
<tr><td>101b</td><td>5</td></tr>
<tr><td>110b</td><td>6</td></tr>
<tr><td>111b</td><td>7</td></tr>
</table>

3.1.2 PEX 8505 I2C Address Selection (SW2)

Switch SW2 is used to select the lower three address bits of the PEX 8505’s I2C slave address.

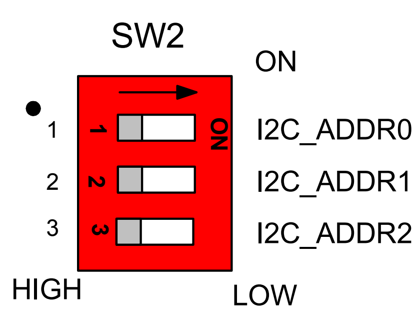

Figure 3-2. Switch SW2 Default Settings

Table 3-2. Switch SW2 Description

<table>
<tr><th>SW2 Functional Description</th><th colspan="2">Switch Position Settings</th></tr>
<tr><td rowspan="10">PEX 8505 I2C Address bits[2:0].
Default setting is 111b.</td><td colspan="2">1: I2C_ADDR[0]
2: I2C_ADDR[1]
3: I2C_ADDR[2]</td></tr>
<tr><td>**Bus Encodings [1:0]**</td><td>**PEX 8505 I2C Slave Address**</td></tr>
<tr><td>000b</td><td>38h</td></tr>
<tr><td>001b</td><td>39h</td></tr>
<tr><td>010b</td><td>3Ah</td></tr>
<tr><td>011b</td><td>3Bh</td></tr>
<tr><td>100b</td><td>3Ch</td></tr>
<tr><td>101b</td><td>3Dh</td></tr>
<tr><td>110b</td><td>3Eh</td></tr>
<tr><td>111b</td><td>3Fh</td></tr>
</table>

3.2 Push-Button Switches

3.2.1 Hot Plug Attention Button# (SW5)

Switch SW5 provides a push-button switch control for the PEX 8505 Hot Plug Controller's HP_BUTTON[3]# input pin. The PEX 8505 contains internal debounce circuitry for this input.

3.2.2 Manual Reset# (SW6)

The PEX 8505 RDK provides a manual PERST# capability. Note that manual PERST# will only apply warm reset to the PEX 8505, and slot J1.

3.3 EEPROM Enable Jumper (JP5)

JP5 is used to enable an EEPROM presence detection to the PEX 8505. Install a shunt between pins 1 - 2 to indicate a Serial EEPROM is present. Un-install the shunt to indicate a Serial EEPROM is not present.

Table 3-3. Jumper JP2 settings

JP5 Setting	EEPROM Status
Shunt installed (Default)	Serial EEPROM present
Shunt not installed	Serial EEPROM not present

3.4 JTAG Header (JP1)

Header JP1 provides a direct connection to the PEX 8505 JTAG interface. The 10-pin connector is designed to allow a direct interface to 3rd party JTAG controllers, such as the Corelis USB-1149.1/E controller.

3.5 PCI Express Fatal Error Indication (D9)

The PEX 8505 provides an output status pin (FATAL_ERR#), which reports the event of a PCI Express fatal error condition. The RDK connects this output to D9, which is lit when a fatal error is detected. Examples of fatal error conditions are data link layer protocol errors, receiver overflow, malformed TLPs, etc… The PCI Express Base specification provides a complete listing of fatal error conditions.

3.6 PEX INTA# (D19)

PEX 8505 provides a side-band interrupt pin for signaling various programmable events.

3.7 Slots J1 Power Fault Indication (D20)

Slot J1 is power by the ATX 4-pin hard disk connector and a DC/DC converter (U12). No circuitry is provided to current limit the power consumed by slot J1; however, a voltage supervisor is provided to monitor under-voltage conditions on the +12V and +3.3V supply rails going to those slots. If either rail drops below 15% of its nominal supply voltage, the power good signal from U3 is used to clear a D-flip flop (U15), which will in turn light a red indicator LED (D14). Once the LED is lit, it remains lit until board power is cycled.

4. Serial EEPROM Registers

4.1 Serial EEPROM Contents

The PEX 8505RDK is shipped with a programmed AT25080A EEPROM. PLX Technology provides the necessary binary image files and software tools required to program the EEPROM. Install a jumper between JP2 pins 1 and 2, before applying power to the RDK.

5. FAQ/Troubleshooting

5.1 Frequently Asked Questions

Q1) Does the PEX 8505RDK require that I use the RDK Port Expansion Kit.

A1) Yes. The PEX 8505RDK is required to plug into the RDK Port Expander in order to gain access to all five ports/lanes.

Q2) What steps must I take to get my RDK working behind the RDK Port Expander?

A2) The RDK Port Expansion Kit has a separate Hardware Reference Manual, which provides of a list of steps that should be taken prior to plugging the RDK into the RDK Port Expander.

Q3) Since the RDK Port Expansion Kit may use a different power than my host PC, is there a power-up ordering requirement?

A2) Yes. The RDK Port Expander/PEX 8505RDK must have power applied before the PC is powered on. This will ensure than the PC BIOS enumeration will see the PEX 8505 and it's downstream components.

6. Bill of Materials/ Schematics

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
SURFACE MOUNT COMPONENTS							
1	1	PLX Technology	PEX8505-AA25BI	IC, 5-lane, 5-port, PCI Express switch	SMT, 196-pin PBGA	U1	
2	1	Intersil	ISL6536IB	IC, Four Channel Supervisor	SMT, 8-pin SOIC	U3	
3	0	TI	TPS2310IPW	IC, Dual-power Hot Plug Controller	SMT, 20-lead TSSOP		
4	0	TI	SN74LVC1G3157DCK	1-bit, SPDT Analog switch	SMT, 6-pin SC-70		Digikey P/N: 296-

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
			R				14909-1-ND
5	1	Fairchild	NC7S08M5X	IC, Tiny Logic 2-input AND gate	SMT, 5-pin SOT-23	U8	Digikey P/N: NC7S08M5XCT-ND
6	1	Maxim	MAX6420UK29-T	IC, Reset controller, Adj. reset timeout	SMT, SOT23-5	U9	
7	2	Cypress	CY28400OXC-2	IC, 100MHz Differential Clock Buffer	SMT, 28-pin SSOP	U10, U11	
8	1	Belfuse	S7AH-08E1A0	Non-iso DC/DC converter, 5V-to-3.3V @ 8A	SMT, 7-pin	U12	
9	1	Micrel	MIC49150WR	LDO Regulator, 1.5A, Adj output	SPAK-5	U13	Digikey P/N: 576-1227-ND
10	1	Maxim	MAX1806EUA15	LDO regulator, 500mA adjustable	SMT, 8-pin uMax	U14	
11	1	TI	SN74LVC2G74DCTR	IC, Single Positive Edge D Flip flop	SMT, 8-pin SSOP	U15	Digikey P/N: 296-13273-1-ND
12	1	Fairchild	NC7S04M5X	IC, Tiny Logic Inverter	SMT, 5-pin SOT-23	U17	Digikey P/N: NC7S04M5XCT-ND
13	1	Adex	CONN-PCIEXP-16X-SM	PCI Express x16 straddle-mount connector	SMT, 164-pin	J1	See second source for alternatives
14	1	Fairchild Semiconductor	FDN359BN	IC, N-Channel MOSFET	SMT, Super SOT-3	Q5	Digikey P/N: FDN359BNCT-ND
15	0	International Rectifier	IRF7470	IC, N-Channel MOSFET	SMT, 8-pin, SO-8		Digikey P/N: IRF7470-ND
16	5	On Semiconductor	MMBT3904LT1	IC, Bipolar Transistor	SMT, SOT-23	Q3, Q4, Q6, Q7, Q8	Digikey P/N: MMBT3904LT1OSCT-ND
17	0	Lumex	SML-LXT0805YW-TR	LED, Yellow	SMT, 0805		Digikey P/N: 67-1554-1-ND
18	5	Lumex	SML-LXT0805GW-TR	LED, Green	SMT, 0805	D15, D16, D17, D18, D20	Digikey P/N: 67-1553-1-ND
19	2	Lumex	SML-LX0603IW-TR	LED, Red	SMT, 0603	D9, D14	Digikey P/N: 67-1548-1-ND
20	6	Lumex	SML-	LED, Green	SMT,	D1, D2, D4, D5,	Digikey

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
			LX0603GW -TR		0603	D8, D19	P/N: 67-1549-1-ND
21	0	ITTCANNON	SDA02H1S KD	Dip Switch, 2-pos, half pitch, tape seal	SMT		Digikey P/N: CKN1286-ND
22	2	ITTCANNON	SDA03H1S KD	Dip Switch, 3-pos, half pitch, tape seal	SMT	SW1, SW2	Digikey P/N: CKN1287-ND
23	1	Omron	B3S1002	Switch, Push Button	SMT	SW6	Digikey P/N: SW416-ND
24	6	CTS	742C08351 2J	Chip Res. Array, 5.1K ohm, 4R isolated	SMT	RN1, RN2, RN3, RN4, RN5, RN6	Digikey P/N: 742C08351 2JCT-ND
25	16	Panasonic	ERJ-3GEY0R00 V	Res. 1/10W, zero ohm 5%	SMT, 0603	R1, R2, R11, R13, R14, R15, R16, R17, R28, R29, R46, R59, R61, R102, R119, R120	Digikey P/N: P0.0GCT-ND
26	0	TTelectronics	LRF2512-LF-R020-F	Res. 2W, 0.02 ohm 1%	SMT, 2512		Mouser P/N: 66-LRF2512-LF-R020-F
27	2	Panasonic	ERJ-3GEYJ4R7 V	Res. 1/10W, 4.7 ohm 5%	SMT, 0603	R62, R63	Digikey P/N: P4.7GCT-ND
28	7	Panasonic	ERJ-2GEJ330X	Res. 1/16W, 33 ohm 5%	SMT, 0402	R18, R64, R65, R68, R69, R80, R83,	Digikey P/N: P33JCT-ND
29	6	Panasonic	ERJ-2RKF49R9 X	Res. 1/16W, 49.9 ohm 1%	SMT, 0402	R66, R67, R71, R73, R86, R87	Digikey P/N: P49.9LCT-ND
30	11	Panasonic	ERJ-3GEYJ151 V	Res. 1/10W, 150 ohm 5%	SMT, 0603	R3, R4, R6, R7, R10, R25, R107, R108, R109, R114, R122	Digikey P/N: P150GCT-ND
31	2	Panasonic	ERJ-3EKF4750 V	Res. 1/16W, 475 ohm 1%	SMT, 0603	R84, R85	Digikey P/N: P475HCT-ND
32	4	Panasonic	ERJ-3EKF1001 V	Res. 1/16W, 1K ohm 1%	SMT, 0603	R99, R105, R113, R123	Digikey P/N: P1.00KHC T-ND
33	1	IRC	PFC-W0805R-03-1301-B	Res. 1/10W, 1.30K ohm 1%	SMT, 0805	R96	Mouser: 66-PFC08C1.3 K-B

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
34	0	Panasonic	ERJ-3EKF2001V	Res. 1/10W, 2.0K ohm, 1%	SMT, 0603		Digikey P/N: P2.00KHCT-ND
35	3	Panasonic	ERJ-3EKF2261V	Res. 1/16W, 2.26K ohm 1%	SMT, 0603	R36, R37, R38	Digikey P/N: P2.26KHCT-ND
36	1	Panasonic	ERJ-3EKF2741V	Res. 1/16W, 2.74K ohm 1%	SMT, 0603	R117	Digikey P/N: P2.74KHCT-ND
37	18	Yageo America	9C06031A5101FKHFT	Res. 1/10W, 5.1K ohm 1%	SMT, 0603	R19, R20, R21, R33, R35, R39, R47, R49, R50, R54, R58, R76, R78, R94, R103, R104, R106, R121	Digikey P/N: 331-5.10KHCT-ND
38	1	Panasonic	ERJ-3EKF7681V	Res. 1/16W, 7.68K ohm 1%	SMT, 0603	R112	Digikey P/N: P7.68KHCT-ND
39	2	Panasonic	ERJ-3EKF8251V	Res. 1/10W, 8.25K ohm 1%	SMT, 0603	R100, R118	Digikey P/N: P8.25KHCT-ND
40	4	Panasonic	ERJ-3GEYJ103V	Res. 1/10W, 10K ohm 5%	SMT, 0603	R12, R57, R110, R115	Digikey P/N: P10KGCT-ND
41	2	Panasonic	ERJ-3GEYJ513V	Res. 1/10W, 51K ohm 5%	SMT, 0603	R45, R60	Digikey P/N: P51KGCT-ND
42	1	Yaego America	9C06031A7502FKHFT	Res. 1/10W, 75K ohm 1%	SMT, 0603	R111	Digikey P/N: 311-75.0KHCT-ND
43	1	Panasonic	ERJ-3GEYJ104V	Res. 1/10W, 100K ohm 5%	SMT, 0603	R101	Digikey P/N: P100KGCT-ND
44	1	Littlefuse	0429 007.WRM	Fuse, Very fast acting, 7A	SMT, 1206	F1	Digikey P/N: F1276CT-ND
45	1	Kemet	C0603C102J5RACTU	Cap. Ceramic, 0.001uF, X7R, 50V 5%	SMT, 0603	C63	Digikey P/N: 399-1083-1-ND
46	10	Kemet	C0402C103K3RACTU	Cap. Ceramic, 0.01uF, X7R, 25V 10%	SMT, 0402	C35, C36, C37, C38, C64, C65, C67, C68, C71,	Digikey P/N: 399-1278-1-ND

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
						C73	
47	3	Kemet	C0603C103K5RACTU	Cap. Ceramic, 0.01uF, X7R, 50V 20%	SMT, 0603	C74, C75, C89	Digikey P/N: 399-1091-1-ND
48	4	AVX Corporation	0402YC223KAT2A	Cap. Ceramic, 0.022uF, X7R, 16V 10%	SMT, 0402	C39, C40, C41, C42	Digikey P/N: 478-1118-1-ND
49	24	Kemet	C0402C104K8PACTU	Cap. Ceramic, 0.1uF, X5R, 10V 10%	SMT, 0402	C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C26, C27, C28, C29, C31, C32, C33, C34, C44, C45, C46, C47, C48	Digikey P/N: 399-3027-1-ND
50	3	Kemet	C0603C104K3RACTU	Cap. Ceramic, 0.1uF, X7R, 25V 10%	SMT, 0603	C62, C86, C92	Digikey P/N: 399-1281-1-ND
51	2	Panasonic	ECJ-1VB1C105K	Cap. Ceramic, 1uF, X5R, 16V 10%	SMT, 0603	C24, C25	Digikey P/N: PCC2224CT-ND
52	8	Kemet	C0805C105K4RACTU	Cap. Ceramic, 1uF, X7R, 16V 20%	SMT, 0805	C78,C80, C81, C83, C84, C87, C88, C91	Digikey P/N: 399-1284-1-ND
53	1	Panasonic	ECJ-1VB0J106M	Cap. Ceramic, 10uF, X5R, 6.3V 20%	SMT, 0603	C79	Digikey P/N: PCC2395TR-ND
54	12	Panasonic	ECJ-3YB1C106M	Cap. MLCC , 10uF, X5R, 16V 20%	SMT, 1206	C20, C21, C22, C23, C30, C43, C66, C69, C70, C72, C85, C90	Digikey P/N: PCC2227TR-ND
55	6	AVX Corporation	TAJB226K020R	Cap. Tantalum, 22uF, 20V 20%	SMT, B-case	C1, C2, C49, C51, C76, C82	Digikey P/N: 478-1683-1-ND
THROUGH-HOLE COMPONENTS							
100	0	Molex	87715-3302	PCI Express x16 Through-hole connector	TH, 164-pin		100
101	1	Molex	53113-0410	Connector, ATX Hard Disk, 4-pin	TH, 4-pin	J5	101
102	1	AMP	103240-5	Header, 2x5, 100mil	TH, 10-pin	JP1	102
103	1	AMP	103185-2	Header, 1x2, 100mil	TH, 2-pin	JP5	103
104	2	AMP	103240-2	Header, 2x2, 100mil	TH, 4-pin	JP3, JP4	104
105	1	Samtec	ICA-308-S-TT	Socket, 8-pin DIP, 300 mil	TH, 8-pin DIP	U2	105
106	1	Vishay	94SP187X0016EBP	Cap. Oscon, 180uF, 16V	TH, 2-pin	C77	106
MANUALLY INSERTED COMPONENTS							
200	1	Atmel	AT25080A-	SPI Serial	8-lead	U2	Digikey

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
			10PU-2.7	EEPROM	PDIP		P/N: AT25080A-10PU-2.7-ND
201	1	Keystone Electronics	9203	PCI bracket w/ two tabs			Mouser P/N: 534-9203
202	2	Building Fasteners	PMSSS 440 0025 PH	Phillips Panhead screw, 4-40 thread, 0.25"			Digikey P/N: H703-ND
203	1	Amp/Tyco	382811-6	Jumpers		JP5	Digikey P/N: A26227-ND
MISCELLANEOUS COMPONENTS							
300	1	PLX	90-0072-000-A	PEX8509RDK Bare Board rev 000			
PART THAT SHOULD NOT BE ASSEMBLED							
	4	Yageo America	9C06031A5101FKHFT	Res. 1/10W, 5.1K ohm 1%	SMT, 0603	R26, R27, R55, R56	
	10	Panasonic	ERJ-3GEY0R00V	Res. 1/10W, zero ohm 5%	SMT, 0603	R22, R23, R24, R30, R31, R32, R34, R53, R92, R93	
	1	Panasonic	ERJ-3GEYJ103V	Res. 1/10W, 10K ohm 5%	SMT, 0603	R116	
	1			Resistor, Value not specified	SMT, 0805	R95	
	2			Resistor, Value not specified	SMT, 0603	R98, R124	
	1	AMP	103240-4	Header, 2x4, 100mil	TH, 8-pin	JP2	
	6	Kemet	C0402C104K8PACTU	Cap. Ceramic, 0.1uF, X5R, 10V 10%	SMT, 0402	C14,C15, C16, C17, C18, C19	
	6	AVX Corporation	TAJB226K020R	Cap. Tantalum, 22uF, 20V 20%	SMT, B-case	C50, C52, C53, C54, C55, C56	
	3	Kemet	C0603C104K3RACTU	Cap. Ceramic, 0.1uF, X7R, 25V 10%	SMT, 0603	C57, C59, C60	
	1	Kemet	C0603C102J5RACTU	Cap. Ceramic, 0.001uF, X7R, 50V 5%	SMT, 0603	C58	
	6	Panasonic	ERJ-3GEYJ151V	Res. 1/10W, 150 ohm 5%	SMT, 0603	R5, R8, R9, R41, R51, R52	
	1	Panasonic	ERJ-3EKF1001V	Res. 1/16W, 1K ohm 1%	SMT, 0603	R40	
	2	TTelectronics	LRF2512-LF-R020-F	Res. 2W, 0.02 ohm 1%	SMT, 2512	R42, R48	
	2	Panasonic	ERJ-3EKF2001V	Res. 1/10W, 2.0K ohm, 1%	SMT, 0603	R43, R44	

Item #	Qty	Man	Man's Part #	Des	Package Type	Comp Des(s)	Subcon. Part #
	6	Panasonic	ERJ-2GEJ330X	Res. 1/16W, 33 ohm 5%	SMT, 0402	R70, R72, R77, R79, R88, R89	
	6	Panasonic	ERJ-2RKF49R9X	Res. 1/16W, 49.9 ohm 1%	SMT, 0402	R74, R75, R81, R82, R90, R91	
	2	ITTCANNON	SDA02H1SKD	Dip Switch, 2-pos, half pitch, tape seal	SMT	SW3, SW4	
	1	Omron	B3S1002	Switch, Push Button	SMT	SW5	
	1	TI	TPS2310IPW	IC, Dual-power Hot Plug Controller	SMT, 20-lead TSSOP	U4	
	3	TI	SN74LVC1G3157DCKR	1-bit, SPDT Analog switch	SMT, 6-pin SC-70	U5, U6, U7	
	3	Molex	87715-3302	PCI Express x16 Through-hole connector	TH, 164-pin	J2, J3, J4	
	2	International Rectifier	IRF7470	IC, N-Channel MOSFET	SMT, 8-pin, SO-8	Q1, Q2	
	3	Lumex	SML-LX0603GW-TR	LED, Green	SMT, 0603	D3, D6, D7	
	5	Lumex	SML-LXT0805GW-TR	LED, Green	SMT, 0805	D10, D11, D12	
	1	Lumex	SML-LXT0805YW-TR	LED, Yellow	SMT, 0805	D13	
SECOND SOURCE / ALTERNATIVE PARTS							
		TwinHunter	TW-164PL	PCI Express x16 straddle-mount connector	SMT, 164-pin		
		ST Microelectronics	STS12NH3LL	IC, N-Channel MOSFET	SMT, 8-pin, SO-8		
		Infineon Tech.	SMBT3904E6327	IC, Bipolar Transistor	SMT, SOT-23		Digikey P/N: SMBT3904INCT-ND
		Littlefuse	0433 005	Fuse, Very fast acting, 5A	SMT, 1206		
		Molex	87715-0123	PCI Express x16 Through-hole connector	TH, 164-pin		
PLX Part #: 91-0076-001-A							
Product Name: PEX8505RDK							

PEX 8505RDK

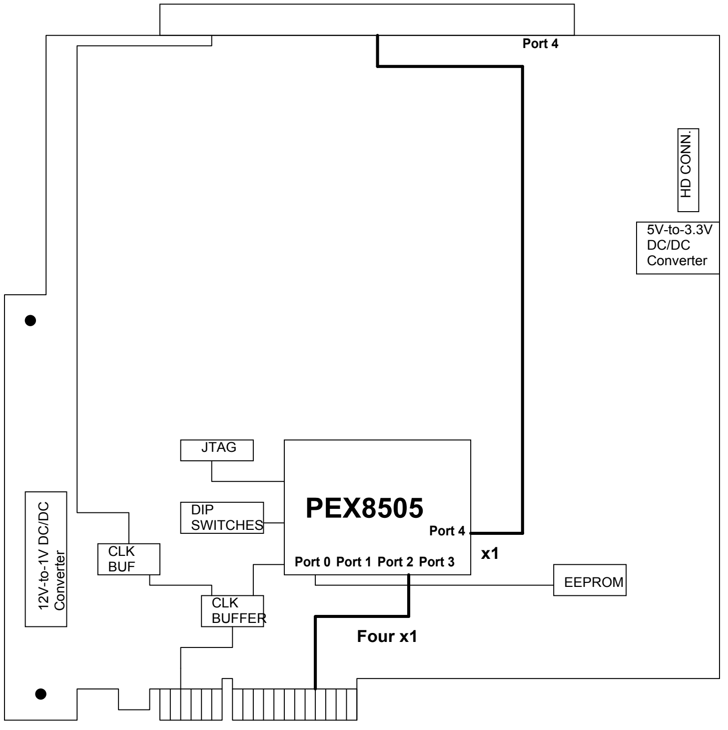

TABLE OF CONTENTS

NOTE: NL INDICATES COMPONENT NOT LOADED

Revision History

Rev#	Date	Changes from last revision
000	03/23/2007	Initial Revision
001	10/1/2007	Fixed note near U12

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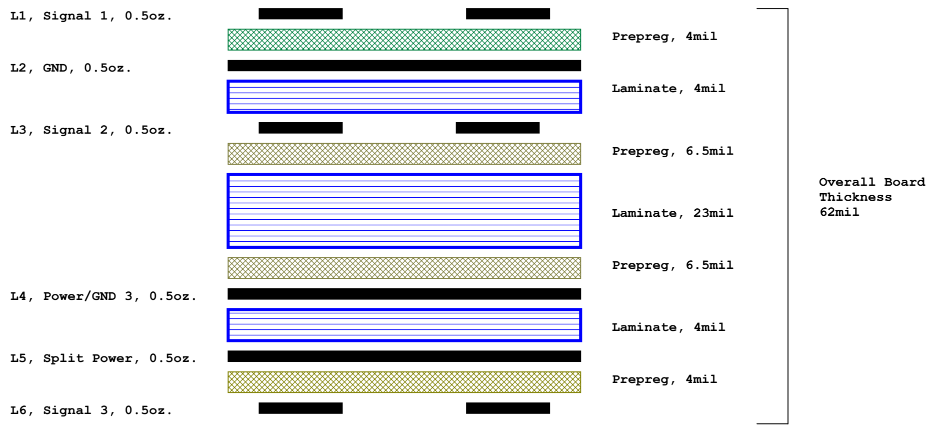
Title	PEX8505RDK - Functional Block Diagram	
Size C	Document Number 91-0076-001-A	Rev 001
Date: Monday, October 01, 2007	Sheet 1 of 9	



Material	Thickness	Dielectric Constant	Layer#	Description	Weight/Thickness
			1	TOP - SIGNAL + COMPONENTS	1/2 oz, .0022
FR4	0.004	4.3			
			2	GROUND PLANE	1/2 oz, .0007
FR4	0.004	4.3			
			3	SIGNAL	1/2 oz, .0007
FR4	0.0065	4.3			
FR4	0.023	4.3			
FR4	0.0065	4.3			
			4	POWER/GROUND PLANE	1/2 oz, .0007
FR4	0.004	4.3			
			5	SPLIT POWER PLANE	1/2 oz, .0007
FR4	0.004	4.3			
			6	BOTTOM - SIGNAL + COMPONENTS	1/2 oz, .0022

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Title: PEX8505RDK - Board Layout Information

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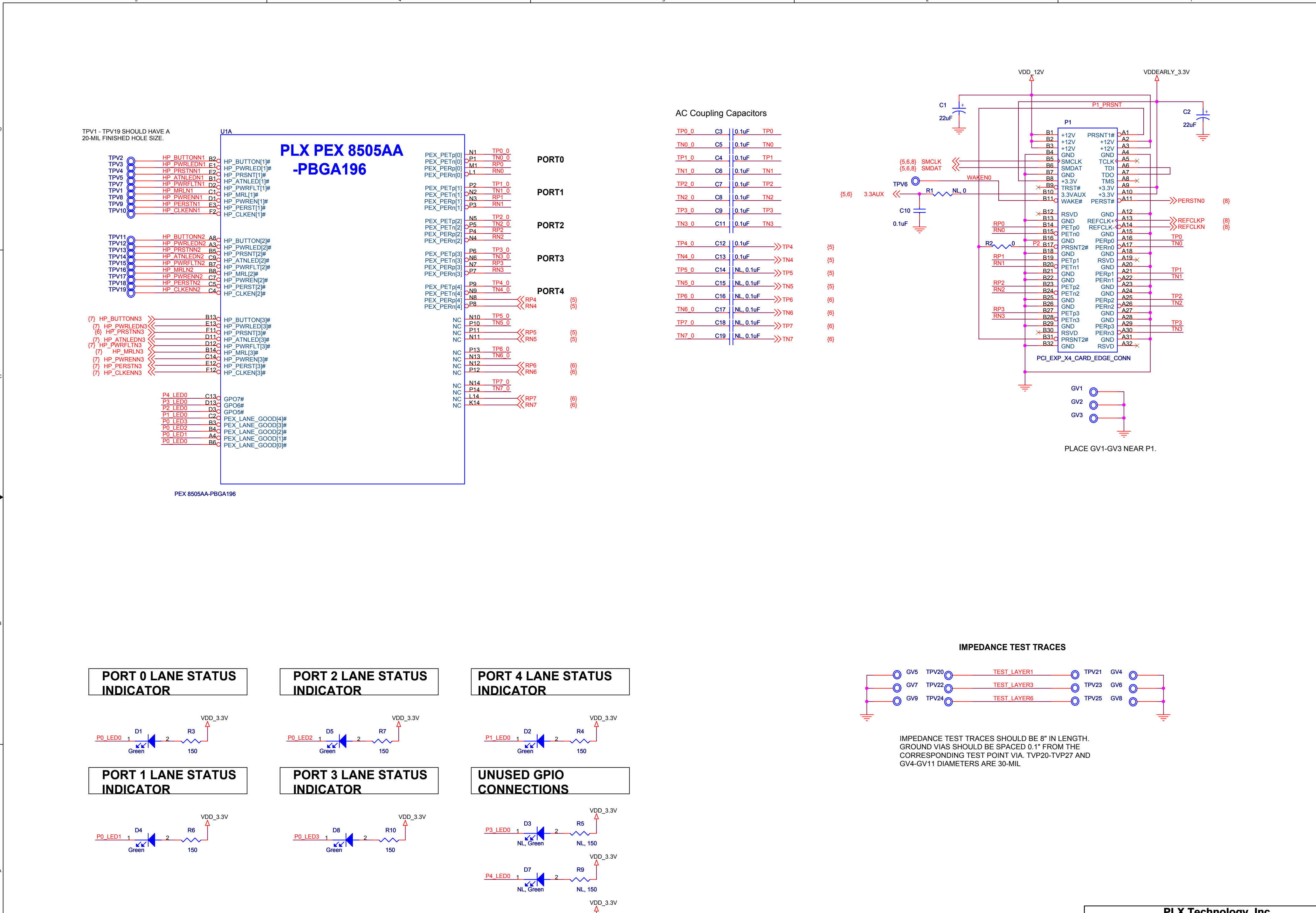

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Title	PEX8505RDK - PEX8505 PEX Interface		
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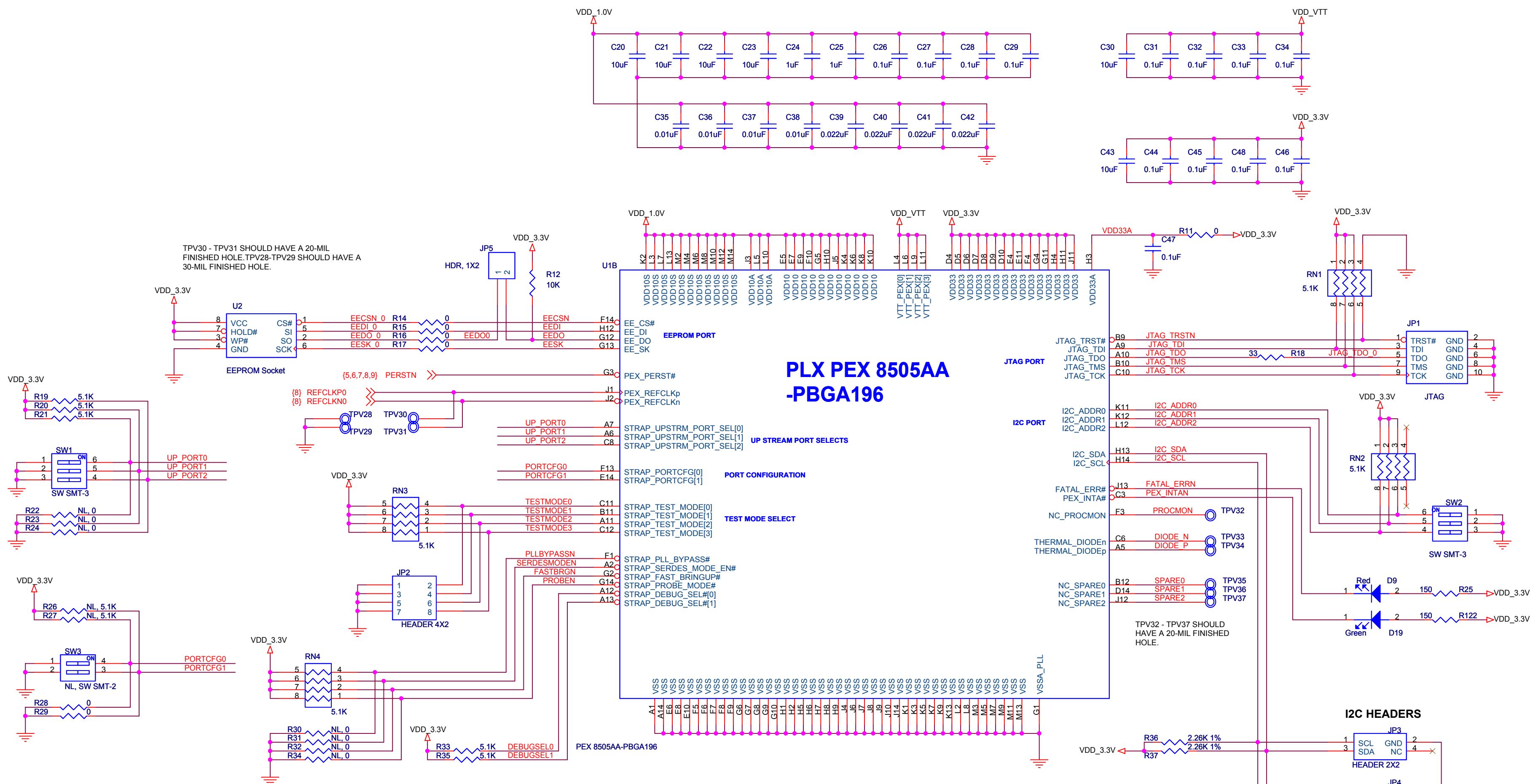


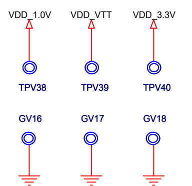
STRAP_PORTCFG[1:0]	PEX 8505 PORT CONFIGURATION					
	Port 0	Port 1	Port 2	Port 3	Port 4	Port 5
00b	x1	x1	x1	x1	x1	
01b	x2	x1	x1			
10b	x2	x2	x1	x1	x1	x1

NOTE: RDK hardwired setting is 00b.

STRAP_UPSTREAM_PORT_SEL[2:0]	
000b	Port 0
001b	Port 1
010b	Port 2
011b	Port 3
100b	Port 4

NOTE: RDK default setting is 000b.

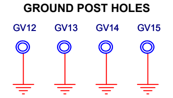
VOLTAGE MEASUREMENT POINTS



CLEARLY LABEL, AND PLACE CLOSE TO U1.

TPV38-40 AND GV16-18 SHOULD BE PLACED CLOSE TO U1. FINISHED HOLE SIZE SHOULD BE 34-MIL

GROUND POST HOLES



GV12-15 SHOULD BE 60-MIL PAD/34-MIL FINISHED HOLE. PROVIDE SILKSCREEN LABELS FOR THESE VIAS.

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Title	PEX8505RDK - PEX8505 Power, Misc.	
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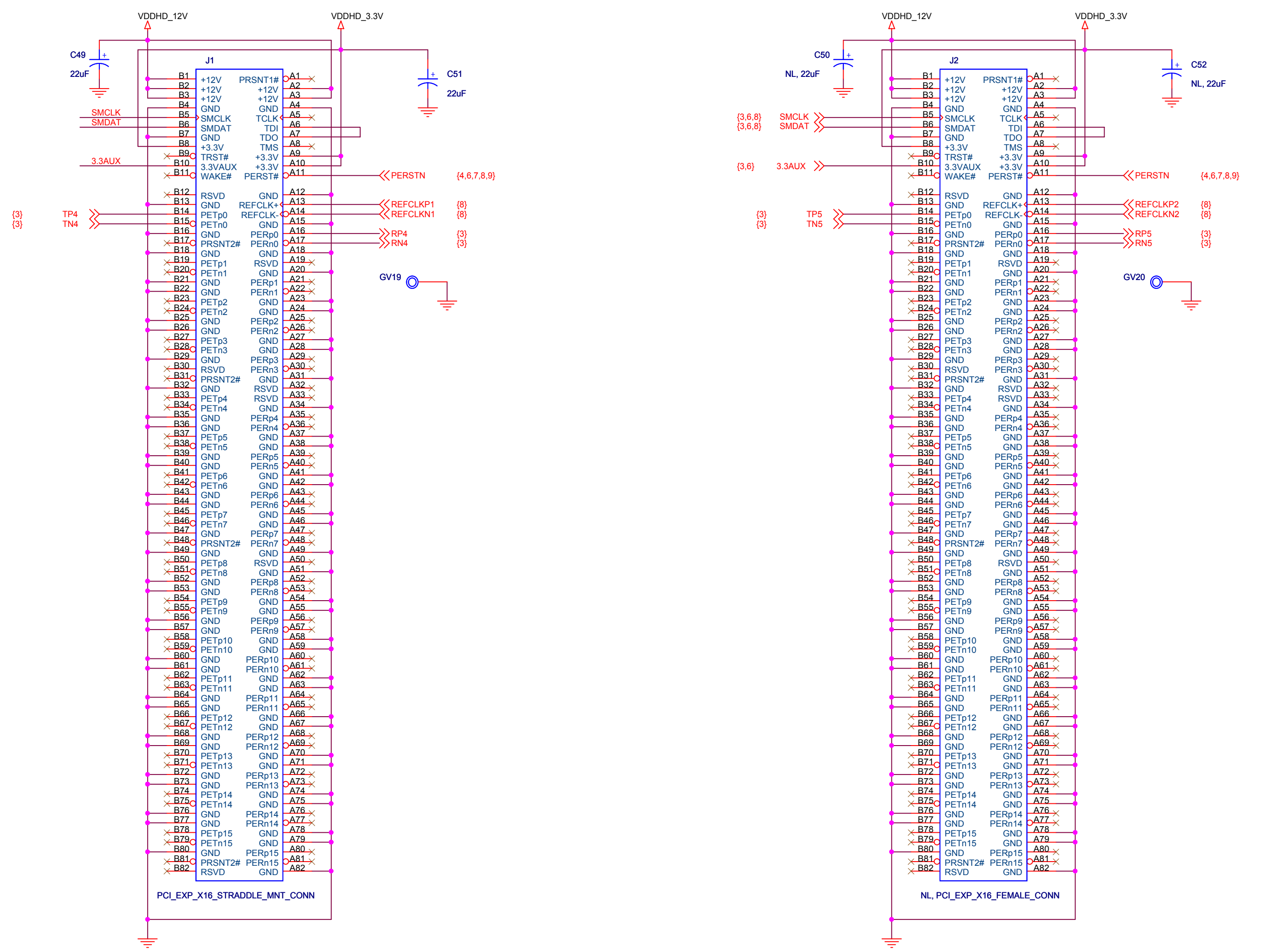
PORT 4 SLOT CONNECTOR



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Title	PEX8505RDK - PCI Express Slot Connectors 1		
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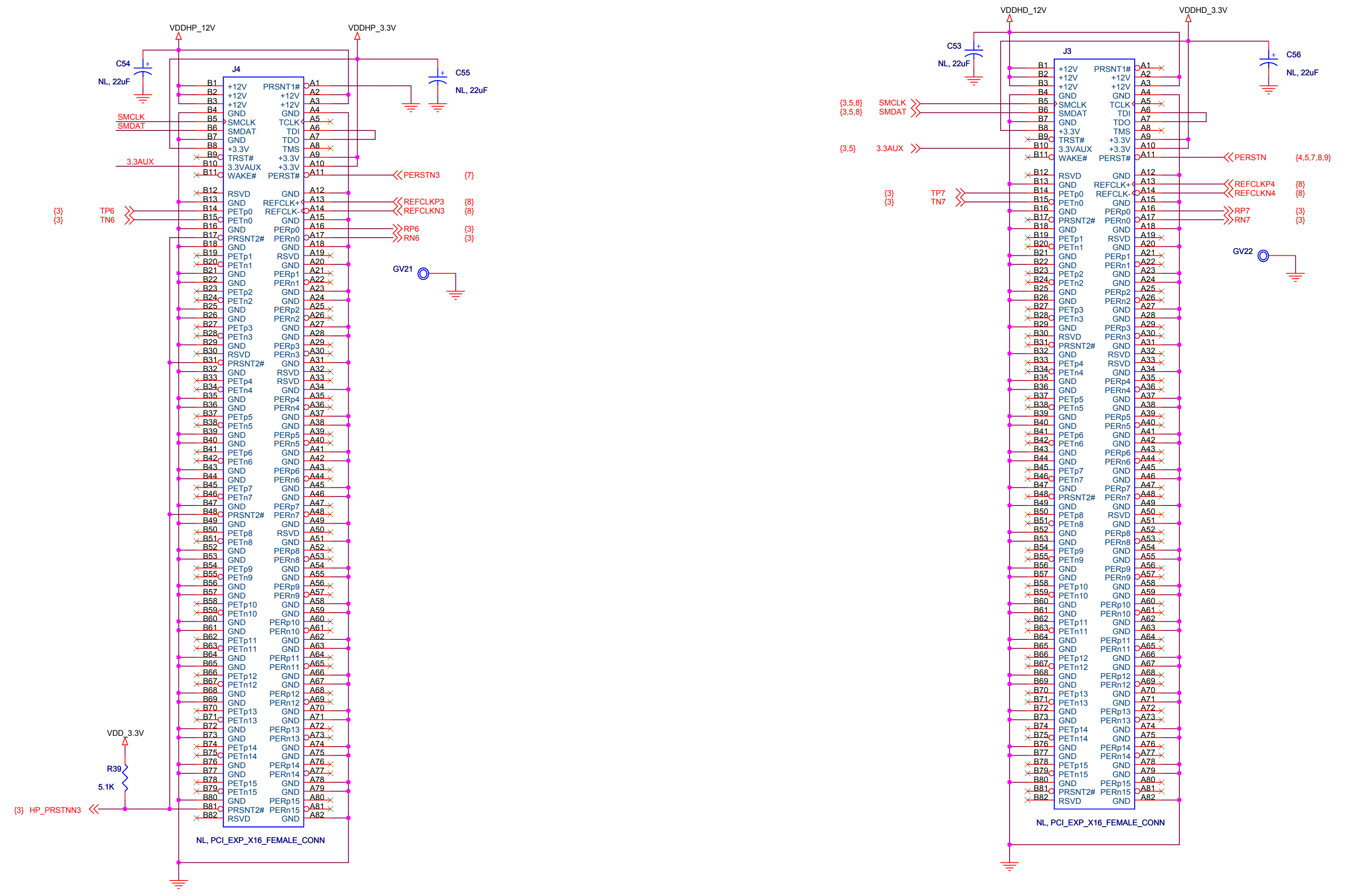

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Title		
PEX8505RDK - PCI Express Slot Connectors 2		
Size: C	Document Number: 91-0076-001-A	Rev: 001
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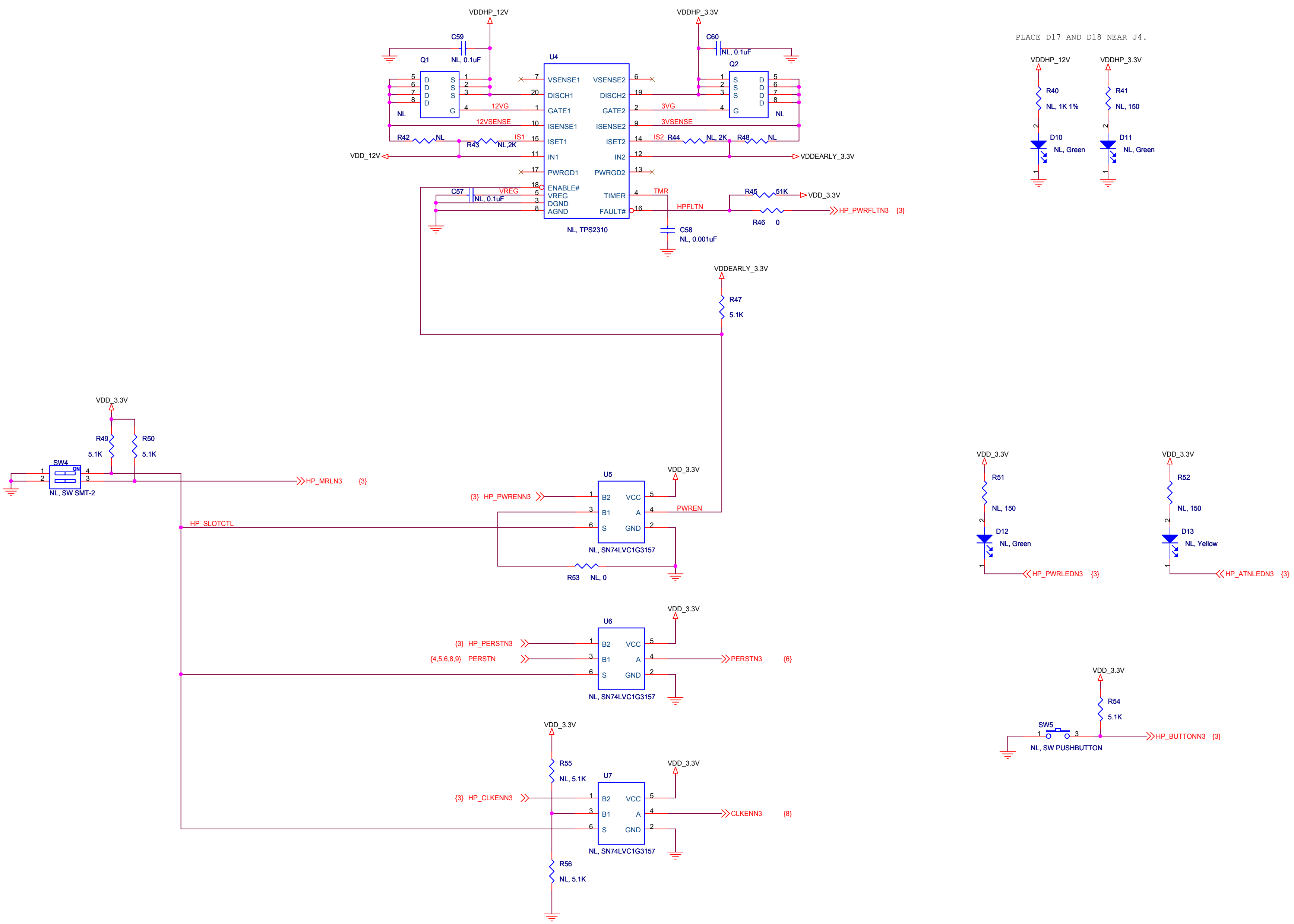
HOT PLUG CIRCUIT

PLACE D17 AND D18 NEAR J4.



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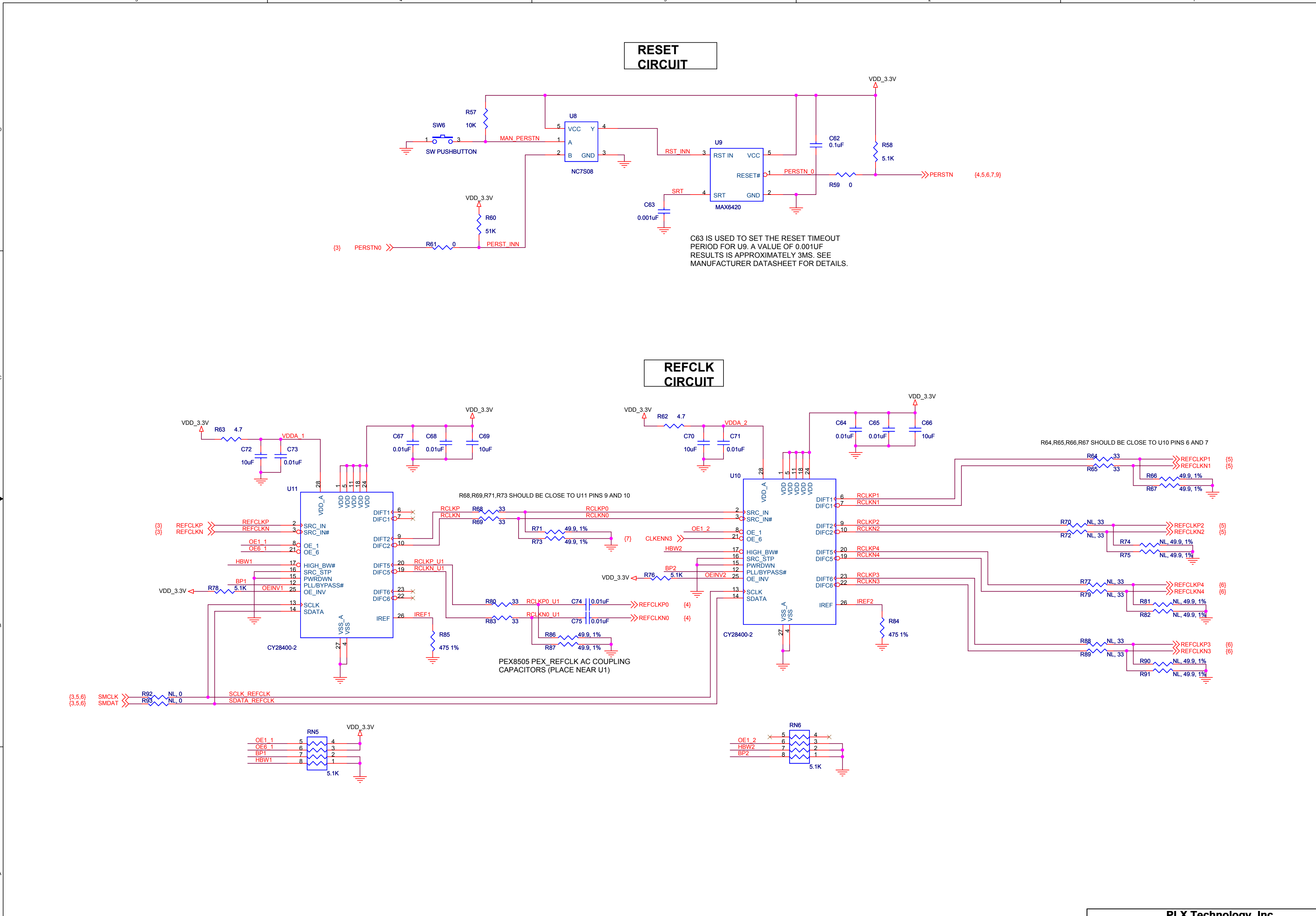
Title	PEX8505RDK - Hot Plug Circuitry	
Size: C	Document Number: 91-0076-001-A	Rev: 001
Date: Monday, October 01, 2007	Sheet 7 of 9	



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Title: PEX8505RDK - Clock and Reset

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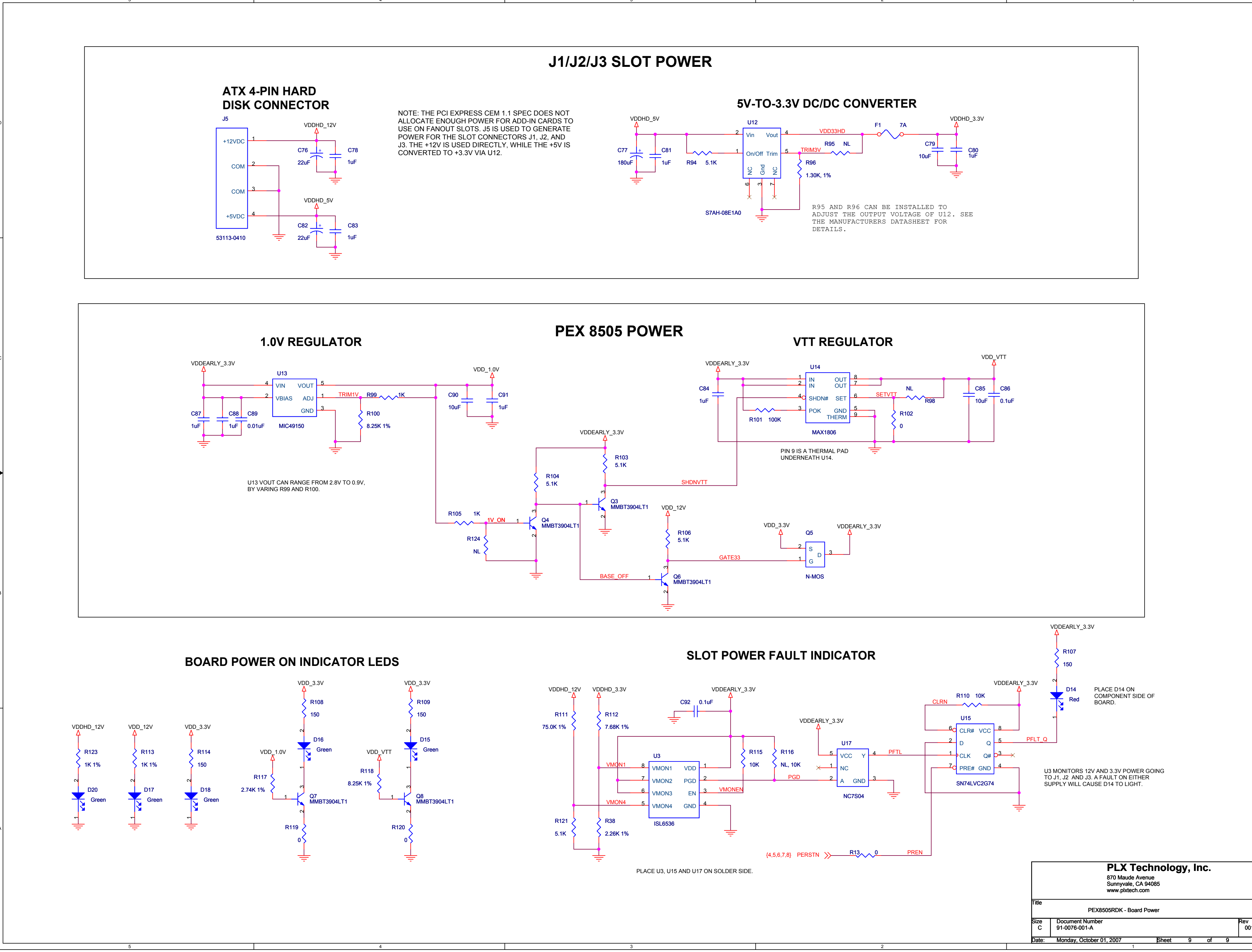

J1/J2/J3 SLOT POWER
ATX 4-PIN HARD DISK CONNECTOR
J5
+12VDC
COM
COM
+5VDC
53113-0410
VDDHD_12V
VDDHD_5V
C76 22uF
C78 1uF
C82 22uF
C83 1uF
NOTE: THE PCI EXPRESS CEM 1.1 SPEC DOES NOT ALLOCATE ENOUGH POWER FOR ADD-IN CARDS TO USE ON FANOUT SLOTS. J5 IS USED TO GENERATE POWER FOR THE SLOT CONNECTORS J1, J2, AND J3. THE +12V IS USED DIRECTLY, WHILE THE +5V IS CONVERTED TO +3.3V VIA U12.
5V-TO-3.3V DC/DC CONVERTER
VDDHD_5V
U12
Vin
Vout
On/Off
Trim
NC
Gnd
NC
S7AH-08E1A0
VDD33HD
TRIM3V
F1 7A
VDDHD_3.3V
C77 180uF
C81 1uF
R94 5.1K
R95 NL
R96 1.30K, 1%
C79 10uF
C80 1uF
R95 AND R96 CAN BE INSTALLED TO ADJUST THE OUTPUT VOLTAGE OF U12. SEE THE MANUFACTURERS DATASHEET FOR DETAILS.
PEX 8505 POWER
1.0V REGULATOR
VDDEARLY_3.3V
U13
VIN
VOUT
VBIAS
ADJ
GND
MIC49150
TRIM1V
R99 1K
R100 8.25K 1%
VDD_1.0V
C87 1uF
C88 1uF
C89 0.01uF
C90 10uF
C91 1uF
U13 VOUT CAN RANGE FROM 2.8V TO 0.9V, BY VARING R99 AND R100.
VTT REGULATOR
VDDEARLY_3.3V
U14
IN
OUT
SHDN#
SET
POK
GND
THERM
MAX1806
VDD_VTT
C84 1uF
R101 100K
SETVTT
R98 NL
R102 0
C85 10uF
C86 0.1uF
PIN 9 IS A THERMAL PAD UNDERNEATH U14.
R103 5.1K
R104 5.1K
SHDNVTT
Q3 MMBT3904LT1
Q4 MMBT3904LT1
R105 1K
1V_ON
R124 NL
VDD_12V
R106 5.1K
VDD_3.3V
Q5
S
D
G
N-MOS
GATE33
BASE_OFF
Q6 MMBT3904LT1
BOARD POWER ON INDICATOR LEDS
VDDHD_12V
VDD_12V
VDD_3.3V
R123 1K 1%
R113 1K 1%
R114 150
D20 Green
D17 Green
D18 Green
R108 150
D16 Green
VDD_1.0V
R117 2.74K 1%
Q7 MMBT3904LT1
R119 0
R109 150
D15 Green
VDD_VTT
R118 8.25K 1%
Q8 MMBT3904LT1
R120 0
SLOT POWER FAULT INDICATOR
VDDHD_12V
VDDHD_3.3V
R111 75.0K 1%
R112 7.68K 1%
C92 0.1uF
U3
VMON1
VDD
VMON2
PGD
VMON3
EN
VMON4
GND
ISL6536
VMONEN
R121 5.1K
R38 2.26K 1%
R115 10K
R116 NL, 10K
PGD
U17
VCC
Y
NC
A
GND
NC7S04
PFTL
R110 10K
CLRN
U15
CLR#
VCC
D
Q
CLK
Q#
PRE#
GND
SN74LVC2G74
PFLT_Q
R107 150
D14 Red
PLACE D14 ON COMPONENT SIDE OF BOARD.
U3 MONITORS 12V AND 3.3V POWER GOING TO J1, J2 AND J3. A FAULT ON EITHER SUPPLY WILL CAUSE D14 TO LIGHT.
{4,5,6,7,8} PERSTN
R13 0
PREN
PLACE U3, U15 AND U17 ON SOLDER SIDE.
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Title
PEX8505RDK - Board Power
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