PEX 8114RDK-F

Hardware Reference Manual

For Board Revision 300

Version 4.2

February 2008

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Order Number: PEX 8114-RDK/F-HRM-P1-4.2

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Preface

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About This Manual

This manual describes the PLX PEX 8114RDK-F, the PEX 8114 Forward Bridge RDK Board Rapid Development Kit, from a hardware perspective. It contains a description of all major functional circuit blocks on the PEX 8114RDK-F and also is a reference for the creation of software for this product. This manual also includes a complete Bill of Materials and Schematics.

Revision History

Date	Version	Comments
April 2005	1.0	Initial release. Supports Board Revision 001.
April 2005	1.1	Update to support Board Revision 100.
July 2005	1.2	• Updated Figure 1, Figure 2, and Figure 4. • Removed Figure 6 and renumbered remaining figures. • Added missing greater than/less than symbols for Section 3.3 bullets. • Replaced second sentence of first paragraph in Section 3.4. • Added information regarding 100MHz to Section 3.5.1. • Appended “Slots Diagram” to Figure 5 title. • Rewrote content of Section 3.5.3. • Reworded first bullet of Section 3.7. • Corrected first sentence of Section 3.7.1 regarding use for on-board voltage generation. • Added DS9 information to Section 4.1.2. • Replaced bill of materials in Section 5.
March 2006	2.0	• Completely revised to support Board Revision 202.
September 2006	3.0	• Updated Section 3.7.3. • Completely revised to support Board Revision 300.
November 2006	4.0	• Updated to reflect use of PEX 8114BB device. • Miscellaneous changes and enhancements throughout manual. • Added new section, “Frequently Asked Questions.” • Removed references to Non-Transparent mode.
March 2007	4.1	• Updated to reflect use of PEX 8114BC device. • Updated the schematics.
February 2008	4.2	• Updated to reflect use of PEX 8114BD device. • Updated the schematics.

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1 General Information

The PLX PEX 8114RDK-F is a Rapid Development Kit based on the PLX ExpressLane™ PEX 8114 PCI Express-to-PCI/PCI-X bridge device implementing Forward Bridge mode. The PEX 8114RDK-F is a complete hardware and software development platform to facilitate getting designs up and running quickly, lowering risk and time-to-market. The PEX 8114RDK-F allows the upstream PCI Express port of the PEX 8114 bridge device to be connected to a host system slot by way of a standard PCI Express board edge connector; the PEX 8114RDK-F is designed to plug into a PCI Express motherboard slot.
The PEX 8114RDK-F also allows for up to four PCI or PCI-X adapters to be plugged into the downstream bus, by way of four standard PCI/PCI-X Slots located on the PEX 8114RDK-F.

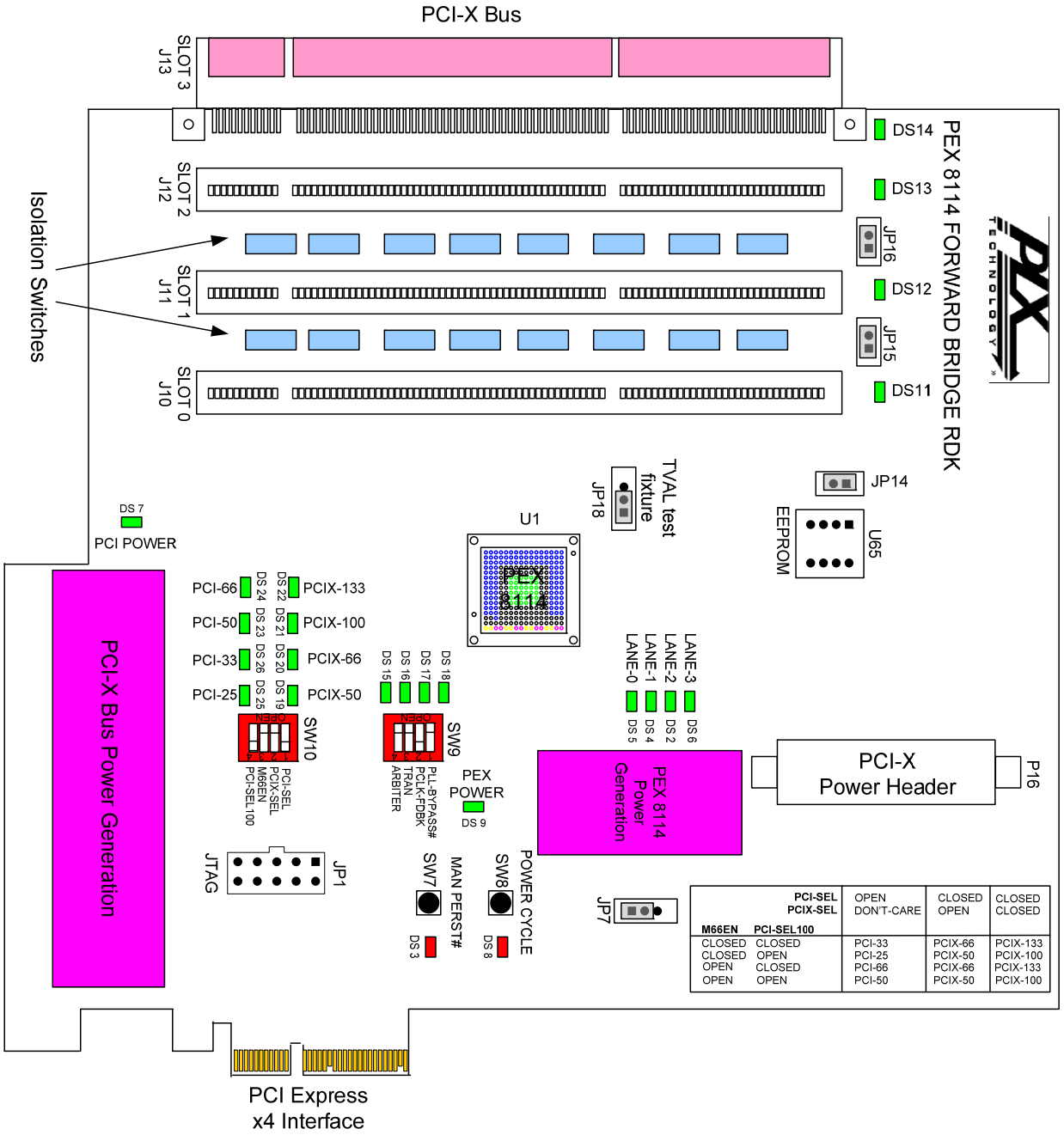


Figure 1. PEX 8114RDK-F – Component Side View

1.1 PEX 8114 Features

- Supports Forward and Reverse Bridging

  Note: *The PEX 8114RDK-F is for Forward Bridge mode designs. For Reverse Bridge mode designs, refer to the PEX 8114RDK-R.*

- Single PCI Express port capable of x4, x2, or x1 link width
- Single PCI-X Bus segment supporting PCI-X protocol at 64-bit/133MHz and/or *PCI Local Bus Specification, Revision 3.0*
- Standard 256-ball PBGA package (17x17mm^2)
- Advanced PCI Express features supported include Advanced Flow Control, Advanced Error Reporting, Integrated Hot Plug, ECRC and Poison Bit, Automatic Polarity, and Lane Reversal
- Fully integrated PCI Express PHY with 8b/10b encoding, hardware link training, and low-power programmable SerDes
- Compliant to the following specifications:
  - *PCI Local Bus Specification, Revision 3.0*
  - *PCI Express to PCI/PCI-X Bridge Specification, Revision 1.0*
  - *PCI Express Base Specification, Revision 1.0a*

1.2 PEX 8114RDK-F Features

- PLX PCI Express-to-PCI/PCI-X bridge device
- Form factor based on *PCI Express Card Electromechanical (CEM) Specification, Revision 1.1*
- Single x4 PCI Express board edge connector for insertion into standard PCI Express Slot of x4 or greater link width

  Note: *A mechanical connector is available to adapt the PEX 8114RDK-F to an x1 slot. Contact your local PLX Sales Representative, if this is required.*

- Four downstream 64-bit PCI or PCI-X Slots on secondary side
- Socketable serial EEPROM for easy configuration
- Lane Status Indicator LEDs for easy visual inspection of PCI Express link and lane status
- ATX connector for additional power requirements
- DIP switches for PEX 8114 hardware configuration
- Indicator LEDs for easy visual inspection of DIP switch settings
- On-board probing points
- On-board manual Reset switches

2 System Architecture

The PEX 8114RDK-F assists customers in evaluating PLX Technology's PEX 8114 PCI Express-to-PCI/PCI-X bridge device, and facilitates early development of customer designs with the PEX 8114. The usage configuration is forward bridging between a PCI Express baseboard and PCI/PCI-X add-in boards. The PEX 8114RDK-F is designed to showcase all features of the PEX 8114 when operating in Forward Bridge mode.

The PEX 8114RDK-F's form factor is based on the *PCI Express Card Electromechanical (CEM) Specification, Revision 1.1*. The PCI/PCI-X interface supports up to 64-bit transfers, at up to 133MHz. (Refer to Figure 2.) The PEX 8114RDK-F has four PCI/PCI-X slot (female) connectors – one straddle- mount and three baseboard mounts. Table 1 defines the slot usage when the PEX 8114RDK-F is operating at different clock frequencies.

Four INT*x*# and four REQ#/GNT# pairs are supported, one for each slot. Each PCI-X signal trace has a test-point (TP) via with an easily readable silkscreen label. The PCI Express interface supports up to four lanes, with each lane capable of up to 2.5 Gbps.

PEX 8114RDK-F power is generated from +3.3 VDC, provided through the PCI Express board edge connector. PCI/PCI-X Bus power is generated on-board or supplied from a 20-pin ATX header for larger current draws.

Table 1. Clock Frequency and Slot Usage

Clock Frequency	Slot Usage
100 to 133MHz	Slots 1, 2, and 3 are isolated by Q-switches Only Slot 0 is used
66 to 100MHz	Slots 2 and 3 are isolated by Q-switches Only Slots 0 and 1 are used
66MHz and below	All four slots can be loaded

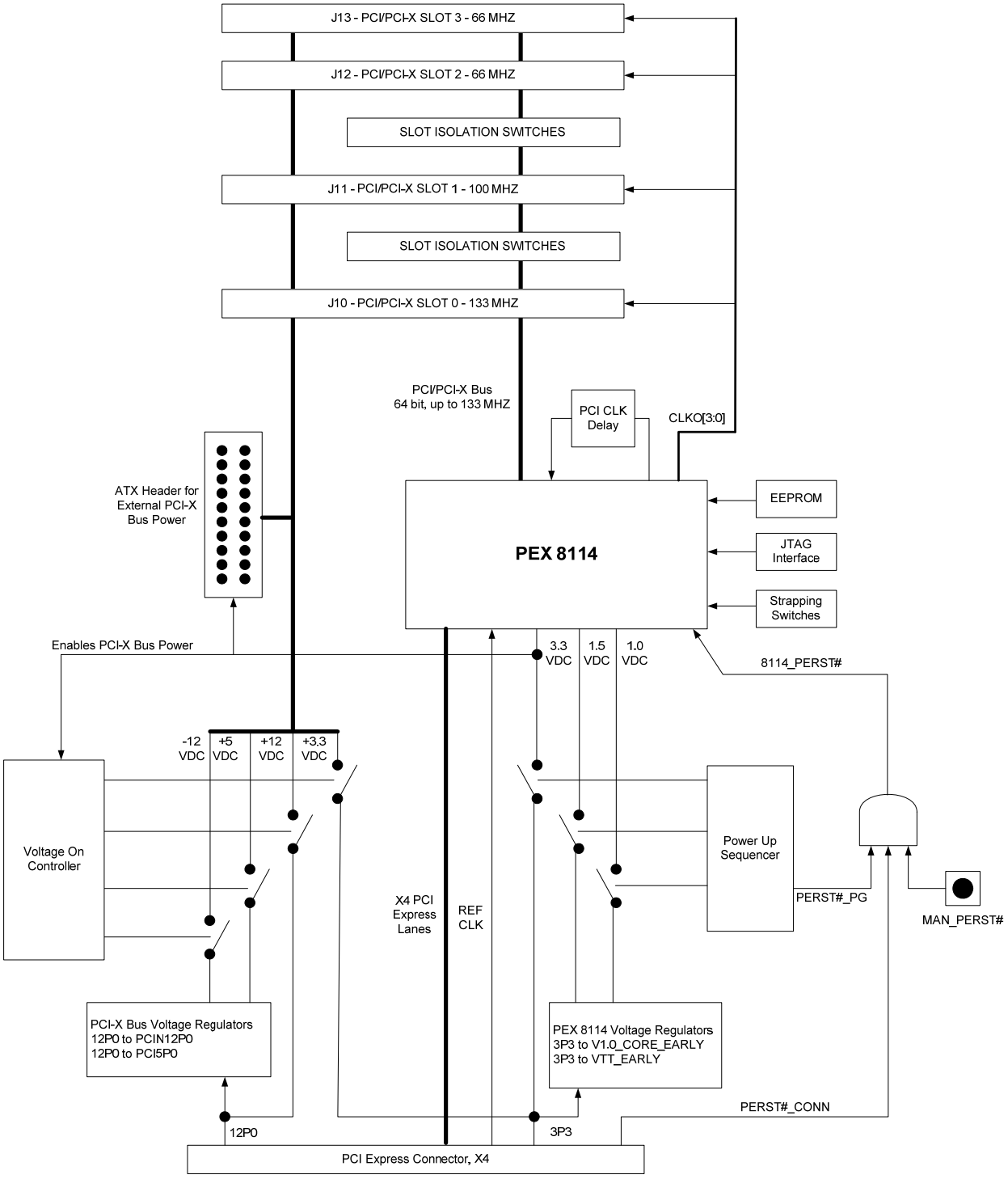


Figure 2. PEX 8114RDK-F Functional Block Diagram

3 Hardware Architecture

There are several subsystems on the PEX 8114RDK-F. Among them are a power system that powers the PEX 8114, a power system that powers the PCI/PCI-X Bus, and controls and indicators. The following sections describe each PEX 8114RDK-F subsystem.

3.1 PEX 8114 Bridge Device

The PEX 8114 is housed in a 17x17mm^2 256-ball PBGA package. Ball pitch is 1.0 mm. No additional cooling is required.

3.2 JTAG Interface

The PEX 8114 has a JTAG interface, which is connected to a 2x5 header. (Refer to Figure 3.) The PEX 8114 JTAG interface can also be connected to the PCI Express board edge connector JTAG pins through 0-Ohm resistors.

There is no “standard” JTAG header pin arrangement; therefore, JTAG header type and pin assignments are somewhat arbitrary. The header and pin assignments chosen for the PEX 8114RDK-F are compatible with the Corelis JTAG single TAP cable (AS00790050-A0).

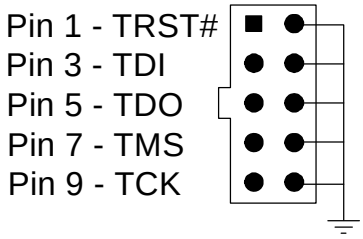


Figure 3. JTAG (JP1) Header (Viewed from Top)

3.3 Serial EEPROM Interface

The PEX 8114 has an SPI EEPROM interface, which can be used to load Configuration data from a serial EEPROM at power-up. This interface is connected to an 8-pin DIP socket (U65), which houses the serial EEPROM. Jumper JP14 (refer to Figure 1), adjacent to this DIP socket, indicates to the PEX 8114 that the serial EEPROM is present when the jumper is inserted.

1 KB of serial EEPROM storage is sufficient.

If the application requires Expansion ROM space, up to a 64-KB serial EEPROM can be used. The serial EEPROM must complete loading within 10 ms, and must be capable of being clocked at 7.8MHz (the clock frequency output by the PEX 8114). Serial EEPROM I/O signaling levels must meet the following values, to be compatible with the PEX 8114 TTL I/O levels:

- $V_{IL} \leq 0.4V$
- $V_{IH} \geq 2.4V$
- $V_{OL} \leq 0.8V$
- $V_{OH} \geq 2.0V$

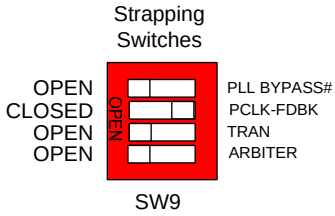
The Atmel AT25xxxA family of serial EEPROMs is one possible family of serial EEPROMs that can be used. The PEX 8114RDK-F includes a pre-programmed AT25640A serial EEPROM.

3.3.1 Serial EEPROM Contents

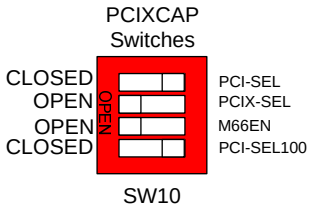
Refer to the *PEX 8114BC/BD Data Book*, Appendix A, “Serial EEPROM Map.”

3.4 Strapping Switches – SW9 and SW10

The PEX 8114 has several balls used for functional mode setup of the bridge device. The Strapping balls that are user-selectable are controlled by DIP switches on SW9. Figure 4 describes the circuitry for controlling the Strapping balls (using SW9) and PCI/PCI-X clock frequency (using SW10), and indicates the default switch settings. A table listing the SW10 switch combinations is silkscreened on the PEX 8114RDK-F, and is provided below in Figure 4. LEDs indicate switch settings and PCI/PCI-X clock frequency.



	CLOSED = Low	OPEN = High
PLL BYPASS#	Internal PLL Bypassed	Internal PLL Used, LED Off
PCLK-FDBK	PCI CLK feedback Off	PCI CLK feedback On, LED On
TRAN	- (always OPEN)	Transparent bridge, LED On
ARBITER	Internal Arbiter Off	Internal Arbiter On, LED On



CLOSED = Low, OPEN = High

M66EN	PCI-SEL PCIX-SEL	OPEN DON'T-CARE	CLOSED OPEN	CLOSED CLOSED
CLOSED	**CLOSED**	PCI-33	PCIX-66	PCIX-133
CLOSED	**OPEN**	PCI-25	PCIX-50	PCIX-100
OPEN	**CLOSED**	PCI-66	PCIX-66	PCIX-133
OPEN	**OPEN**	PCI-50	PCIX-50	PCIX-100

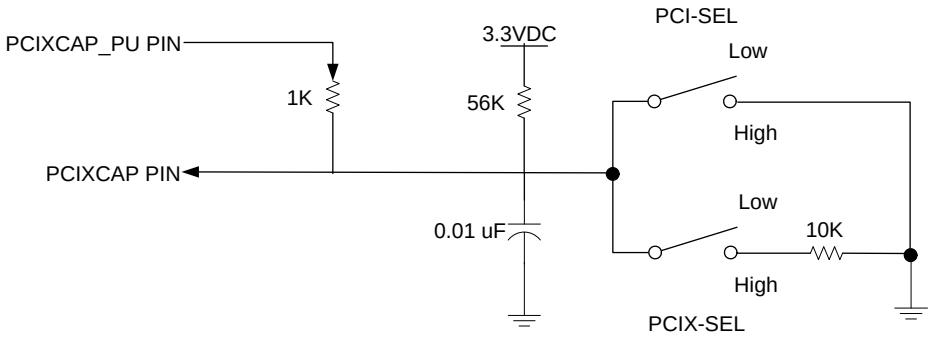


Figure 4. Strapping (SW9) and PCI/PCI-X Clock Frequency (SW10) Control Circuitry

3.5 PCI/PCI-X Interface

The PCI/PCI-X interface is set up as a four-slot motherboard. Each slot has its own REQ/GNT pair, which can be arbitrated by the PEX 8114. The PEX 8114 also drives individual PCI_CLKO signals to each slot.

3.5.1 Slot Connectors

The PEX 8114RDK-F has four female PCI/PCI-X slots. (Refer to Figure 5.) Slot 3 is a straddle-mount connector, so that any board plugged into Slot 3 will be in-plane with the bridge board. The remaining three slots are baseboard connectors. All four slots are capable of running up to 64-bit data and are strictly 3.3V. All four slots support up to 66-MHz transfers; however, only Slots 0 and 1 support up to 100-MHz transfers, and only Slot 0 supports up to 133MHz transfers. When operating faster than 66MHz, Slots 2 and 3 are isolated from the bus by Q-switches. When operating faster than 100MHz, Slots 1, 2, and 3 are isolated from the bus by Q-switches. (Refer to Table 2.)

Table 2. Supported Clock Frequencies, by Slot

Slot	Clock Frequency (MHz)		
	Up to 66 (JP15 and JP16 Installed)	Up to 100 (JP15 Installed)	Up to 133 (Neither Jumper Installed)
0	4	4	4
1	4	4	
2	4		
3	4		

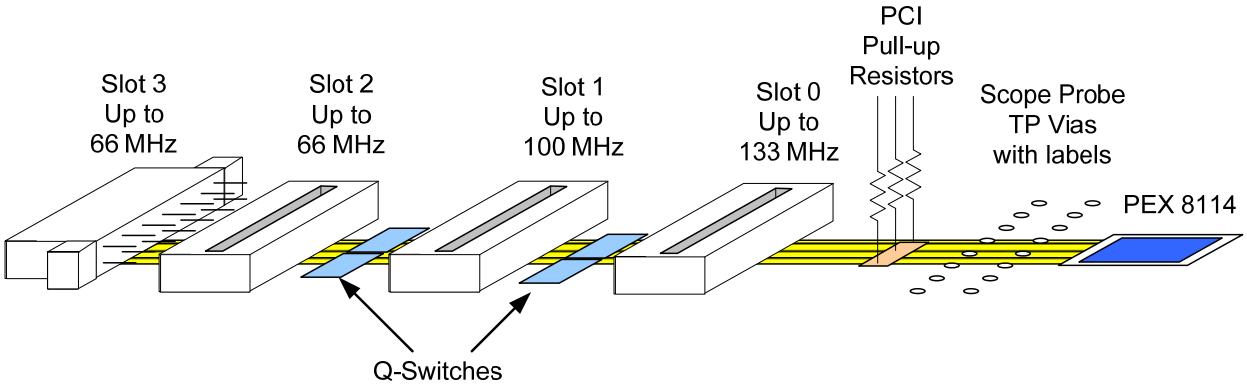


Figure 5. PCI/PCI-X Bus Arrangement Slots Diagram

3.5.2 PCI Terminations

The upper 32-bit transfer lines are pulled up to PCI_3P3 by way of 8.2K-Ohm resistors, to hold the upper lines to known values when not being driven. The four REQ# lines (PCI_REQ[3:0]#) are also pulled up by way of 8.2K-Ohm resistors, to hold these lines for unpopulated slots.

3.5.3 PCI CLK

The PEX 8114 is capable of driving four separate PCI_CLKO signals (PCI_CLKO[3:0]), which are point-to-point routed and length-matched to each of the four PCI/PCI-X slots.

3.5.4 Probing Points

All PCI/PCI-X signals are associated with a Test-Point Via (TPV). Each via has a silkscreen label clearly identifying its associated signal. (Refer to Figure 5.)

3.6 PCI Express Interface

The PCI Express interface is a male board edge connector, based on the *PCI Express Card Electromechanical (CEM) Specification, Revision 1.1,* for an x4 interface. This connector provides +12 VDC and +3.3 VDC, RefClk, and PERST#. The PCI Express lanes are laid out as 100-Ohm, controlled-impedance, stripline-differential pairs. Within-pair trace-length mismatch is not greater than 0.127 mm (0.005 inches). Layer stackup is ground plane – signal plane – ground plane.

3.6.1 RefClk

PCI Express RefClk enters the PEX 8114RDK-F through the PCI Express board edge (male) connector. RefClk is laid out as a 100-Ohm, controlled-impedance, stripline-differential pair. Trace-length mismatch is not greater than 0.127 mm (0.005 inches). RefClk must, and does, pass through AC-coupling capacitors before entering the PEX 8114. Valid values for the AC-coupling capacitors are the same as for the *PCI Express Base Specification, Revision 1.0a* recommendation (75 to 200 nF, with package sizes of 0603 or 0402). The PEX 8114RDK-F uses 0.1 µF values in 0402 packages.

3.6.2 PERST#

PERST# into the PEX 8114 is generated by ANDing three signals:

- PEX 8114 Power Good signal from the Power Sequencer
- PERST# from the PCI Express board edge connector
- Manual PERST# generated by the SW7 pushbutton

Red LED DS3 indicates PERST# assertion, and momentarily blinks On when the PEX 8114RDK-F is first powered up.

3.6.3 Lane Status LED Indicators

Four green surface-mount LEDs (DS6, DS2, DS4, and DS5) are attached to the four PEX 8114 PEX_LANE_GOOD[3:0]# balls, respectively, to indicate lane status. A lane is active when its LED is turned On.

3.6.4 Hot Plug

PCI Express Hot Plug is not supported on the PEX 8114RDK-F. This is because the PEX 8114RDK-F is meant to plug into a PCI Express baseboard, so the RDK cannot control power to other PCI Express slots. PCI Express Hot Plug is supported, however, on the Reverse Bridge RDK board, PEX 8114RDK-R. (Refer to the *PEX 8114RDK-R Hardware Reference Manual.*) Additionally, the PEX 8114 does not support PCI-X Hot Plug.

3.7 Power

The PEX 8114RDK-F has three power domains:

- PEX 8114RDK-F board power supplied by the PCI Express board edge connector
- PEX 8114 bridge device power
- PCI/PCI-X Bus power

3.7.1 Board Power

+3.3 VDC from the PCI Express board edge connector is used to generate voltages for the PEX 8114, and power the Power Sequencer IC (U14) used to turn On voltages to the PEX 8114. This voltage also powers circuitry that is not directly connected to the PEX 8114.

If voltages are applied to the PEX 8114 +3.3 VDC VIO balls (*such as* PCI signals, Strapping balls, and so forth) without the PEX 8114 VDD33 balls being powered, the internal power ring begins to energize and a value of approximately +1.8V appears at the VDD33 balls. This is not known to cause a problem; however, the PEX 8114RDK-F ensures that this condition never occurs.

3.7.2 PEX 8114 Bridge Device Power

PEX 8114 power consists of:

- VDD Core +1.0 ±0.1 VDC
- VTT +1.35 to +1.8 VDC
- VIO +3.3 ±0.3 VDC

3.7.2.1 PEX 8114 Voltage Generation

VDD10 and VDD10S are tied together and supplied by the +1.0 VDC power plane. +3.3 VDC is provided to the PEX 8114RDK-F by way of the PCI Express board edge connector and passed to VIO. +3.3 VDC is also used to generate VDD Core and VTT. The PEX 8114 VTT voltage is jumper-selectable (JP7) and can be fixed at +1.5 VDC (jumper pins 1 and 2), or adjustable by way of a potentiometer (R91) (jumper pins 2 and 3).

The two PEX 8114 analog voltages, VDD33A and VDD10A, power internal core and SerDes PLLs. These voltages are delivered to the PEX 8114 from the VIO and VDD Core voltages, through LC filtering circuits.

3.7.2.2 PEX 8114 Voltage Sequencing

All three voltages (+3.3 VDC, VTT, and +1.0 VDC) can be sequentially turned On by the Power Sequencer IC (U14), which controls three MOSFET switches (Q5, Q6, and Q7). Optimal power sequence is from lowest to highest voltage. The Power Sequencer monitors under-voltage conditions, and turns Off PEX 8114 power when a fault is detected. Power-up sequencing is initiated by a one-shot Supervisor IC (U16) with a 3-ms timeout, powered by the +3.3 VDC from the PCI Express board edge connector. Power sequencing can also be manually initiated, using pushbutton SW8. Red LED DS8 indicates when the PEX 8114RDK-F is receiving +3.3 VDC; however, the sequencer is not enabled. This LED momentarily blinks On when the PEX 8114RDK-F is first powered up.

Alternatively, the Power Sequencer can be bypassed by removing the Q5, Q6, and Q7 MOSFET switches and installing fuses F10, F9, and F3, respectively. To date, this power-up method has been successfully implemented without experiencing problems. If current draw measurements are needed, F10, F9, and F3 can be populated with current sense resistors instead.

3.7.3 PCI/PCI-X Bus Power

Per the *PCI Local Bus Specification, Revision 3.0*,PCI/PCI-X Bus power consists of four voltages:

- +12 VDC ±5%
- +5 VDC ±5%
- +3.3 VDC ± 0.3V
- -12 VDC ±10%

These voltages can be provided by two sources – on-board generation or from a 20-pin ATX header (P16).

For on-board generation, the 20-pin ATX header cannot be connected. PCI_5P0 and PCI_N12P0 are generated from +12 VDC, provided through the PCI Express board edge connector. +12 VDC and +3.3 VDC from the PCI Express board edge connector are passed through to provide PCI_3P3 and PCI_12P0. +12 VDC from the PCI Express board edge connector also powers a PCI-X Hot Plug Controller (U128), which is used to turn On power to the PCI/PCI-X Bus and monitor over-current/under-voltage fault conditions. When the PEX 8114RDK-F and PEX 8114 are powered on, U128 is enabled to energize the PCI/PCI-X Bus.

The 20-pin ATX header is intended for use when PCI/PCI-X Bus power demands are heavy, requiring an external ATX power supply. When an ATX power supply is plugged into this header, on-board PCI/PCI-X voltage generation and delivery is automatically disabled – no additional switch/jumper settings are needed. The ATX supply's ENABLE# pin (pin 14) is used such that the external ATX supply is intended to be switched On at all times, but does not deliver power to the PEX 8114RDK-F until the PEX 8114RDK-F and PEX 8114 are both fully powered up.

4 Mechanical Architecture

Figure 6 illustrates the PEX 8114RDK-F board and component placement.

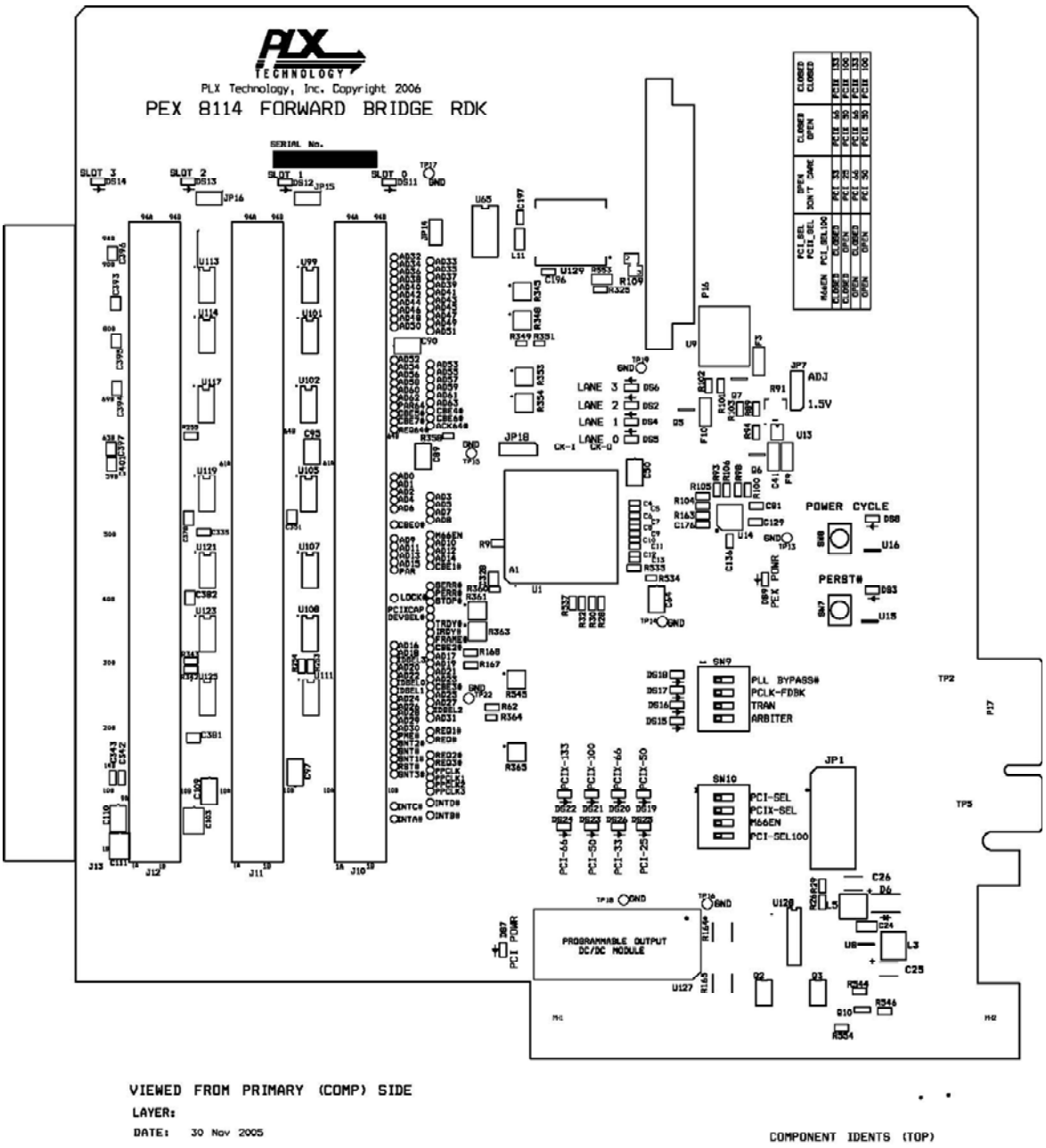


Figure 6. PEX 8114RDK-F Component Placement (Primary Component Side)

4.1 Monitoring Point, LED Indicator, and Control Summary

This section summarizes the PEX 8114RDK-F interfaces that are used for monitoring, indicating, and controlling PEX 8114 performance.

4.1.1 Monitoring Points

Table 3. PEX 8114RDK-F Monitoring Points

Footprint/ Silkscreen Label	Function
F3	Test Point via at this footprint can be used to monitor PEX 8114_1P0_CORE voltage to the PEX 8114.
F9	Test Point via at this footprint can be used to monitor PEX 8114_VTT voltage to the PEX 8114.
F10	Test Point via at this footprint can be used to monitor V3.3 voltage to the PEX 8114.
GND	Eight ground posts, scattered around the PEX 8114RDK-F, that provide probe reference points.
L1	Test Point via at this footprint can be used to monitor PEX 8114_1P0A voltage to the PEX 8114.
L2	Test Point via at this footprint can be used to monitor V3.3A voltage to the PEX 8114.
P16	PCI/PCI-X Bus power can be monitored at this header.
	All PCI/PCI-X signals have a clearly labeled Test Point Via (TPV), to allow scope probing. (Refer to Figure 5 and Section 8)

4.1.2 LED Indicators

Table 4. PEX 8114RDK-F LED Indicators

Location/ Silkscreen Label	Color	Function
DS3	Red	Turned On when PERST# to PEX 8114 is active (asserted). Momentarily blinks On when the PEX 8114RDK-F is first powered up.
DS6, DS2, DS4, DS5	Green	PEX_LANE_GOOD[3:0]# status indicators for Lanes 3, 2, 1, or 0, respectively. Turned On when the associated lane is active.
DS7	Green	Power Good indicator. Turned On when PCI/PCI-X Bus power is good.
DS8	Red	Turned On when the PEX 8114RDK-F is receiving +3.3 VDC, but the Power Sequencer is turned Off.
DS9	Green	Power Good indicator. Turned On when PEX 8114 power is good.
DS11, DS12, DS13, DS14	Green	PCI/PCI-X slot active indicators for Slots 0, 1, 2, and 3, respectively.
DS15	Green	STRAP_ARB Strapping ball status indicator. Turned On when SW9, pin 4 is Open. (Refer to Section 3.4, "Strapping Switches – SW9 and SW10.")
DS16	Green	STRAP_TRAN Strapping ball status indicator. Turned On when SW9, pin 3 is Open. (Refer to Section 3.4, "Strapping Switches – SW9 and SW10.")
DS17	Green	STRAP PCLK-FDBK Strapping ball status indicator. Turned On when SW9, pin 2 is Open. (Refer to Section 3.4, "Strapping Switches – SW9 and SW10.")
DS18	Green	STRAP_PLL_BYPASS# Strapping ball status indicator. Turned On when SW9, pin 1 is Closed. (Refer to Section 3.4, "Strapping Switches – SW9 and SW10.")
DS19	Green	Turned on when the PEX 8114 is operating in PCI-X mode at 50MHz.
DS20	Green	Turned on when the PEX 8114 is operating in PCI-X mode at 66MHz.
DS21	Green	Turned on when the PEX 8114 is operating in PCI-X mode at 100MHz.
DS22	Green	Turned on when the PEX 8114 is operating in PCI-X mode at 133MHz.
DS23	Green	Turned on when the PEX 8114 is operating in PCI mode at 50MHz.
DS24	Green	Turned on when the PEX 8114 is operating in PCI mode at 66MHz.
DS25	Green	Turned on when the PEX 8114 is operating in PCI mode at 25MHz.
DS26	Green	Turned on when the PEX 8114 is operating in PCI mode at 33MHz.

4.1.3 Controls

Table 5. PEX 8114RDK-F Controls

Location/ Silkscreen Label	Function
SW7	• Manual PERST# to the PEX 8114. Momentary SPST pushbutton control.
SW8	• Manual initiation of the PEX 8114 power-up sequence. Momentary SPST pushbutton control.
SW9	• DIP switch control of the PEX 8114 Strapping balls. (Refer to Section 3.4, "Strapping Switches – SW9 and SW10.")
SW10	• DIP switch control of the PCI/PCI-X Clock Frequency Strapping balls to the PEX 8114. (Refer to Section 3.4, "Strapping Switches – SW9 and SW10.")
JP7, R91	• PEX 8114 VTT voltage is jumper-selectable and can be fixed at +1.5 VDC (jumper JP7, pins 1 and 2), or adjustable by way of a potentiometer (jumper JP7, pins 2 and 3 and potentiometer R91).
JP14	• Jumper selection to select serial EEPROM present (assert EE_PR#).
JP15, JP16	• Jumper selection to select a 4-, 2-, or 1-slot PCI/PCI-X Bus.
JP18	• Jumper must be across pins 1 and 2 for standard operation. • When the jumper is across pins 2 and 3, access is provided to test fixtures for measuring PCI/PCI-X timing parameters. (Refer to Section 8, Sheet 8.)

4.2 Layout Information

4.2.1 Trace Routing Design Rules

The characteristic trace impedances are within *PCI Express Base Specification, Revision 1.0a*-defined spec (100 Ohm ±5%) for differential, and within the *PCI-X Electrical and Mechanical Addendum to the PCI Local Bus Specification, r2.0a*-defined spec (57 Ohm ±5%) for single-ended.

4.2.2 Power Decoupling

Power decoupling is provided by two means – plane capacitance (provided by the PCB stackup) and discrete decoupling capacitors. Plane capacitance filters noise above approximately 100MHz. The footprints for the discrete decoupling capacitors are designed such that the inductance between the pad and plane is reduced by careful via placement. (Refer to Figure 7.)

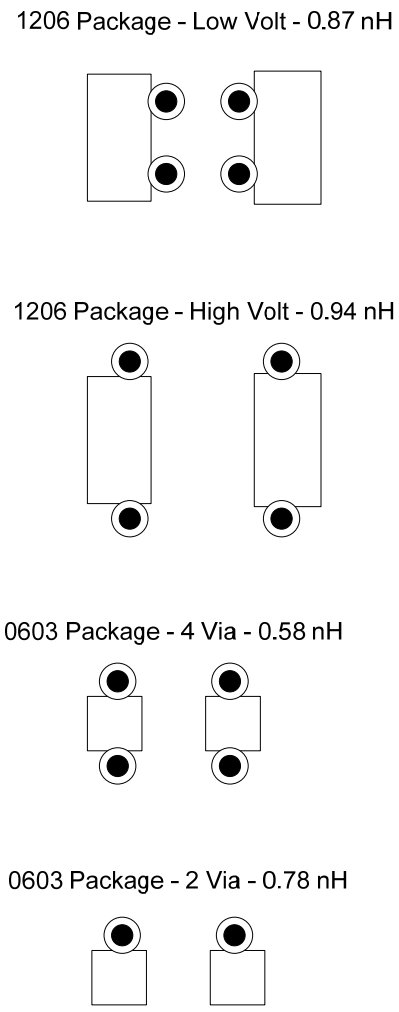


Figure 7. Decoupling Capacitor Footprints

4.2.3 PCB Layer Stackup

The PEX 8114RDK-F is a 10-layer, 63-mil thick PCB, as illustrated in Figure 8. The target signal impedance for all routing layers is 57 Ohm ±5% single-ended impedance and 100 Ohm ±5% differential.

This PCB stackup was chosen for the following reasons:

- Power/ground plane arrangement provides capacitance to filter supply voltage noise above 100MHz
- Differential pair routing layers and plane layers arrangement provides shielding for the PCI Express signals

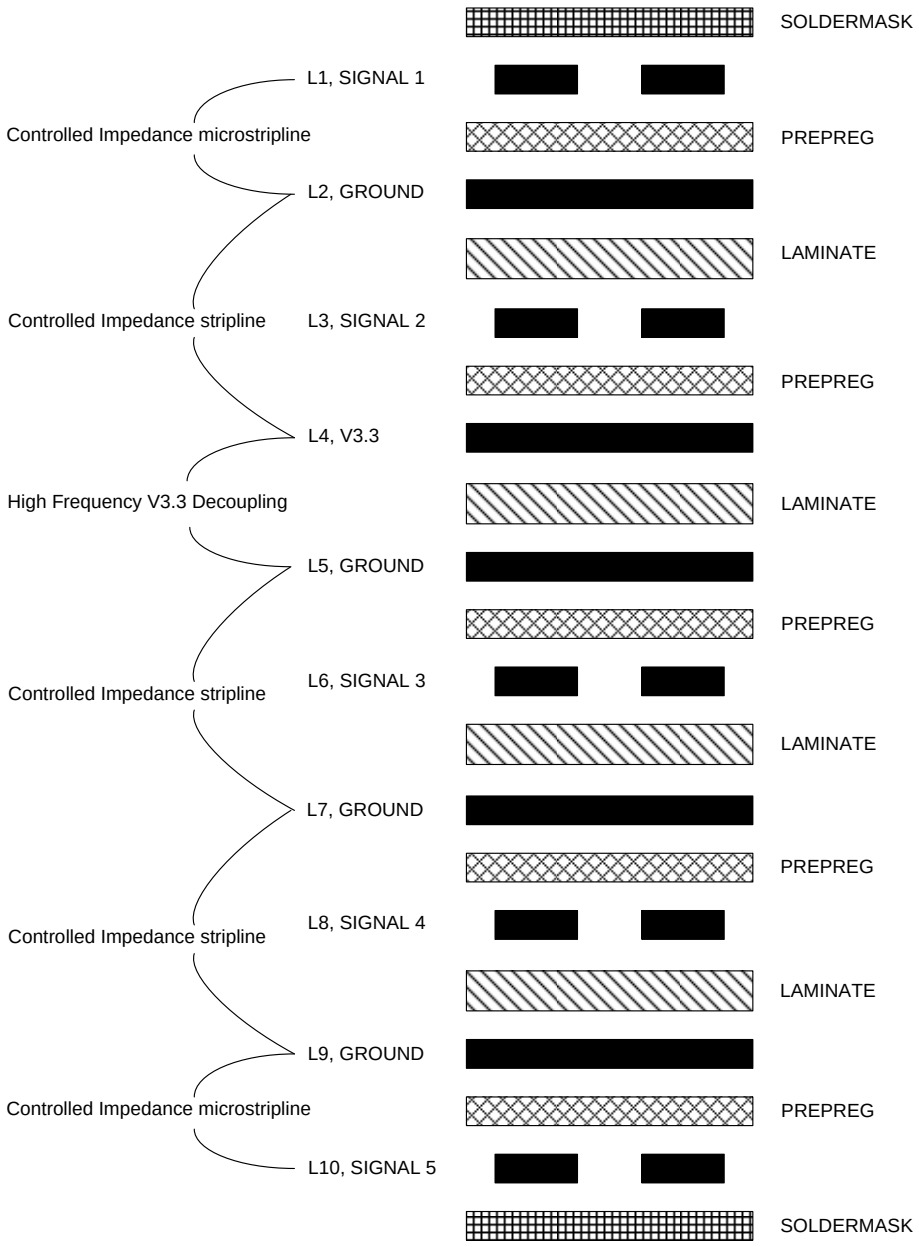


Figure 8. PEX 8114RDK-F 10-Layer PCB Stackup

5 Netlengths

This section provides the PCI/PCI-X (Table 6) and PCI Express (Table 7) signal trace netlengths.

Table 6. PCI/PCI-X Signal Trace Netlengths

Signal	PEX 8114 to 1st Q-Switches (ADxx)	Q-Switch	1st to 2nd Q-Switches (S1_ADxx)	PEX 8114 to 2nd Q-Switches	Q-Switch	2nd Q-Switches to End (S2_ADxx)	PEX 8114 to End
AD0	1966	200	629	2795	200	935	3930
AD1	1853	200	658	2711	200	860	3771
AD2	2016	200	635	2851	200	994	4045
AD3	1909	200	626	2735	200	852	3787
AD4	2088	200	645	2933	200	848	3981
AD5	1995	200	625	2820	200	866	3886
AD6	2107	200	633	2940	200	849	3989
AD7	1986	200	666	2852	200	904	3956
AD8	1668	200	690	2558	200	919	3677
AD9	2433	200	751	3384	200	900	4484
AD10	1971	200	769	2940	200	900	4040
AD11	2384	200	678	3262	200	861	4323
AD12	1923	200	652	2775	200	877	3852
AD13	2401	200	654	3255	200	871	4326
AD14	2005	200	632	2837	200	853	3890
AD15	2391	200	612	3203	200	830	4233
AD16	2253	200	632	3085	200	836	4121
AD17	2230	200	689	3119	200	908	4227
AD18	2412	200	679	3291	200	892	4383
AD19	2136	200	743	3079	200	967	4246
AD20	2450	200	737	3387	200	877	4464
AD21	2307	200	1058	3565	200	992	4757
AD22	2281	200	721	3202	200	1151	4553
AD23	2286	200	680	3166	200	1084	4450
AD24	2506	200	646	3352	200	859	4411
AD25	2457	200	928	3585	200	877	4662
AD26	2551	200	647	3398	200	1220	4818
AD27	2435	200	645	3280	200	1195	4675
AD28	2661	200	639	3500	200	850	4550
AD29	2516	200	704	3420	200	923	4543
AD30	2792	200	709	3701	200	906	4807
AD31	2613	200	722	3535	200	1044	4779
AD32	3430	200	728	4358	200	978	5536
AD33	3594	200	716	4510	200	874	5584
AD34	3331	200	663	4194	200	866	5260
AD35	3496	200	640	4336	200	874	5410
AD36	3288	200	642	4130	200	909	5239
AD37	3424	200	633	4257	200	845	5302
AD38	3216	200	622	4038	200	835	5073
AD39	3303	200	637	4140	200	856	5196

Signal	PEX 8114 to 1st Q-Switches (ADxx)	Q-Switch	1st to 2nd Q-Switches (S1_ADxx)	PEX 8114 to 2nd Q-Switches	Q-Switch	2nd Q-Switches to End (S2_ADxx)	PEX 8114 to End
AD40	3228	200	632	4060	200	879	5139
AD41	3379	200	670	4249	200	877	5326
AD42	3144	200	723	4067	200	881	5148
AD43	3277	200	701	4178	200	906	5284
AD44	3133	200	696	4029	200	876	5105
AD45	3241	200	627	4068	200	849	5117
AD46	3058	200	648	3906	200	833	4939
AD47	3140	200	635	3975	200	850	5025
AD48	2981	200	649	3830	200	852	4882
AD49	3140	200	672	4012	200	872	5084
AD50	2876	200	639	3715	200	839	4754
AD51	3012	200	721	3933	200	881	5014
AD52	2692	200	641	3533	200	850	4583
AD53	2818	200	700	3718	200	909	4827
AD54	2726	200	857	3783	200	966	4949
AD55	2751	200	873	3824	200	1042	5066
AD56	2696	200	802	3698	200	921	4819
AD57	2675	200	749	3624	200	901	4725
AD58	2545	200	677	3422	200	892	4514
AD59	2574	200	670	3444	200	871	4515
AD60	2504	200	655	3359	200	876	4435
AD61	2543	200	623	3366	200	850	4416
pAD62	**490**	**TVAL length**					
AD62+ pAD62	2466	200	605	3271	200	831	4302
AD63	2593	200	632	3425	200	840	4465
CBE0#	2307	200	686	3193	200	850	4243
CBE1#	2037	200	628	2865	200	863	3928
CBE2#	2162	200	662	3024	200	900	4124
CBE3#	2354	200	651	3205	200	854	4259
CBE4#	2581	200	644	3425	200	872	4497
CBE5#	2171	200	691	3062	200	863	4125
CBE6#	2501	200	637	3338	200	873	4411
CBE7#	2119	200	705	3024	200	854	4078
PAR	2069	200	646	2915	200	877	3992
REQ64#	2248	200	732	3180	200	870	4250
ACK64#	2126	200	673	2999	200	889	4088
PAR64	2096	200	625	2921	200	862	3983
MIN	**1668**			**2558**			**3677**
MAX	**3594**			**4510**			**5584**
DELTA	**1926**			**1952**			**1907**

Signal	PEX 8114 to 1st Q-Switches (ADxx)	Q-Switch	1st to 2nd Q-Switches (S1_ADxx)	PEX 8114 to 2nd Q-Switches	Q-Switch	2nd Q-Switches to End (S2_ADxx)	PEX 8114 to End
FRAME#	2647	200	627	3474	200	867	4541
IRDY#	2425	200	635	3260	200	856	4316
TRDY#	2370	200	627	3197	200	856	4253
STOP#	2320	200	735	3255	200	859	4314
DEVSEL#	2309	200	626	3135	200	866	4201
PERR#	2113	200	743	3056	200	956	4212
SERR#	2024	200	675	2899	200	885	3984
MIN	**2024**			**2899**			**3984**
MAX	**2647**			**3474**			**4541**
DELTA	**623**			**575**			**557**
	PCI_REQ#_ REQ0#	**R16**	**REQ#_ REQ0#**		**TOTAL**		
REQ0#	211	60	5268		5539	**MIN**	**3650**
	REQx#					**MAX**	**5539**
REQ1#	3650				3650	**DELTA**	**1889**
REQ2#	5405				5405		
REQ3#	5055				5055		
	PCI_GNT#_ GNT0#	**R38**	**GNT#_ GNT0#**				
GNT0#	685	60	3675		4420		
	PCI_GNT1#	**R17**	**GNT1#**				
GNT1#	342	60	4009		4411		
	PCI_GNT2#	**R18**	**GNT2#**				
GNT2#	314	60	4595		4969		
	PCI_GNT3#	**R19**	**GNT3#**				
GNT3#	262	60	4939		5261		
PCLKs							
	PCI_CLKO0	**R32**	**pPCLK**		**TOTAL**		
CLKO0	417	60	5406		5883	**MIN**	**5816**
	PCI_CLKO1	**R30**	**pPCLK1**			**MAX**	**5968**
CLKO1	374	60	5382		5816	**DELTA**	**152**
	PCI_CLKO2	**R28**	**pPCLK2**				
CLKO2	435	60	5473		5968		
	PCI_CLKO3	**R25**	**pPCLK3**				
CLKO3	143	60	5758		5961		
	PCLK_OUT	**R109**	**PCLK_IN**				
PCLK-FDBK	2951	60	2950		5961		

Table 7. PCI Express Signal Trace Netlengths

Signal	PEX 8114 to 1st Q-Switches (ADxx)	Q-Switch	1st to 2nd Q-Switches (S1_ADxx)	PEX 8114 to 2nd Q-Switches	Q-Switch	2nd Q-Switches to End (S2_ADxx)	PEX 8114 to End
PERn3	4062						
PERp3	4066						
DELTA	**4**						
PERn2	4096						
PERp2	4099						
DELTA	**3**						
PERn1	4127						
PERp1	4129						
DELTA	**2**						
PERn0	4175						
PERp0	4168						
DELTA	**7**						
	PETxx	**CAP**	**PB_PETxx**	**TOTAL**			
PETn3	339	40	3582	3961			
PETp3	336	40	3584	3960			
DELTA	**3**		**2**	**1**			
PETn2	331	40	3604	3975			
PETp2	328	40	3609	3977			
DELTA	**3**		**5**	**2**			
PETn1	325	40	3634	3999			
PETp1	323	40	3638	4001			
DELTA	**2**		**4**	**2**			
PETn0	318	40	3681	4039			
PETp0	317	40	3679	4036			
DELTA	**1**		**2**	**3**			
REFCLKn	324	40	3681	4045			
REFCLKp	326	40	3678	4044			
DELTA	**2**		**3**	**1**			

6 Frequently Asked Questions

1. **When I turn On the computer, it fails to boot. Not even the monitor turns On.**

   Power to the PCI/PCI-X Bus cannot be turned On. Check whether LED DS11 is turned On – if it is not On, then the +3.3 VDC for the PCI/PCI-X Bus is not present. This voltage is required to pull-up the upper 32-bit lines of the PCI/PCI-X Bus; otherwise, these lines have no valid value and the PEX 8114 gets hung.

2. **The PCI/PCI-X Bus Clock Frequency switch settings (SW10) and LED indicators (DS19 through DS26) indicate one clock frequency, but when I probe the bus, it is operating at a lower frequency.**

   The PCI/PCI-X Bus Clock Frequency switch settings and LED indicators set/indicate the maximum possible clock frequency. However, an add-in board on the bus can advertise that it must operate at a lower clock frequency. Should this occur, the PEX 8114 adjusts the clock frequency to accommodate the lowest common denominator.

7 References

The following is a list of documentation to provide further details.

- PLX Technology, Inc.
  870 W Maude Avenue, Sunnyvale, CA 94085 USA
  Tel: 800 759-3735 or 408 774-9060, Fax: 408 774-2169, http://www.plxtech.com
  - *PEX 8114BC/BD Data Book, Version 3.1* or higher
  - *PEX 8114BD Errata, Revision 1.0* or higher
  - *PEX 8114BB Design Checklist Application Note, Version 1.0* or higher
  - *PEX 8114RDK-R Hardware Reference Manual*
- PCI Special Interest Group (PCI-SIG)
  3855 SW 153rd Drive, Beaverton, OR 97006 USA
  Tel: 503 619-0569, Fax: 503 644-6708, http://www.pcisig.com
  - *PCI Local Bus Specification, Revision 2.3*
  - *PCI Local Bus Specification, Revision 3.0*
  - *PCI Express Card Electromechanical (CEM) Specification, Revision 1.1*
  - *PCI to PCI Bridge Architecture Specification, Revision 1.1*
  - *PCI Bus Power Management Interface Specification, Revision 1.2*
  - *PCI Express Base Specification, Revision 1.0a*
  - *PCI Express to PCI/PCI-X Bridge Specification, Revision 1.0*
  - *PCI-X Addendum to PCI Local Bus Specification, Revision 1.0b*
  - *PCI-X Addendum to PCI Local Bus Specification, Revision 2.0a*
  - *PCI-X Electrical and Mechanical Addendum to the PCI Local Bus Specification, Revision 2.0a*

8 Bill of Materials and Schematics

This section replicates the PEX 8114RDK-F Bill of Materials and Schematics.

Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
SURFACE MOUNT COMPONENTS									
1	78	Kemet	C0603C104K3RACTU	CAP, SMD, CER, 0.1UF, 25V, X7R, 0603	SMT, 0603	C1, C2, C130, C176, C197, C65, C66, C67, C68, C320, C321, C322, C323, C324, C325, C326, C327, C328, C329, C330, C331, C332, C345, C347, C348, C349, C350, C351, C352, C353, C354, C355, C356, C357, C358, C359, C360, C361, C362, C363, C364, C365, C366, C367, C368, C369, C370, C371, C372, C373, C374, C375, C376, C377, C378, C379, C380, C381, C382, C383, C384, C385, C386, C387, C388, C389, C390, C391, C392, C393, C394, C395, C396, C397, C398, C399, C400, C401	Digi-Key	399-1281-1-ND	0.1uF
2	10	Kemet	C0402C104K8PACTU	CAP .10UF 10V CERAMIC X5R 0402	SMT, 0402	C4, C5, C6, C7, C8, C9, C10, C11, C12, C13	Digi-Key	399-3027-2-ND	0.1uF
3	14	Kemet	C0603C103K5RACTU	CAP 0.01UF, 50V CERAMIC X7R 0603	SMT, 0603	C3, C196, C333, C334, C335, C336, C337, C338, C339, C340, C341, C342, C343, C344	Digi-Key	399-1091-1-ND	0.01uF
4	1	Panasonic	ECJ-1VB1A105K	CAP 1UF 10V CERAMIC 0603 X5R	SMT, 0603	C81	Digi-Key	PCC2174CT-ND	1uF
5	1	Kemet	C0805C105K4RAC	CAP, CERAMIC, 1UF, 16V, 10%, X7R	SMT, 0805	C24			1uF
6	7	Panasonic	ECJ-1VB1H102K	CAP 1000PF 50V CERAMIC X7R 0603	SMT, 0603	C42, C73, C74, C79, C80, C99, C134	Digi-Key	PCC1772CT-ND	1000pF
7	18	Kemet	C0402C102K3RAC	Cap, Ceramic, 1000pF, 25V, 10%, X7R	SMT, 0402	C279, C280, C281, C283, C284, C285, C286, C287, C288, C289, C290, C291, C292, C293, C294, C295, C296, C298	Digi-Key	399-1031-1-ND	1000pF
8	1	Vishay Sprague	293D475X0016B2T	CAP, SMD, ELECT, 4.7UF 16V, 20%	Bcase-3528eia	C25			4.7uF
9	1	Vishay Sprague	293D106X0016B2T	CAP, SMD, ELECT, 10UF, 16V, B CASE	Bcase-3528eia	C26			10uF
10	46	Panasonic	ECJ-3YB1C106M	CAP 10UF 16V CERAMIC X5R 1206	SMT, 1206	C41, C45, C46, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C63, C64, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113, C114	Digi-Key	PCC2227CT-ND	10uF

Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
11	2	TDK	C5750X5R1C476M	CAP CER 47UF 16V X5R 20% 2220 LOVOLT FOOTPRINT	SMT, 2220, LoVolt	C82, C83	Digi-Key	445-1452-1-ND	47uF
12	2	Panasonic	ECJ-1VB1H222K	CAP 2200PF 50V CERAMIC X7R 0603	SMT, 0603	C129, C136	Digi-Key	PCC1776CT-ND	2200pF
13	2	Panasonic	ECJ-1VB1H152K	CAP 1500PF 50V CERAMIC X7R 0603	SMT, 0603	C133, C135	Digi-Key	PCC1774CT-ND	1500pF
14	1	Panasonic	ECJ-1VB1H332K	CAP 3300PF 50V CERAMIC X7R 0603	SMT, 0603	C137	Digi-Key	PCC1778CT-ND	3300pF
15	19	Panasonic	ECJ-0EB1C223K	CAP, SMD, CER, 22000PF, 16V, 10%, X7R, 0402	SMT, 0402	C300, C301, C302, C303, C304, C305, C306, C307, C308, C309, C310, C311, C312, C313, C315, C316, C317, C318, C319	Digi-Key	PCC2138CT-ND	0.022uF
16	1	Panasonic	ECJ-0EB1E101K	CAP 100PF 25V CERAMIC X7R 0402	SMT, 0402	C405	Digi-Key	PCC1702CT-ND	100pF
17	3	Panasonic	ECJ-1VB1H333K	CAP .033UF 50V CERAMIC X7R 0603	SMT, 0603	C406, C407, C408	Digi-Key	PCC2284CT-ND	0.033uF
18	1	Kemet	C0402C100J5GACTU	CAP CERAMIC 10PF 50V NP0 0402	SMT, 0402	C413	Digi-Key	399-1011-1-ND	10 pF
19	22	Panasonic	LNJ308G8LRA	LED GREEN SS TYPE LOW CUR SMD	SMT, 0603	DS2, DS4, DS5, DS6, DS7, DS9, DS11, DS12, DS13, DS14, DS15, DS16, DS17, DS18, DS19, DS20, DS21, DS22, DS23, DS24, DS25, DS26	Digi-Key	P521CT-ND	Green
20	2	Panasonic	LNJ208R8ARA	LED RED HI BRT SS TYPE LO CUR SM	SMT, 0603	DS3, DS8	Digi-Key	P524CT-ND	RED LED
21	1	On Semiconductor	MBRS120T3	DIODE, Schottky, If=1A, Vr=20V, Vf=0.55V max	SMB	D6			MBRS120T3
22	1	Raycon	RT-HD3-GT-184AECN	CONN, PCI-X 1.0, Female, SM, Straddle-mount	PCI/PCI-X_FEMALE_STRADDLE-MOUNT_92POS	J13			PCI-X, FM, Straddle-mount
23	3	MuRata	BLM21AG121SN1D	Ferrite, 200mA, 120 ohm at 100 MHz, DCR=0.15ohm	SMT, 0805	L1, L2, L11	Digi-Key	490-1038-1-ND	Ferrite Bead
24	2	Sumida	CR43-100	IND, 10uH, DCR=0.182 ohm, I=1.04A, 20%	CR43	L3, L5			10uH

Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
25	2	International Rectifier	IRF7470	MOSFET, N-CHAN, 10A, Rds=13 mohm	SO8	Q2, Q3	Digi-Key	IRF7470-ND	IRF7470
26	3	Fairchild	FDN339AN	MOSFET, N-CHAN, 3A, Rds=50 mohm	SuperSOT-3	Q5, Q6, Q7	Newark	34C0138	FDN339AN
27	1	Fairchild Semiconductor	BSS138	IC, N-channel MOSFET	SOT-23	Q9			BSS138
28	1	ON Semi	MMBT3904LT1	NPN, GPSS, MMBT3904, SOT23	SOT23-3	Q10	Digi-Key	MMBT3904LT1OSCT-ND	MMBT3904LT1
29	2	CTS Resistor Products	742-083-512-J	RESNET, MF, 5.1 KOHM NIL 5%, ISOLATED	742-CTS-RN-8	RN1, RN2	Digi-Key	742C083512JCT-ND	5.1K
30	12	CTS Resistor Products	742-083-822-J	RESNET, MF, 8.2 KOHM NIL 5%, ISOLATED	742-CTS-RN-8	R345, R346, R347, R348, R353, R354, R355, R356, R361, R363, R365, R545	Digi-Key	742C083822JCT-ND	8.2K
31	1	Bourns	3224W-1-503E	RES, VAR, 50 KOHM MULTI-TURN, 4mm SMD, TOP ADJ	BOURNS-3224W	R91	Arrow		50K
32	25	Yageo	9C06031A0R00JLHFT	RES 0.0 OHM 1/10W 5% 0603 SMD	SMT, 0603	R4, R5, R6, R7, R8, R16, R25, R28, R30, R32, R62, R63, R84, R85, R86, R87, R109, R146, R159, R160, R168, R253, R341, R343, R574	Digi-Key	311-0.0GCT-ND	0
33	2	Panasonic	ERJ-M1WSJ5M0U	RES CURRENT SEN .005 OHM 1W 0.5%	SMT, 2512	R164, R165	Digi-Key	P5.0TCT-ND	0.005
34	5	Panasonic	ERJ-3GEYJ360V	RES 36 OHM 1/10W 5% 0603 SMD	SMT, 0603	R17, R18, R19, R27, R38	Digi-Key	P36GCT-ND	36
35	25	Panasonic	ERJ-3GEYJ391V	RES 390 OHM 1/10W 5% 0603 SMD	SMT, 0603	R12, R13, R15, R23, R24, R39, R94, R107, R108, R556, R557, R558, R559, R560, R561, R562, R563, R564, R565, R566, R567, R569, R570, R571, R572	Digi-Key	P390GCT-ND	390
36	4	Panasonic	ERJ-3GEYJ102V	RES 1.0K OHM 1/10W 5% 0603 SMD	SMT, 0603	R9, R20, R21, R22	Digi-Key	P1.0KGCT-ND	1K
37	2	Panasonic	ERJ-2RKF1001X	RES 1.00K OHM 1/16W 1% 0402 SMD	SMT, 0402	R110, R111	Digi-Key	P1.00KLCT-ND	1.00K
38	1	Panasonic	ERJ-3EKF1001V	RES 1.00K OHM 1/16W 1% 0603 SMD	SMT, 0603	R101	Digi-Key	P1.00KHCT-ND	1.00K
39	1	Panasonic	ERJ-3EKF1471V	RES 1.47K OHM 1/16W 1% 0603 SMD	SMT, 0603	R90	Digi-Key	P1.47KHCT-ND	1.47K

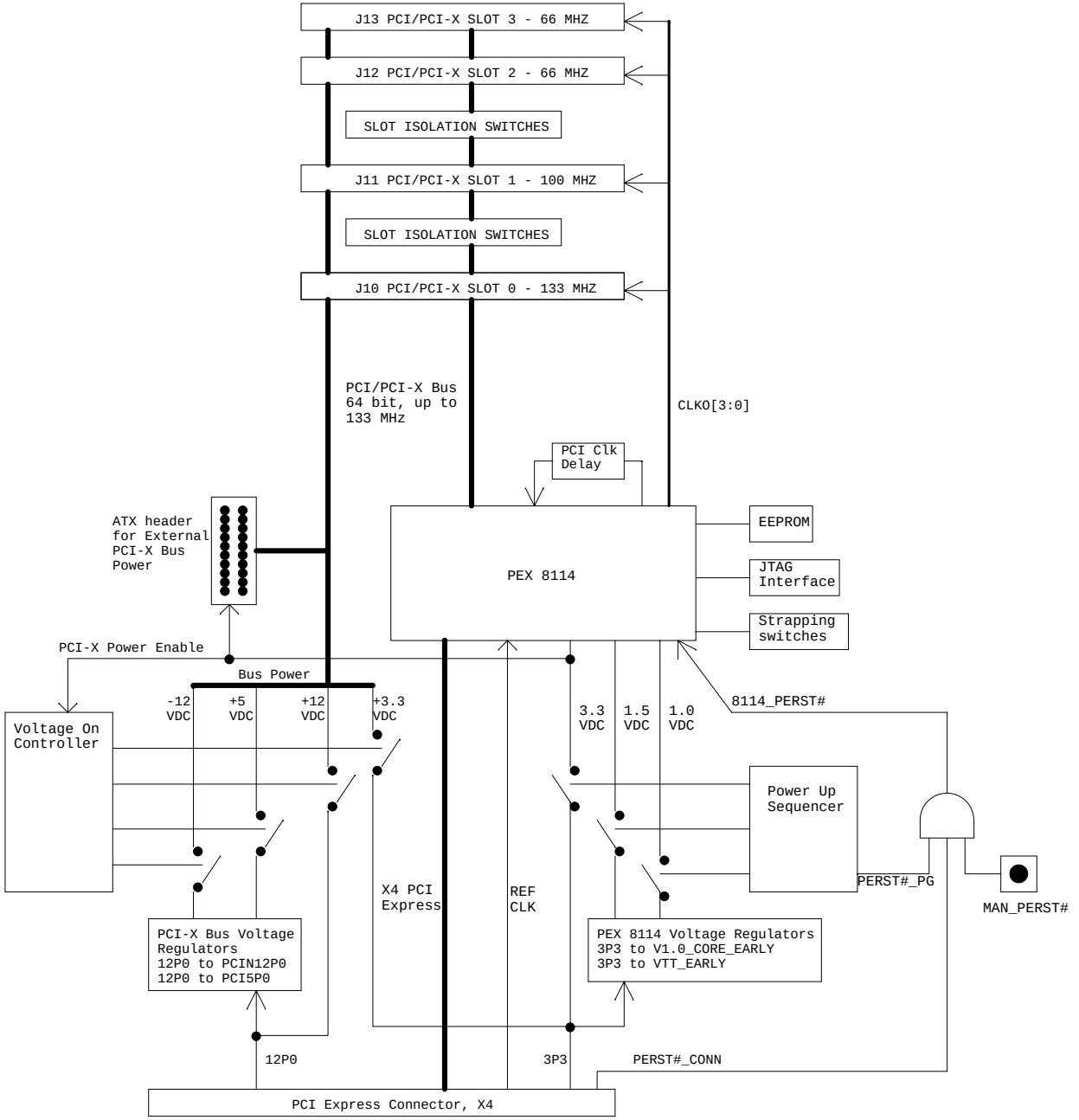
Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
40	1	Panasonic	ERJ-3GEYJ152V	RES 1.5K OHM 1/10W 5% 0603 SMD	SMT, 0603	R33	Digi-Key	P1.5KGCT-ND	1.5K
41	2	Panasonic	ERJ-3EKF3161V	RES 3.16K OHM 1/16W 1% 0603 SMD	SMT, 0603	R100, R106	Digi-Key	P3.16KHCT-ND	3.16K
42	13	Panasonic	ERJ-3GEYJ332V	RES 3.3K OHM 1/10W 5% 0603 SMD	SMT, 0603	R46, R48, R157, R158, R161, R162, R163, R170, R255, R534, R535, R536, R537	Digi-Key	P3.3KGCT-ND	3.3K
43	1	Panasonic	ERJ-3GEYJ512V	RES, CF, 5.1K OHM, 1/16W, 5%, 0603 SMD	SMT, 0603	R325	Digi-Key	P5.1KGCT-ND	5.1K
44	1	Panasonic	ERJ-3EKF6041V	RES 6.04K OHM 1/16W 1% 0603 SMD	SMT, 0603	R166	Digi-Key	P6.04KHCT-ND	6.04K
45	3	Panasonic	ERJ-3EKF7501V	RES 7.50K OHM 1/16W 1% 0603 SMD	SMT, 0603	R93, R98, R104	Digi-Key	P7.50KHCT-ND	7.50K
46	8	Panasonic	ERJ-2GEJ822X	RES, 8.2K OHM, 1/16W, 5% 0402 SMD	SMT, 0402	R349, R350, R351, R352, R357, R358, R359, R360	Digi-Key	P8.2KJCT-ND	8.2K
47	1	Panasonic	ERJ-3EKF9091V	RES 9.09K OHM 1/16W 1% 0603 SMD	SMT, 0603	R102	Digi-Key	P9.09KHCT-ND	9.09K
48	3	Panasonic	ERJ-3GEYJ103V	RES 10K OHM 1/10W 5% 0603 SMD	SMT, 0603	R1, R2, R40	Digi-Key	P10KGCT-ND	10K
49	2	Rohm	MCR03EZPFX1002	RES 10.0K OHM 1/10W 1% 0603 SMD	SMT, 0603	R14, R26	Digi-Key	RHM10.0KHCT-ND	10.0K
50	1	Panasonic	ERJ-3EKF1242V	RES 12.4K OHM 1/16W 1% 0603 SMD	SMT, 0603	R89	Digi-Key	P12.4KHCT-ND	12.4K
51	1	Panasonic	ERJ-3GEYJ183V	RES 18K OHM 1/10W 5% 0603 SMD	SMT, 0603	R546	Digi-Key	P18KGCT-ND	18K
52	1	Panasonic	ERJ-3EKF2802V	RES 28.0K OHM 1/16W 1% 0603 SMD	SMT, 0603	R105	Digi-Key	P28.0KHCT-ND	28.0K
53	1	Panasonic	ERJ-3EKF4992V	RES 49.9K OHM 1/16W 1% 0603 SMD	SMT, 0603	R103	Digi-Key	P49.9KHCT-ND	49.9K
54	1	Panasonic	ERJ-3GEYJ563V	RES 56K OHM 1/10W 5% 0603 SMD	SMT, 0603	R11	Digi-Key	P56KGCT-ND	56K
55	1	Panasonic	ERJ-2GEJ563X	RES 56K OHM 1/16W 5% 0402 SMD	SMT, 0402	R364	Digi-Key	P56KJCT-ND	56K
56	1	Panasonic	ERJ-3GEYJ753V	RES 75K OHM 1/10W 5% 0603 SMD	SMT, 0603	R544	Digi-Key	P75KGCT-ND	75K
57	1	Panasonic	ERJ-3EKF8452V	Res. 1/16W, 84.5K ohm, 1%	SMT, 0603	R29	Digi-Key	P84.5KHCT-ND	84.5K

Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
58	2	Omron	B3S-1002	SWITCH TACT 6MM SMD MOM 230GF		SW7, SW8	Digi-Key	SW416-ND	B3S-1002
59	1	PLX Technology	PEX8114-BD13BI	IC, PCI Express-PCIX bridge, Forward/Reverse, single x4 port, PCIX 133 MHz	PBGA256	U1			PEX 8114
60	1	Linear Technology	LT1931ES5	DC/DC converter, Inverting, -12V at 150 mA, Fsw=1.2MHz	SOT23-5	U8			LT1931ES5
61	1	Micrel	MIC49300BR	IC, V-REG, 3A, ADJ, SPak5	SPak5	U9	Arrow		MIC49300
62	1	Maxim	MAX1806EUA15	IC, V-REG, 500 mA, ADJ 0.8-4.5V	uMAX8	U13			MAX1806
63	1	Intersil	ISL6123IR	IC, Power Sequencer, 4 channel	QFN24	U14	Arrow		ISL6123
64	1	Maxim	MAX6412UK29-T	IC, Reset controller, 2.9V threshold, Adj. reset timeout	SOT23-5	U15			MAX6412
65	1	Maxim	MAX6414UK29-T	IC, Reset controller, 2.9V threshold, Adj. reset timeout	SOT23-5	U16			MAX6414
66	28	IDT	IDTQS3VH245Q	IC, Bus Switch, 8 Bit, Ron=4 ohm, Cio=4pF, BW=500 MHz	QSOP20	U98, U99, U100, U101, U102, U103, U104, U105, U106, U107, U108, U109, U110, U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125			IDTQS3VH245Q
67	1	Power-One	YNS12S16-D	IC, DC/DC, Non-Isolated, 10-14 VDC In, 16A, 0.75-5.5 VDC Out, Sense, On/Off active low, SMD		U127			YNS12S16-D
68	1	Intersil	HIP1011ACB	IC, Hot Plug Controller, PCI	SOIC16	U128	Arrow		HIP1011A
69	1	Fairchild	FSA1256	IC, Analog Switch, Dual SPST, NO	uPAK8	U133			FSA1256
70	4	Fairchild	NC7SZ04P5X	IC, NOT GATE	SC70-5	U136, U137, U138, U139			NC7SZ04P5X
71	1	On Semiconductor	MC14556BD	IC, Dual 2:4 Demux	SOIC16	U140			MC14556BD

Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
72	1	Fairchild	NC7SZ08P5X	IC GATE AND 2-INPUT UHS SC70-5	SC70-5	U141	Digi-Key	NC7SZ08P5XCT-ND	NC7SZ08P5X
THROUGH-HOLE COMPONENTS									
100	1	Amp	103308-1	CONN HEADER LOPRO STR 10POS 15AU	0.1" 2x5	JP1	Digi-Key	A26267-ND	JTAG Header
101	2	3M	929400-01-36	HEADER, 1x3 VERTICAL, .1in THRU-HOLE	SIP-3	JP7, JP18			JUMPER3
102	3	3M	929400-01-36	HEADER, 1x2 VERTICAL, .1in THRU-HOLE	SIP-2	JP14, JP15, JP16	Digi-Key	929400-01-36-ND	JUMPER
103	3	Amp	145165-4	CONN, PCI-X 1.0, Female, Thru-hole, VERT.	PCI/PCI-X_FEMALE_THRU-HOLE_92POS	J10, J11, J12	Digi-Key	145165-4-ND	PCI-X, FM, Thru-hole
104	1	Molex	39-29-9202	Header, ATX, 20 position, ST dual-row	ATX20_ST	P16			ATX_20ST
105	2	Grayhill	76SB04	SWITCH 4POS DIP EXT ROCK UNSEALD	DIP8	SW9, SW10	Digi-Key	GH1104-ND	SW DIP-4
106	8	FCI	76201-023	TERM, PIN, PRESS-FIT, .025inSq, .230Lng		TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP22			Stakepin
107	1	Mill-Max	210-93-308-41-001000	Socket, EEPROM, DIP8, Thru-hole	DIP8	U65	Digi-Key	ED60000-ND	EEPROM 8 Pin DIP Socket
MANUALLY INSERTED COMPONENTS									
200	1	Atmel	AT25640A-10PI-2.7	IC SRL EE 64K 2.7V 8DIP	DIP-8	U65	Digi-Key	AT25640A-10PI-2.7-ND	AT25640A
201	5	Amp	881545-2	SHUNT LP W/HANDLE 2 POS 30AU		JP7, JP14, JP15, JP16, JP18	Digi-Key	A26242-ND	
MISCELLANEOUS COMPONENTS									
300	1	Keystone	9203	Bracket, PCI, blank					
301	1	PLX Technology	90-0052-300-A	PEX 8114 Forward Bridge RDK PCB Rev 300					
PARTS THAT SHOULD NOT BE ASSEMBLED									
400	3	Littelfuse	0433 1.75	FUSE, very fast acting, 1.75A, 63V, 1206	SMT, 1206	F3, F9, F10			NL
401	5	Yageo	9C06031A0R00JLHFT	RES 0.0 OHM 1/10W 5% 0603 SMD	SMT, 0603	R167, R254, R340, R342, R554	Digi-Key	311-0.0GCT-ND	NL
402	1	Yageo	9C08052A0R00JLHFT	RES 0.0 OHM 1/8W 5% 0805 SMD	SMT, 0805	R553	Digi-Key	311-0.0ACT-ND	NL

Item #	Qty	Mfgr	Mfgr Part #	Des.	Package Type	Component Designator(s)	Dist.	Dist Part #	Part
403	1	Pericom	PI6C2401 W	IC, zero delay clock buffer, 25-134MHz, PLL bypass capable, source termination on-chip	SOIC-8	U130			PI6C2401
404	1	Elmec	VDA-ES7R5	IC, Delay Line, Adjustable, 0-7.5ns, 0.5ns steps, Fmax= 133 MHz	VDA-8P	U129			VDA-ES7R5
PLX Part # 91-0052-300-B									
Product Name: PEX 8114RDK-F									

Schematic Table of Contents



Revision History

Rev. #	Date	Reason for Revision
000	January 31, 2005	Distributed for Comprehensive Design Review
001	February 3, 2005	Results of Comprehensive Design Review
100	April 2, 2005	PCI Clock schematic page removed. IDSEL assignments changed. R546, R40, DS9 added. Footprints for U14, C82, C83 changed. Silkscreen labels added.
200	October 13, 2005	Modified for PEX8114BA. Distributed for Comprehensive Design Review.
201	November 3, 2005	Results of Comprehensive Design Review
202	December 3, 2005	Results of 2nd Comprehensive Design Review TPV test points added to PCI clock lines.
300	April 6, 2006	Minor layout modifications. Correcting PB_PERST# generation.

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Title: PEX 8114 Forward Bridge RDK - Functional Block Diagram

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Board Thickness = 63 mils

LAYER STACKUP

		SOLDERMASK, Er=3.0, x.x mils
L1, SIGNAL 1		
		PREPREG, Er=4.0, x.x mils
L2, GND		
		LAMINATE, Er=4.0, 6.2 mils
L3, SIGNAL 2		PCI_12P0, PCI_N12P0
		PREPREG, Er=4.0, x.x mils
L4, V3.3		
		LAMINATE, Er=4.0, 6.2 mils
L5, GND		
		PREPREG, Er=4.0, x.x mils
L6, SIGNAL 3		PCI_3P3, P-BRIDGE_1P0_CORE
		LAMINATE, Er=4.0, 6.2 mils
L7, GND		
		PREPREG, Er=4.0, x.x mils
L8, SIGNAL 4		PCI_5P0, 3P3, 12P0
		LAMINATE, Er=4.0, 6.2 mils
L9, GND		
		PREPREG, Er=4.0, x.x mils
L10, SIGNAL 5		
		SOLDERMASK, Er=3.0, x.x mils

PEX 8114 voltages are carried on V3.3, P-BRIDGE_1P0_CORE, and VTT. VTT is carried on a wide trace.

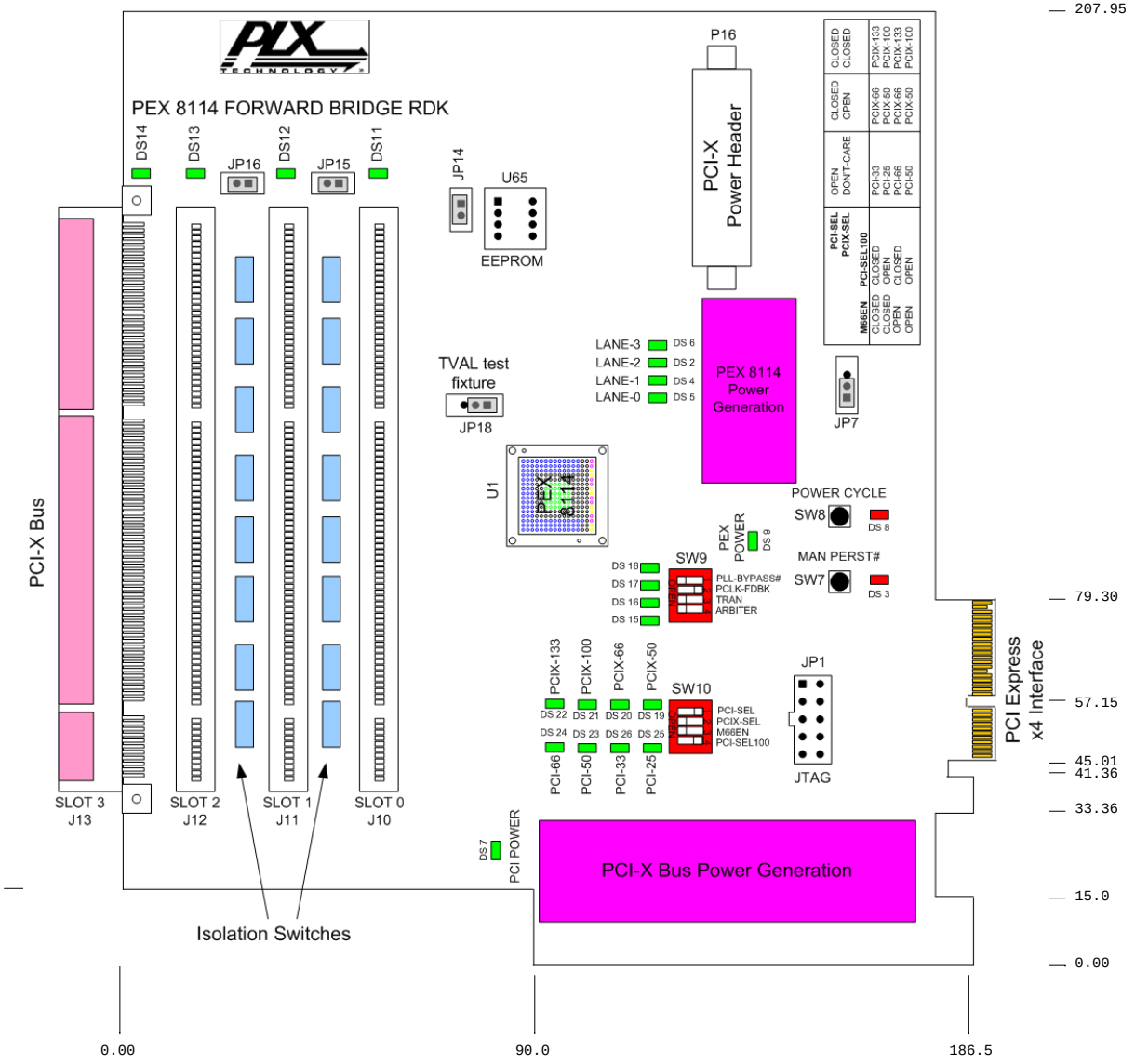
OUTER TRACES

WIDTH = 5.0 mils
Cu = 1.50 oz
Trace Zo = 57 ohm
DIFF Trace Zo = 100 ohm

INNER TRACES

WIDTH = 4.0 mils
Cu = 0.50 oz
Trace Zo = 57 ohm
DIFF Trace Zo = 100 ohm

NL = No Load



All dimensions in mm.

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Title: PEX 8114 Forward Bridge RDK - Board Layout Information			
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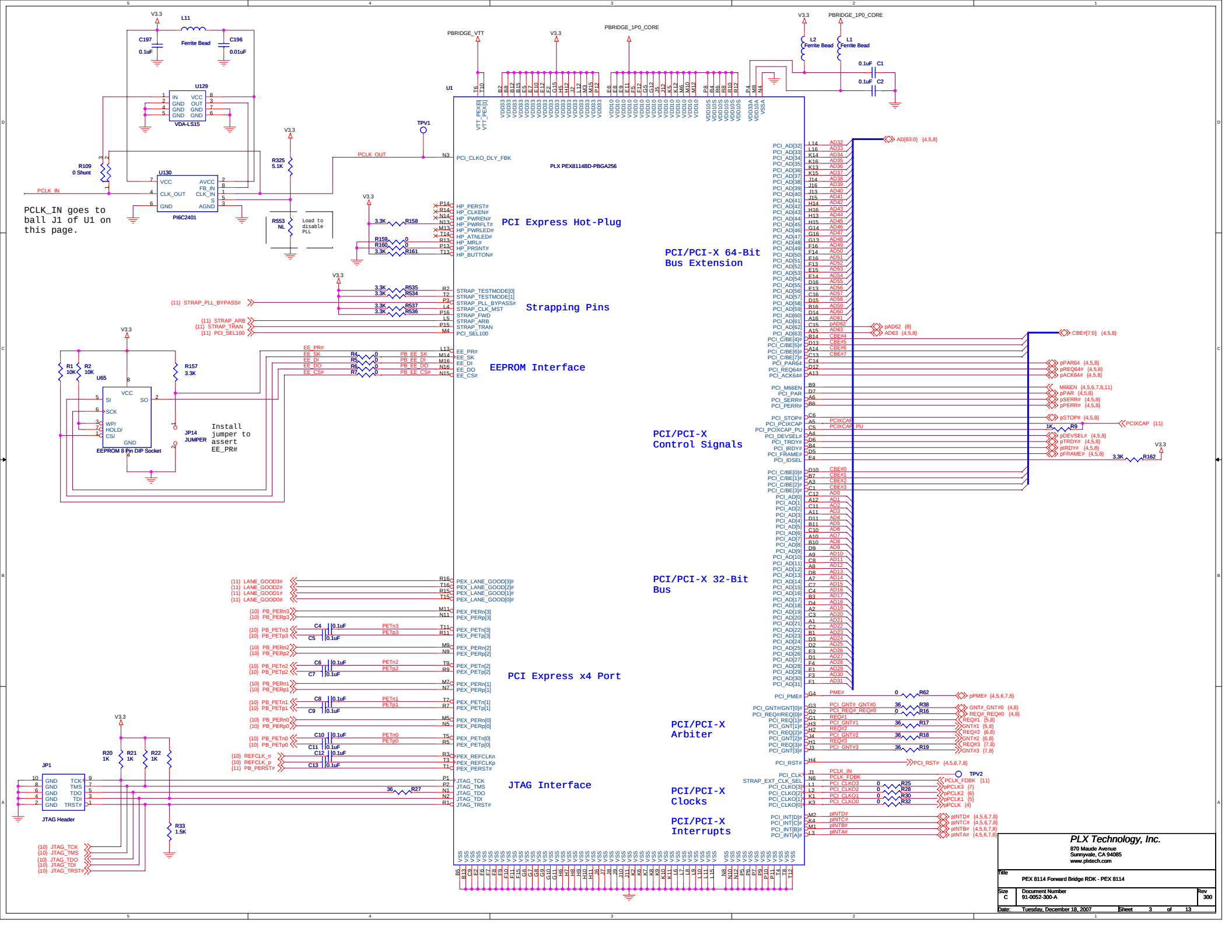
PCI Express Hot-Plug
PCI/PCI-X 64-Bit Bus Extension
Strapping Pins
EEPROM Interface
PCI/PCI-X Control Signals
PCI/PCI-X 32-Bit Bus
PCI Express x4 Port
PCI/PCI-X Arbiter
JTAG Interface
PCI/PCI-X Clocks
PCI/PCI-X Interrupts
PLX PEX8114BD-PBGA256
PCLK_IN goes to ball J1 of U1 on this page.
Install jumper to assert EE_PR#
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PEX 8114 Forward Bridge RDK - PEX 8114
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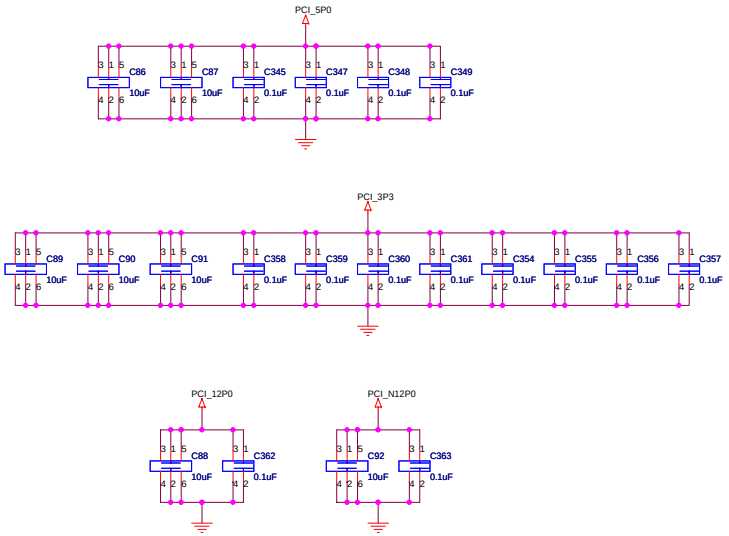
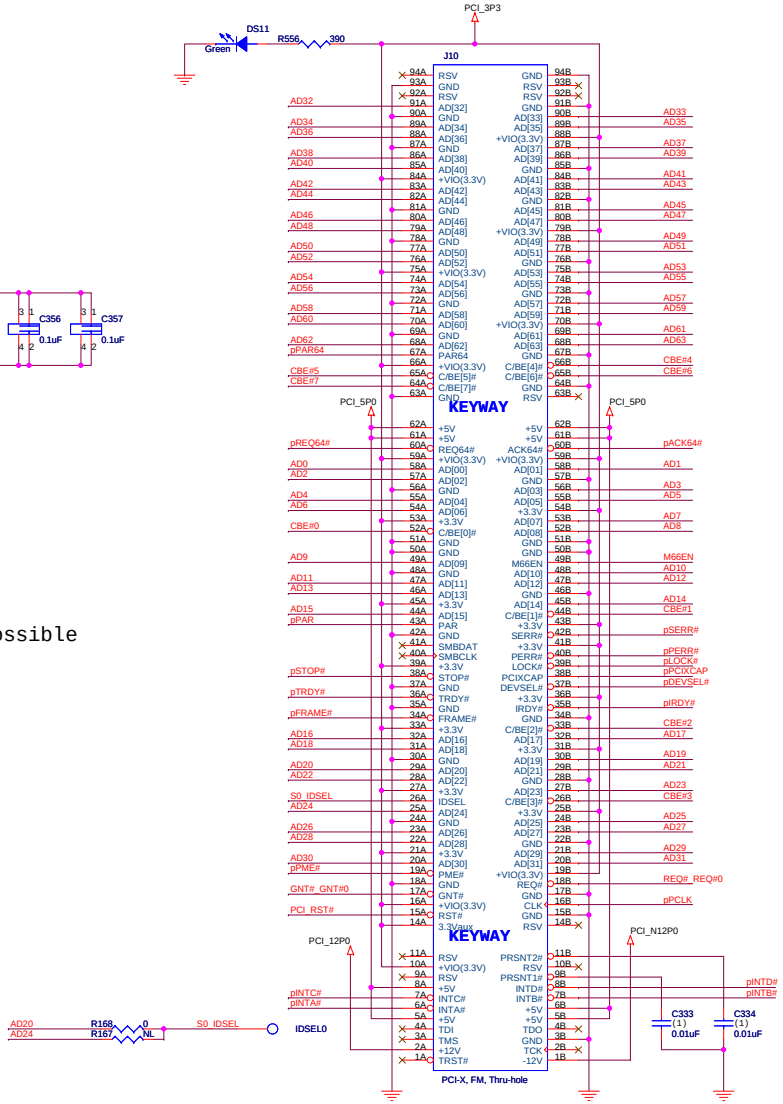
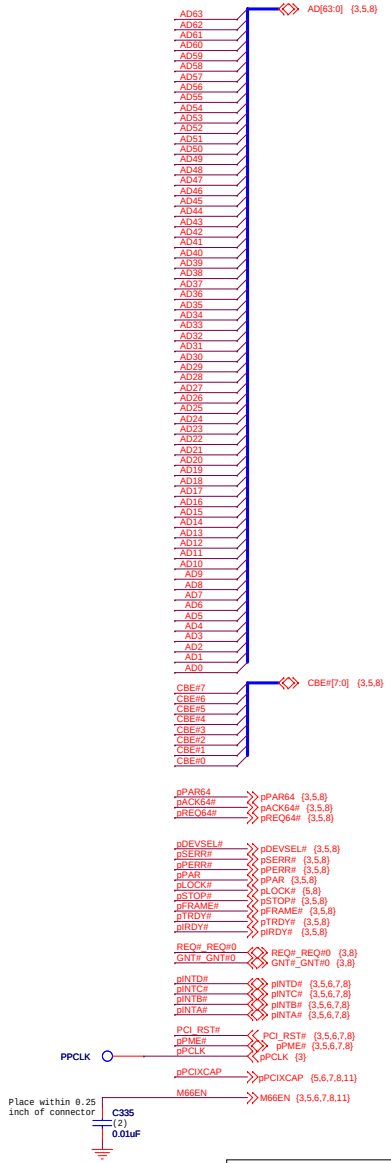
PCI SLOT 0



Place caps as close to connector power pins as possible





(1) PCI Specification, Rev 2.3, Section 4.3.7

(2) PCI Specification, Rev 2.3, Section 7.7.7

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Title		
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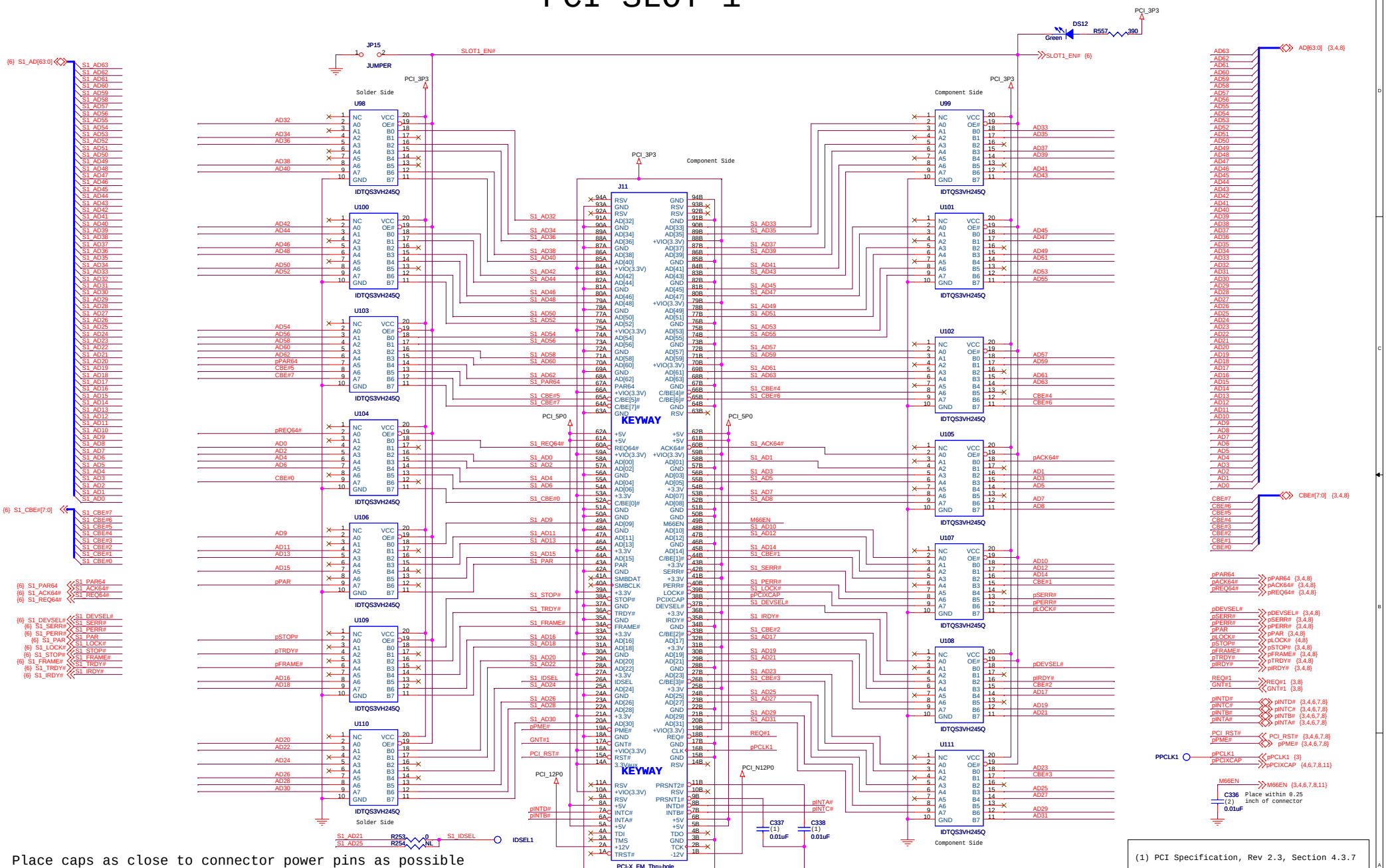
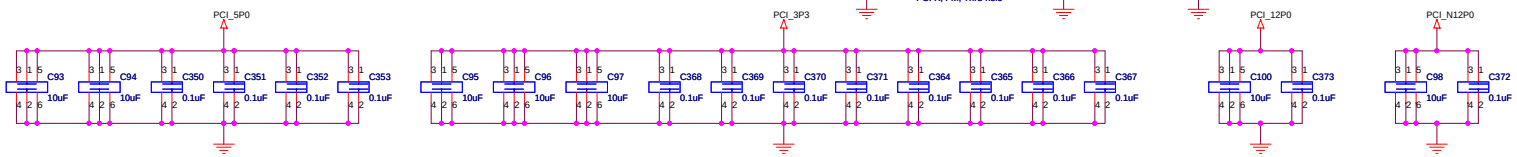
PCI SLOT 1



Place caps as close to connector power pins as possible



(1) PCI Specification, Rev 2.3, Section 4.3.7

(2) PCI Specification, Rev 2.3, Section 7.7.7

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Title	PEX 8114 Forward Bridge RDK - PCI Slot 1	
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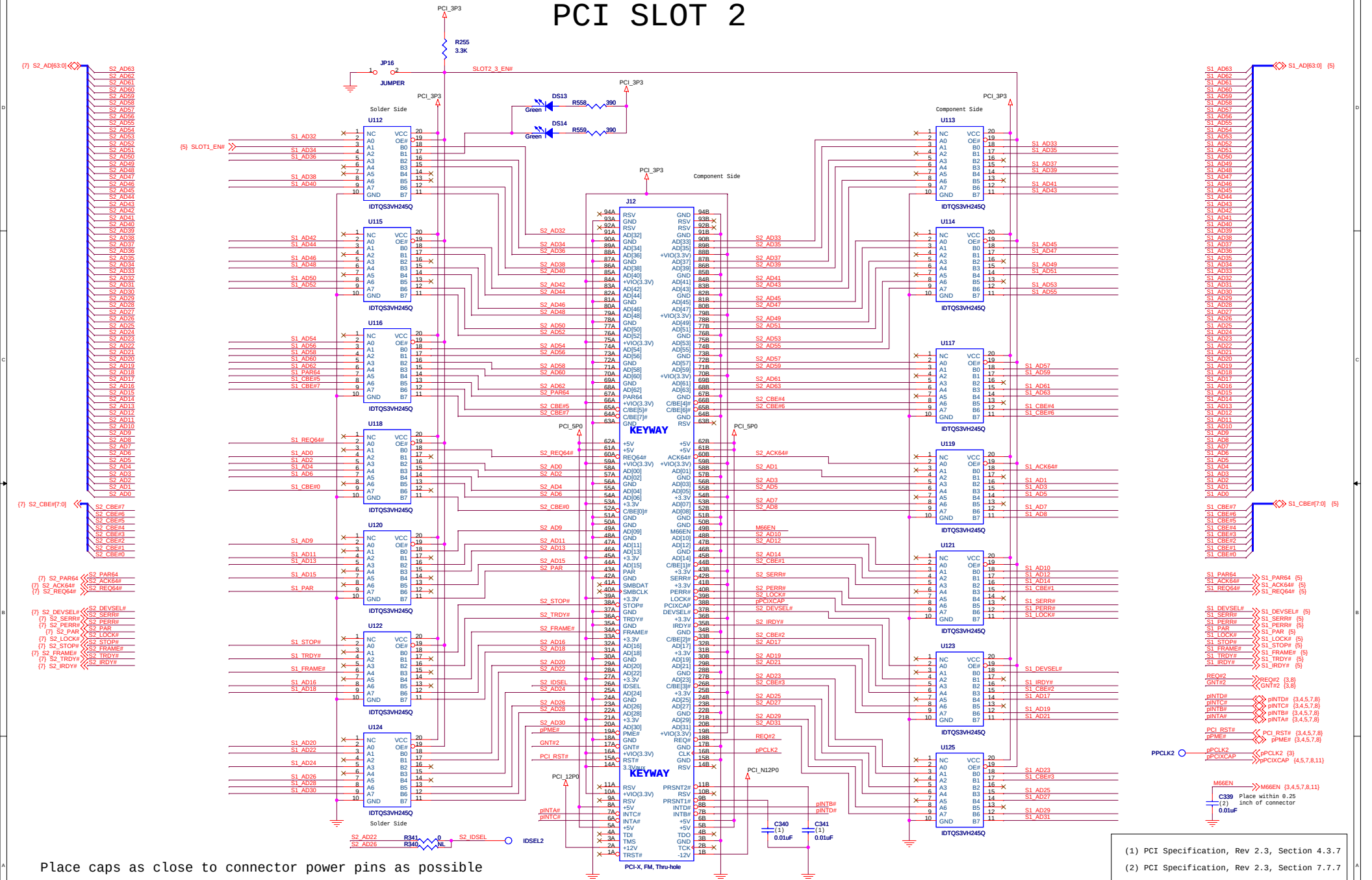
PCI SLOT 2



(1) PCI Specification, Rev 2.3, Section 4.3.7

(2) PCI Specification, Rev 2.3, Section 7.7.7

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Title	PEX 8114 Forward Bridge RDK - PCI Slot 2	
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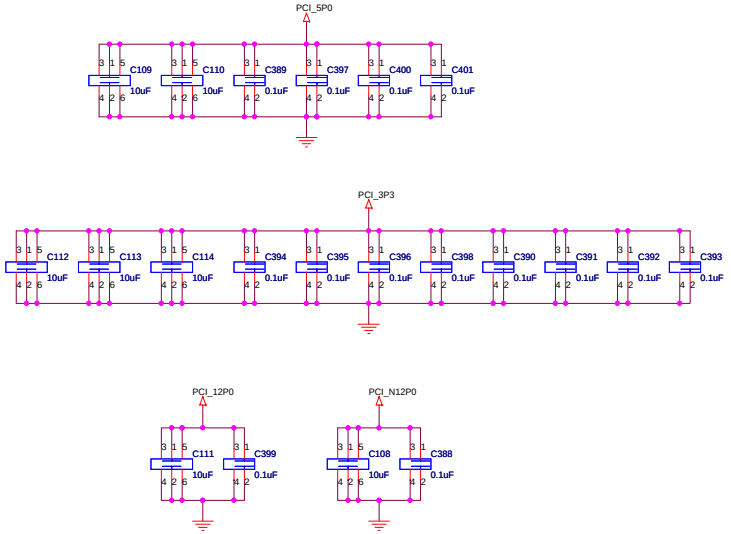
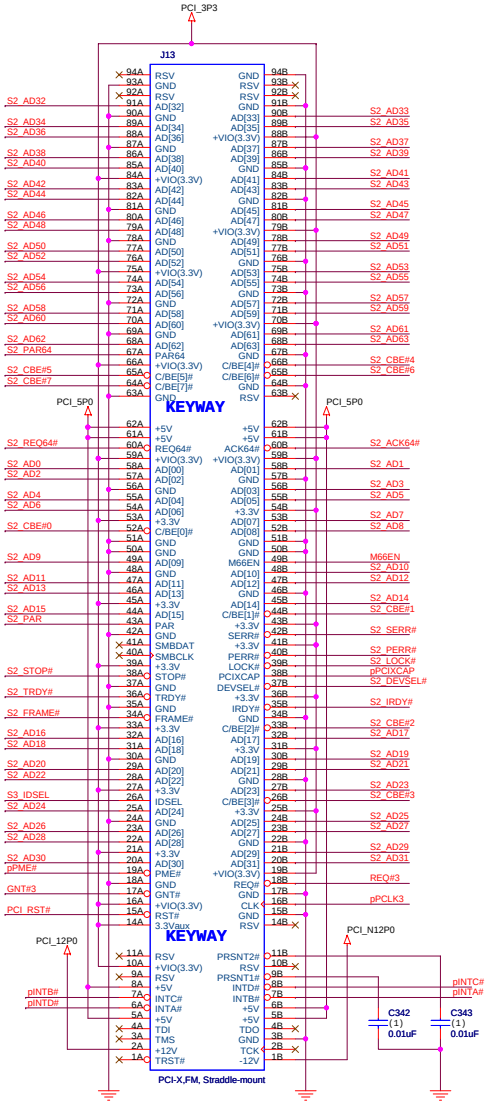
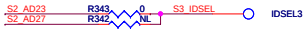
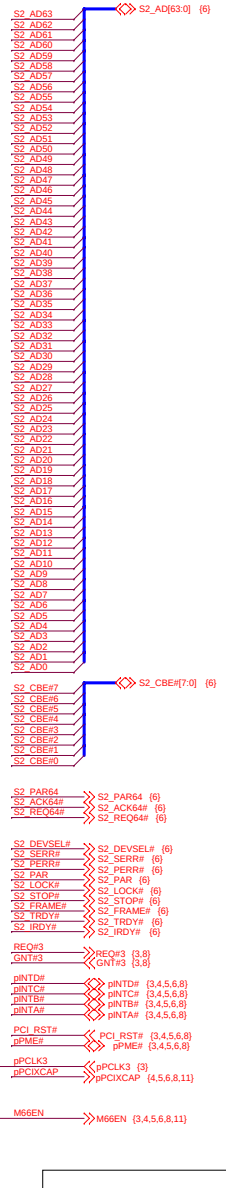
PCI SLOT 3



Place caps as close to connector power pins as possible







(1) PCI Specification, Rev 2.3, Section 4.3.7

(2) PCI Specification, Rev 2.3, Section 7.7.7

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Title	PEX 8114 Forward Bridge RDK - PCI Slot 3	
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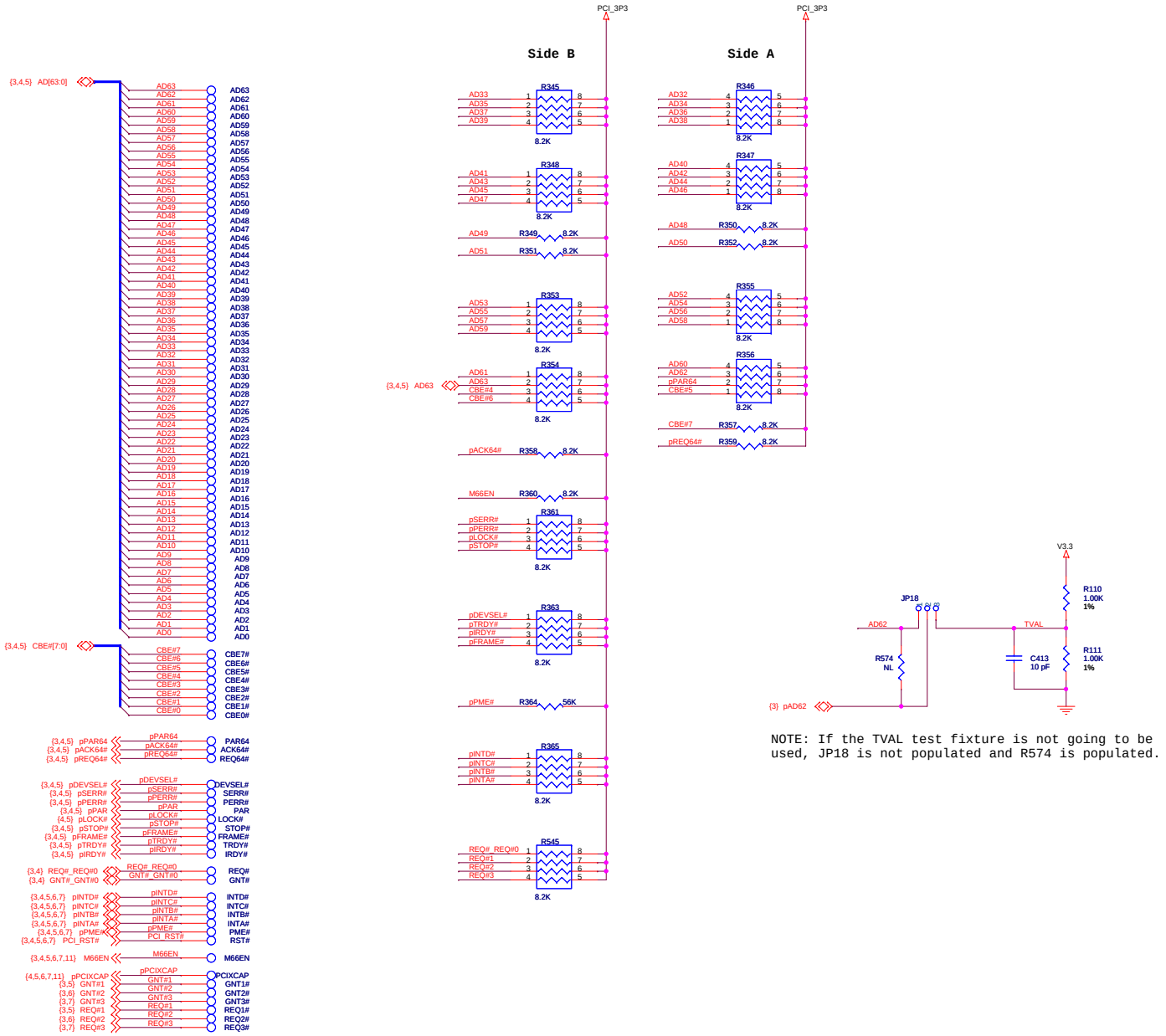

NOTE: If the TVAL test fixture is not going to be used, JP18 is not populated and R574 is populated.

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Title: PEX 8114 Forward Bridge RDK - PCI Termination		
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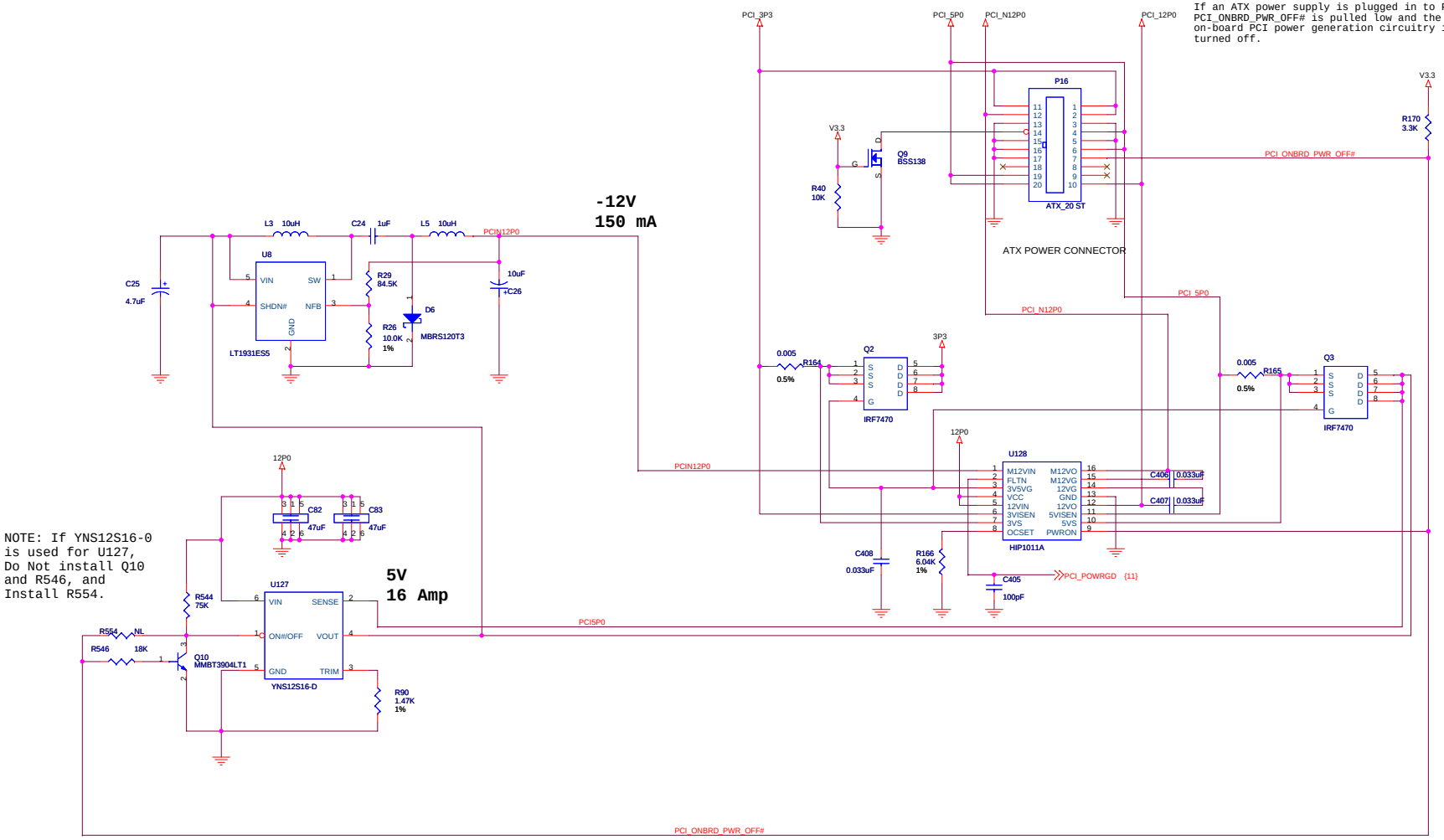

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Title	PEX 8114 Forward Bridge RDK - PCI Power	
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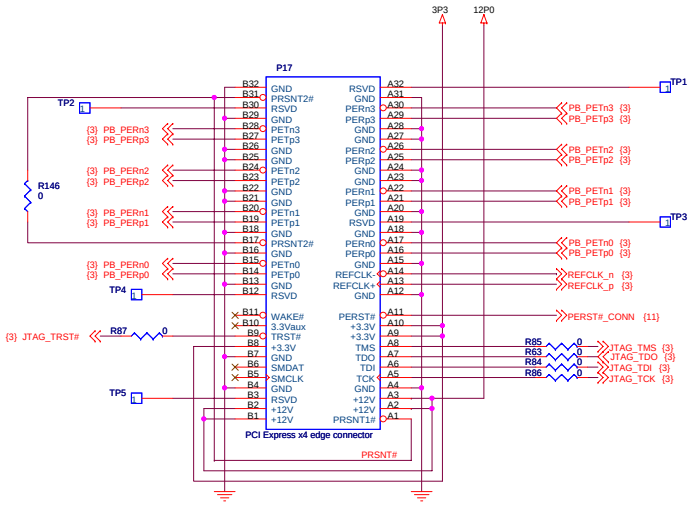

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Title	PEX 8114 Forward Bridge RDK - PCI Express/AUX IO	
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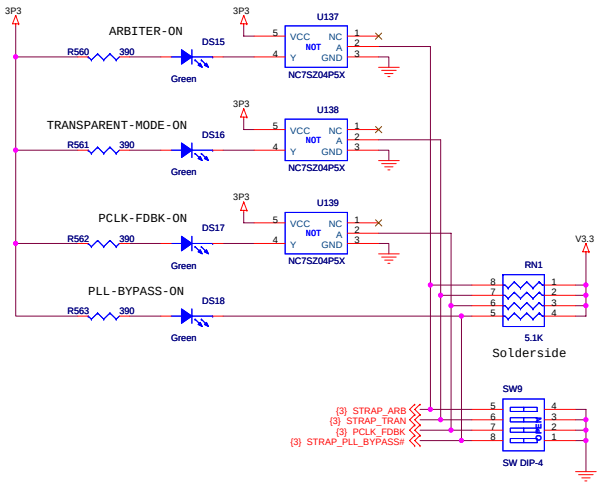

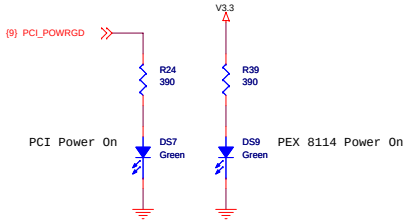

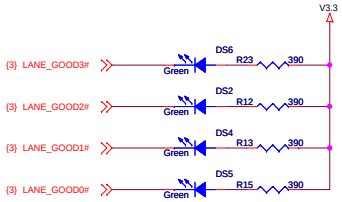

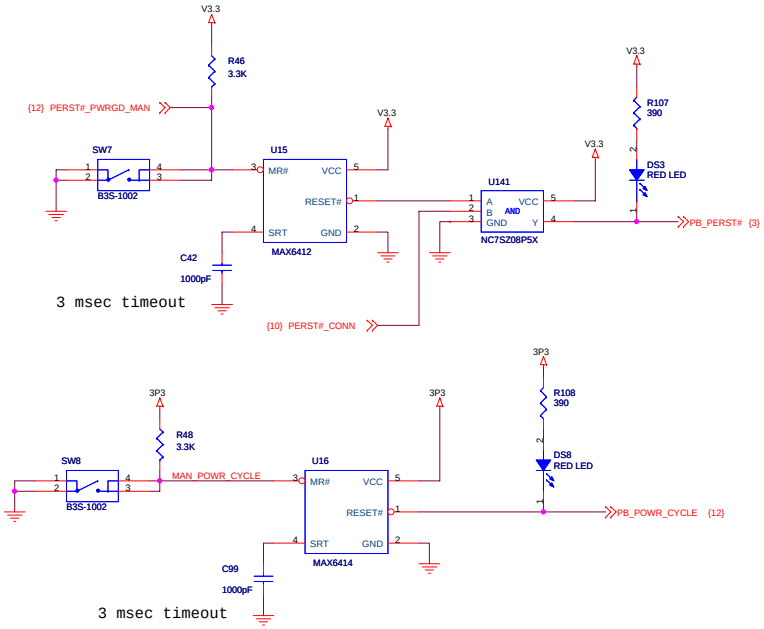

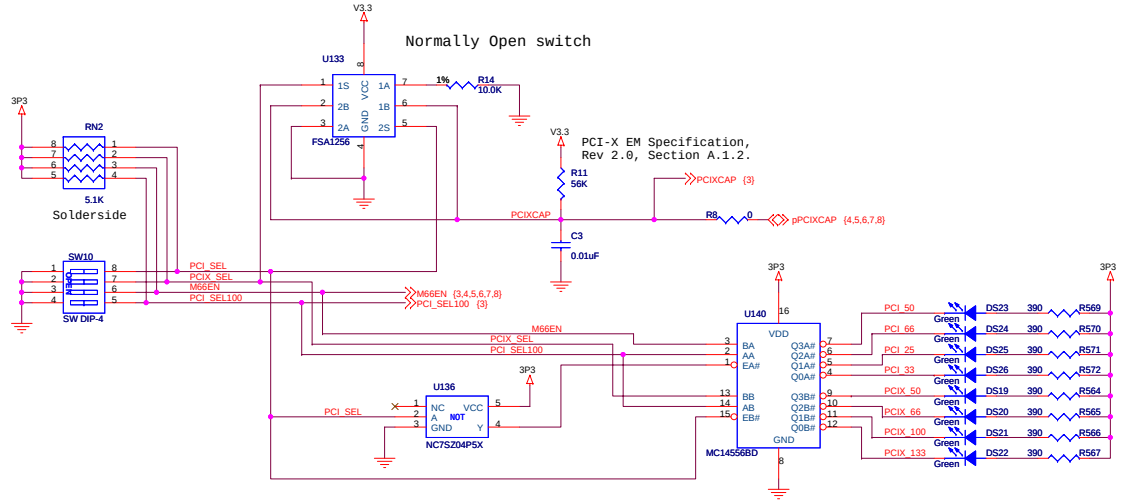

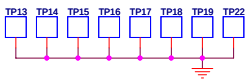

Ground Reference Posts for Test Instruments.

CLOSED=0

OPEN=1

PCI_SEL / PCIX_SEL / M66EN / PCI_SEL100	OPEN / DON'T CARE	CLOSED / OPEN	CLOSED / CLOSED
CLOSED CLOSED	PCI 33	PCIX 66	PCIX 133
CLOSED OPEN	PCI 25	PCIX 50	PCIX 100
OPEN CLOSED	PCI 66	PCIX 66	PCIX 133
OPEN OPEN	PCI 50	PCIX 50	PCIX 100

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Title: PEX 8114 Forward Bridge RDK - Switches/Indicators

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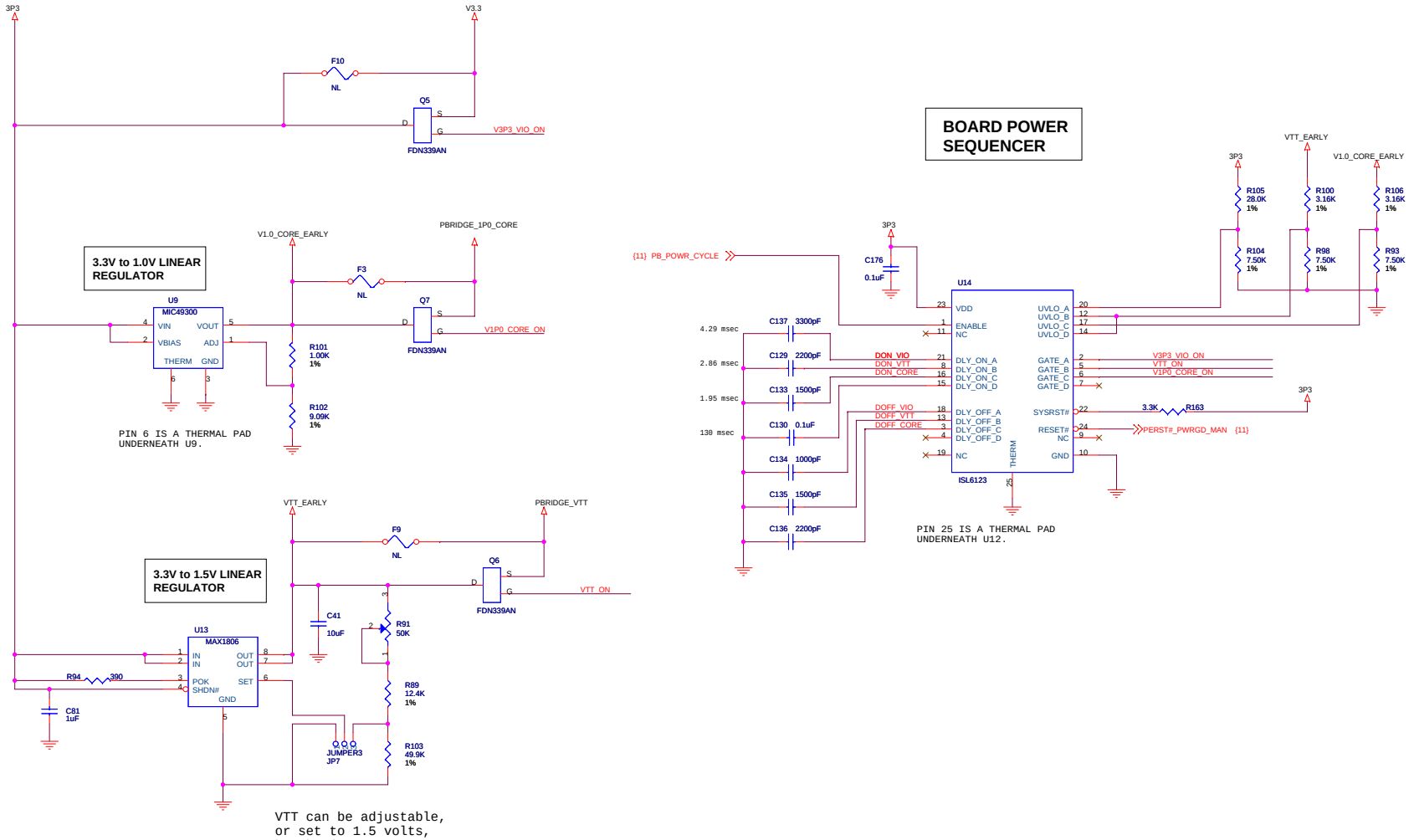

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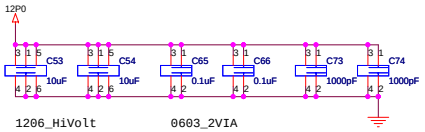
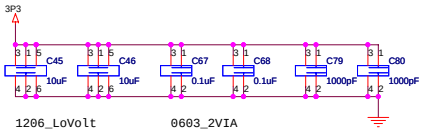
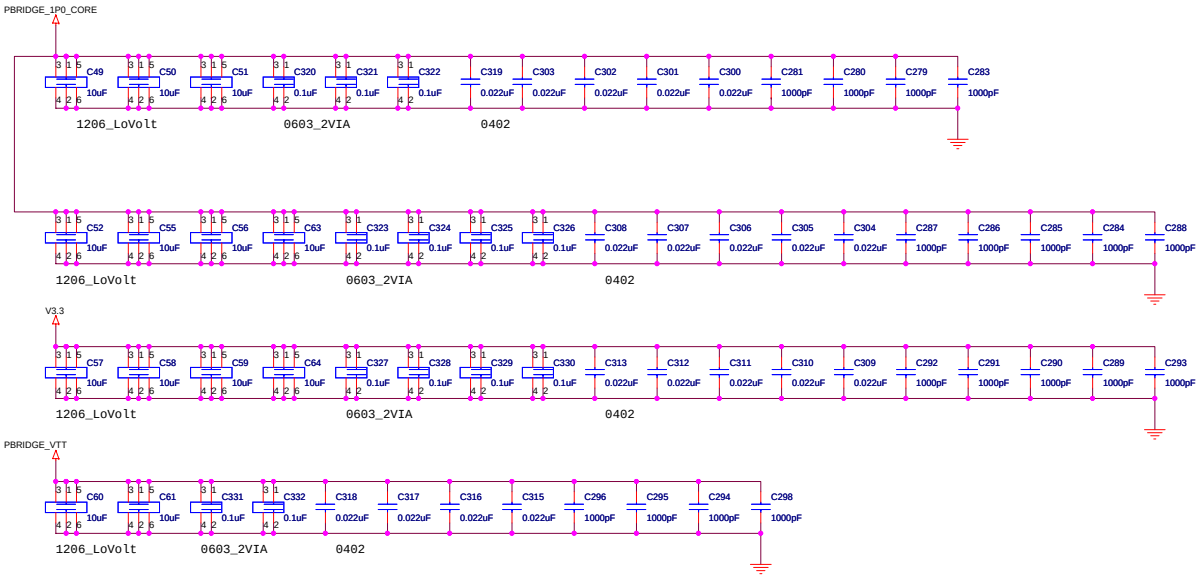
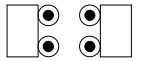




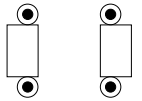


CAP FOOTPRINTS

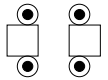
1206_LoVolt - 0.87 nH



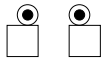
1206_HiVolt - 0.94 nH



0603_4VIA - 0.58 nH



0603_2VIA - 0.78 nH



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