

ADC1xDxxxxRF

Virtex-4

Cypress uC

Expansion

Power

FRONT END

PLL

EXT_CLK_SELECT removed from the schematic

		TEXAS INSTRUMENTS 15000 TI Blvd Dallas, Texas 75243 USA (972) 644-5590 www.ti.com	
		PROJECT NAME: ADC1xDxxxx(RF)RB	PAGE TITLE Title Page
DESIGNED:	DATE:	SCHEMATIC REV: B	
DRAWN:	DATE:		
CHECKED:	DATE: 11/19/2013	THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.	
LAST MODIFIED: Monday, January 13, 2014	DOC #: SV600863		

ADC1xDxxxx(RF)RB Reference Board

REFERENCE DESIGN

Board ID:	SV600863
EVM Assembly	Variant
ADC10D1500RB	-001
ADC12D1600RB	-002
ADC12D1600RFRB	-003
ADC12D1800RB	-004
ADC12D1800RFRB	-005
ADC12D2000RFRB	-006
ADC12D800RFRB	-007

SPECIAL NOTES

These schematics reflect the current state of product development. This design had NOT yet been fully tested at the time these schematics were generated.


Since this product is in development, the user of this document is strongly advised to check for the latest revision.

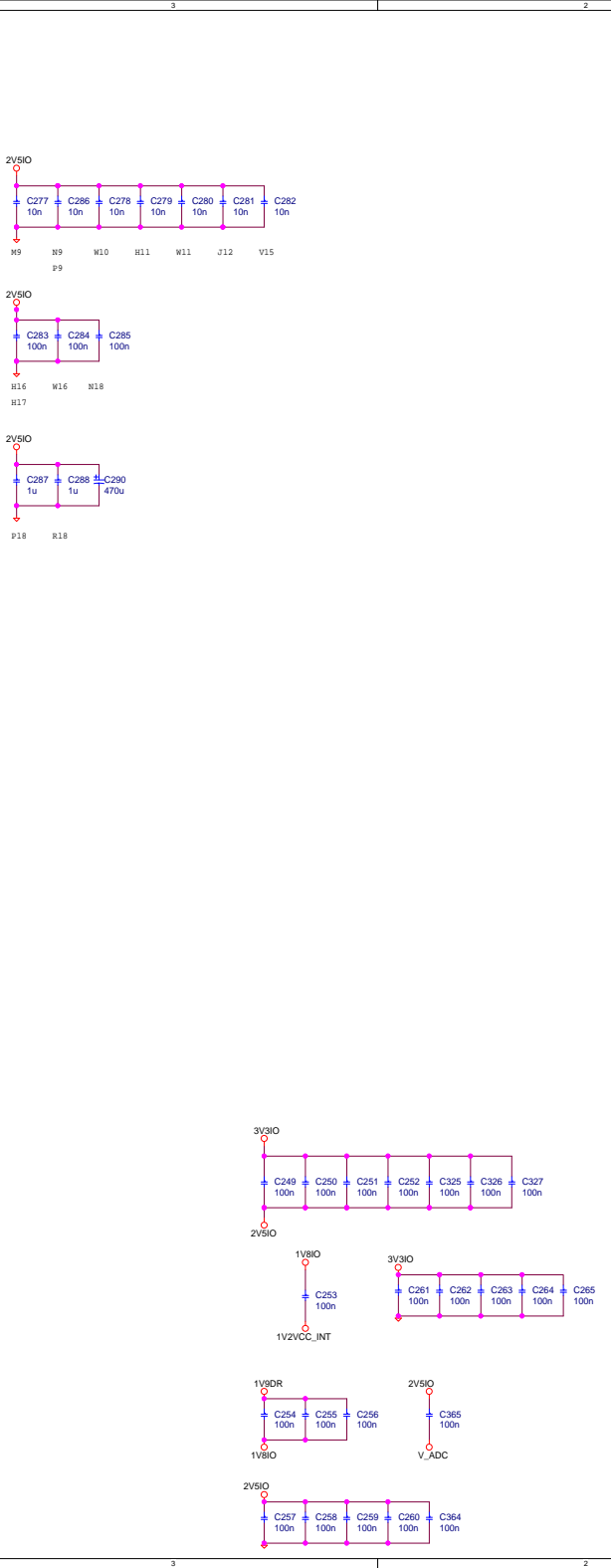
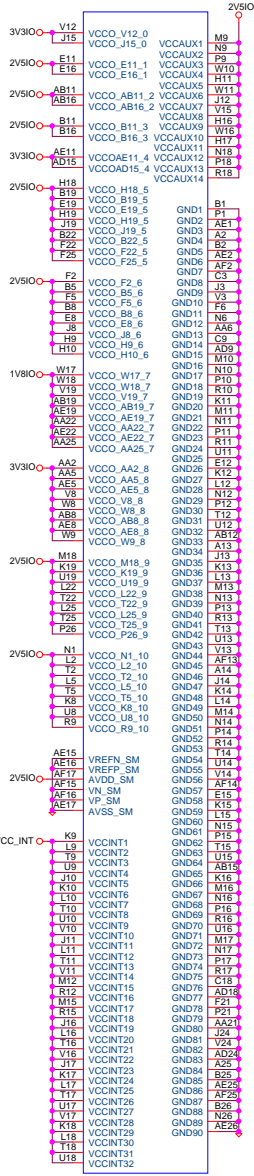
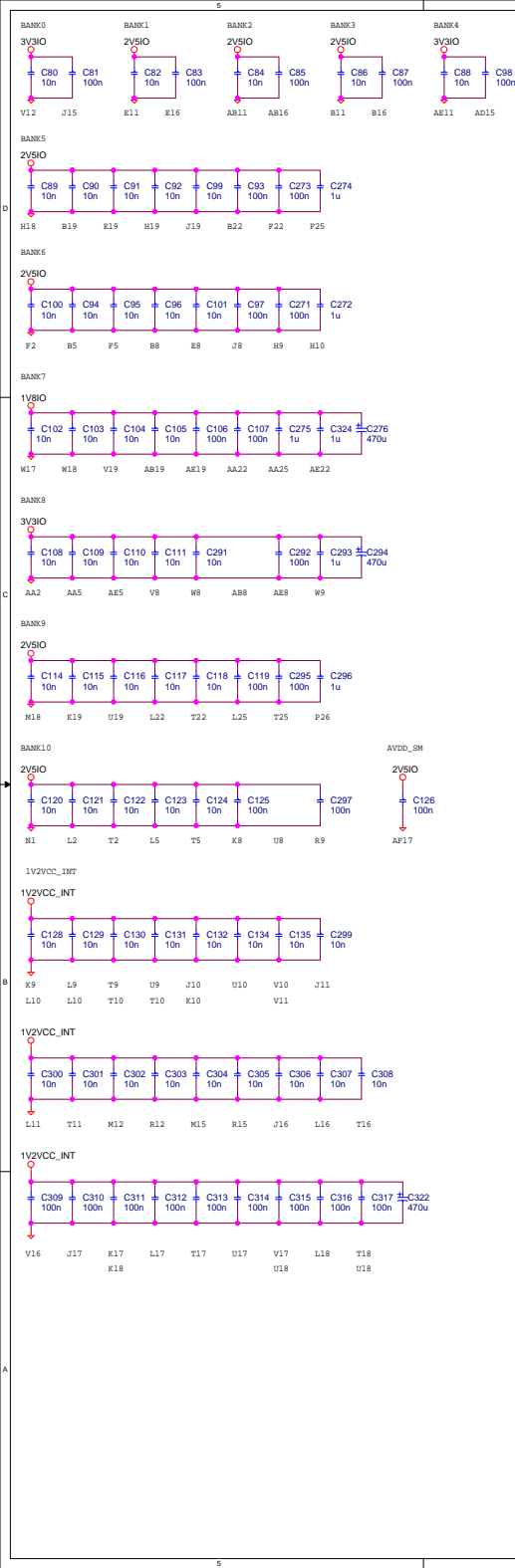
Texas Instruments reserves the right to make changes to this product.

ALL parts labeled "NA" are NOT ASSEMBLED.

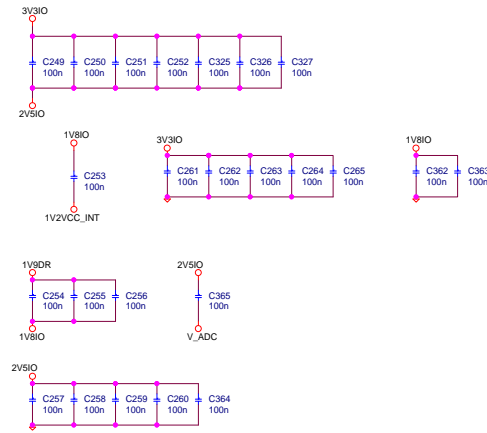
Print Instructions:

- To create a readable printout, we recommend to use A3 or 11x17" paper size.
- When printing from this PDF file, make sure to check the "Shrink to fit" box.

		TEXAS INSTRUMENTS 12500 TI Blvd Dallas, Texas 75243 USA (972) 644-5590 www.ti.com
PROJECT NAME:	ADC1xDxxxx(RF)RB	PAGE TITLE Title Page
DESIGNED:	DATE:	
DRAWN:	DATE:	
CHECKED:	DATE: 11/19/2013	
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.		SCHEMATIC REV: B
LAST MODIFIED: Monday, January 13, 2014 DOC #: SV600863		Sheet 1 OF 12



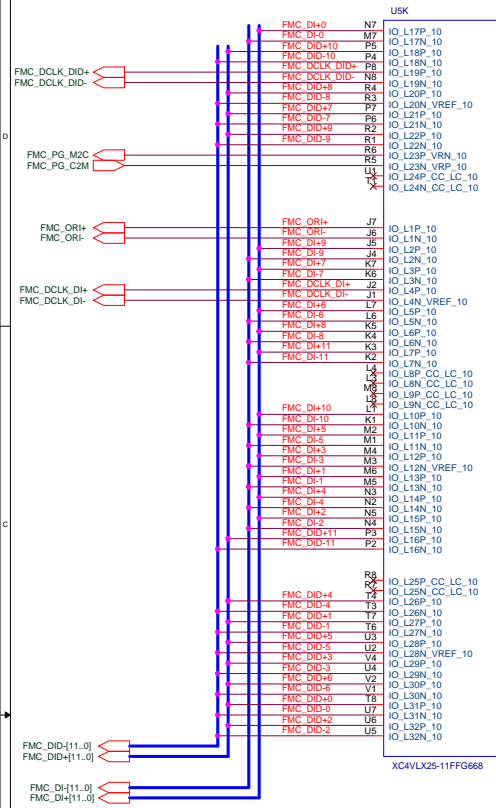
BANK #	BANK SUPPLY	INTERFACE
1	2V5IO	USI-1 Header
2	2V5IO	Test Headers, Temp. Sensor
3	2V5IO	ADC DCLK
4	3V3IO	Cypress, LEDs, 100 MHz oscillator
5	2V5IO	ADC Q-Channel (LVDS)
6	2V5IO	Clock generator
7	1V8IO	ADC Control
8	3V3IO	Cypress, LEDs
9	2V5IO	ADC I-Channel (LVDS)
10	2V5IO	Logic Analyzer Header



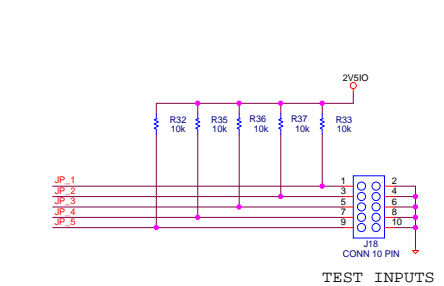
**TEXAS
INSTRUMENTS**

TEXAS INSTRUMENTS
15000 TI Blvd
Dallas, Texas 75243
USA
(972) 644-5580
www.ti.com

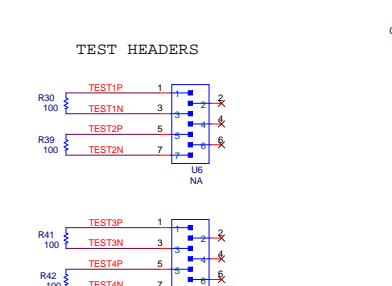
PROJECT NAME: ADC1xDxxx(R)RB	PAGE TITLE: Title Page
DESIGNED:	DATE:
DRAWN:	DATE:
CHECKED:	DATE: 11/19/2013
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.	
LAST MODIFIED: Monday, January 13, 2014	DOC #: SV600863
Schematic Rev: B	
Sheet 1 OF 12	



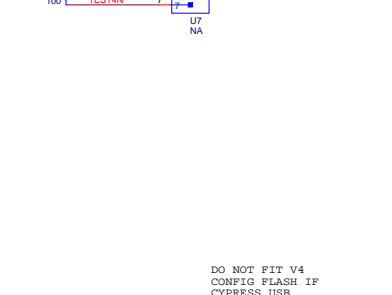
BANK 1 - 2.5V I/O



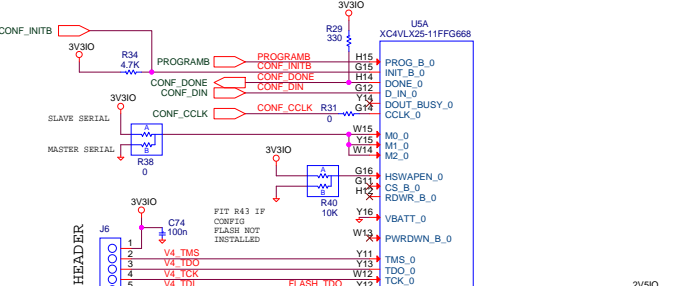
BANK 2 - 2.5V I/O



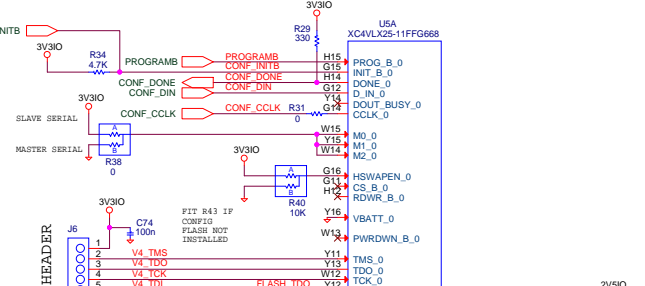
BANK 3 - 2.5V I/O



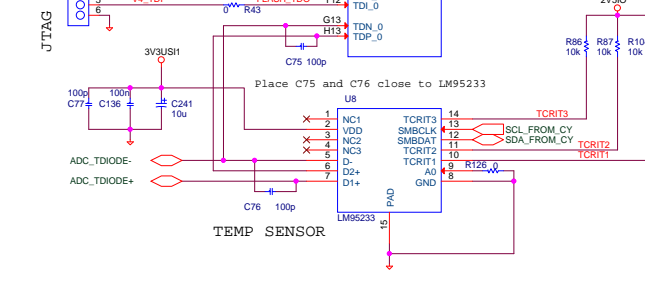
BANK 4 - 3.3V I/O



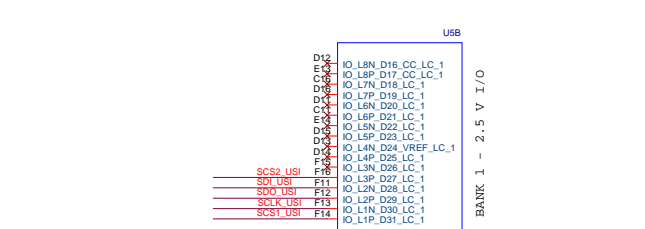
BANK 5 - 2.5V I/O



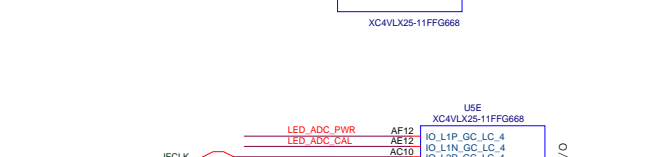
BANK 6 - 2.5V I/O



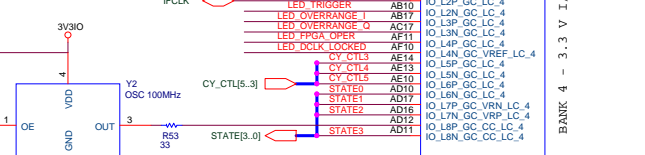
BANK 7 - 2.5V I/O



BANK 8 - 3.3V I/O



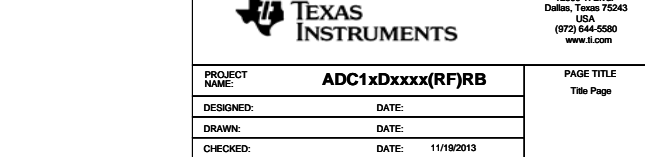
BANK 9 - 3.3V I/O



BANK 10 - 3.3V I/O



BANK 11 - 3.3V I/O



BANK 12 - 3.3V I/O

TEXAS INSTRUMENTS
 15001 North Dallas, Texas 75243
 USA
 (972) 644-5590
 www.ti.com

PROJECT NAME: ADC1x0xxx(RF)RB

DESIGNED: DATE: PAGE TITLE: Title Page

DRAWN: DATE:

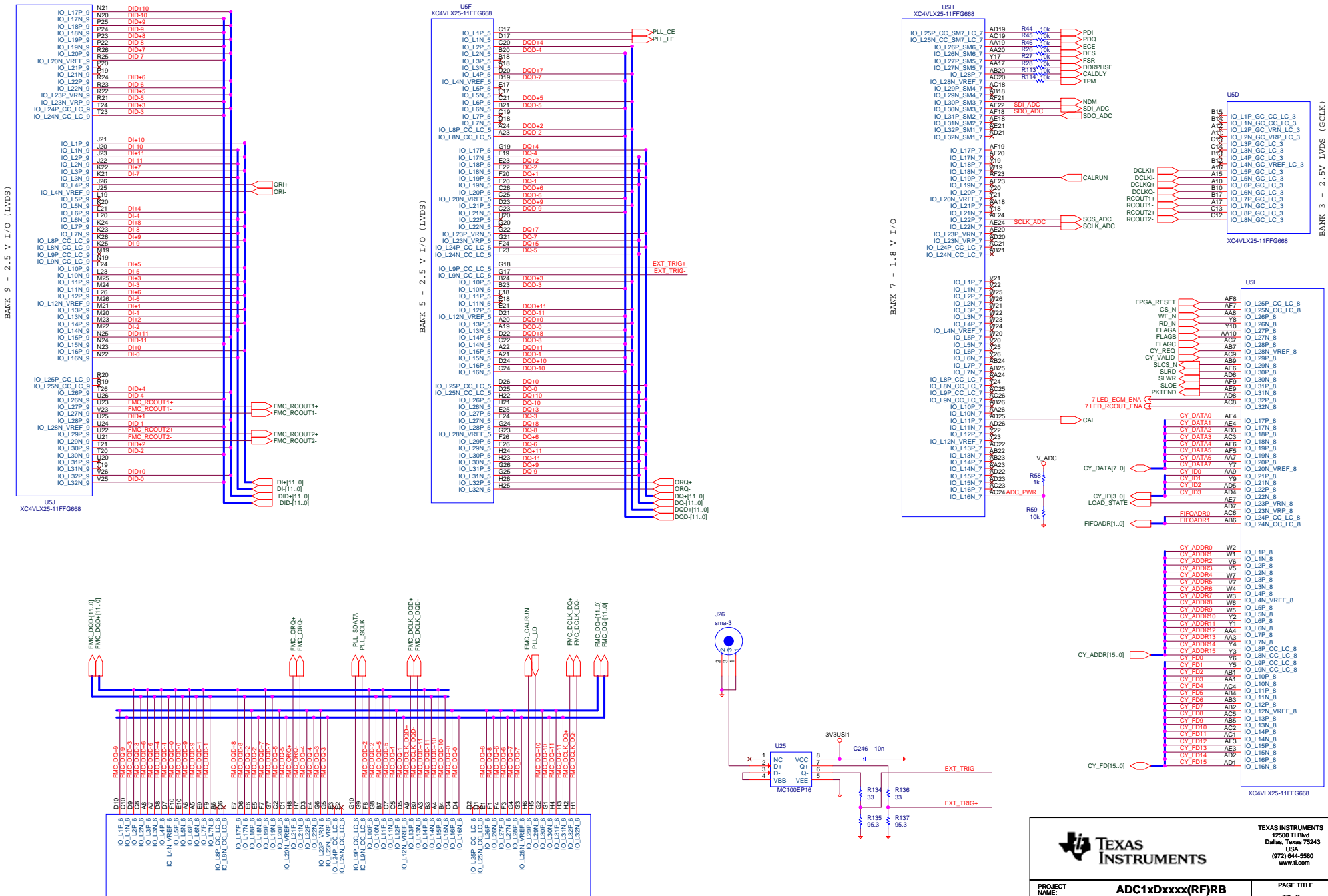
CHECKED: DATE: 11/19/2013

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.

LAST MODIFIED: Monday, January 13, 2014 DOC #: SV600863

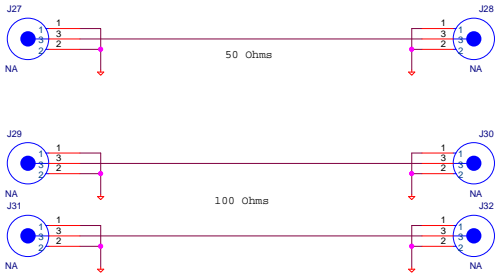
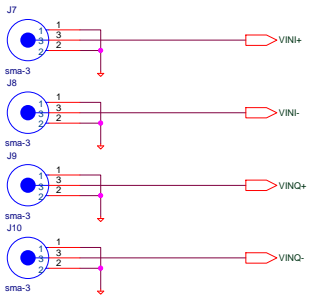
SHEMATIC REV: B

Sheet 1 OF 12




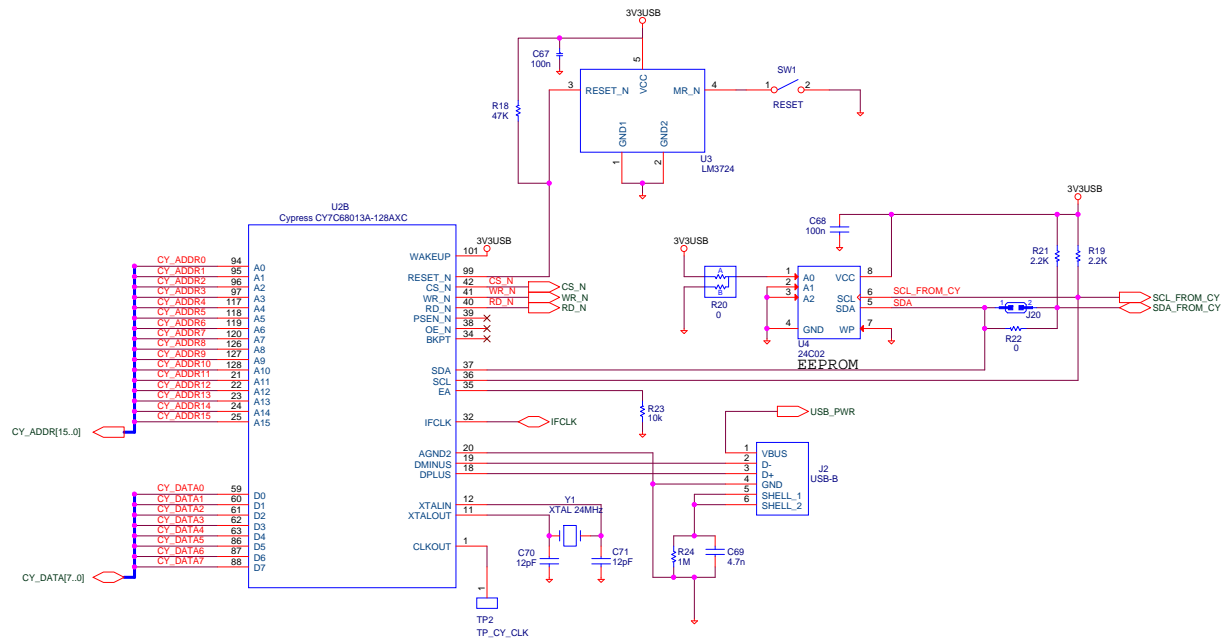
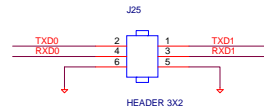
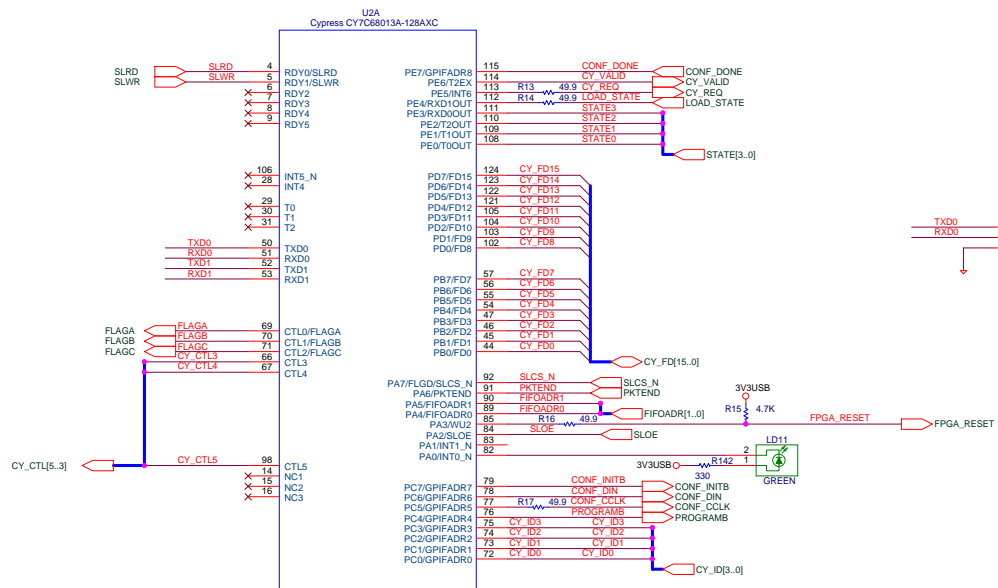
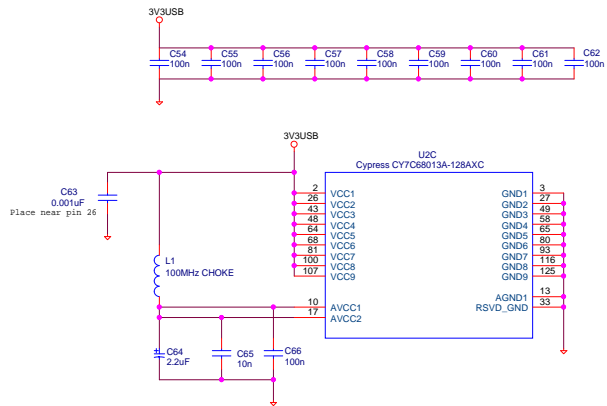
TEXAS INSTRUMENTS
12500 TI Blvd.
Dallas, Texas 75243
USA
(972) 644-5580
www.ti.com

PROJECT NAME: ADC1x0xxx(RF)RB		PAGE TITLE: Title Page
DESIGNED:	DATE:	SCHEMATIC REV: B
DRAWN:	DATE:	
CHECKED:	DATE: 11/19/2013	Sheet 1 OF 12
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.		
LAST MODIFIED: Monday, January 13, 2014 DOC #: SV600863		

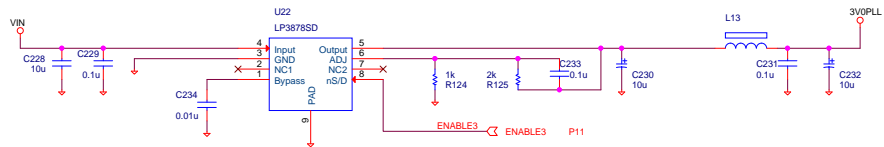


Impedance test connectors

		TEXAS INSTRUMENTS 12500 TI Blvd Dallas, Texas 75243 USA (972) 644-5580 www.ti.com	
		PROJECT NAME: ADC1xDxxx(RF)RB	PAGE TITLE Title Page
DESIGNED:	DATE:		
DRAWN:	DATE:		
CHECKED:	DATE: 11/19/2013		
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.			SCHEMATIC REV: B
LAST MODIFIED: Monday, January 13, 2014 DOC #: SV600863			Sheet 1 OF 12



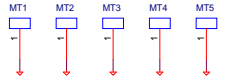
		TEXAS INSTRUMENTS 12500 TI Blvd Dallas, Texas 75243 USA (972) 644-5580 www.ti.com	
		PROJECT NAME: ADC1xDxxxx(RF)RB	PAGE TITLE: Title Page
DESIGNED:	DATE:	CHECKED:	
DRAWN:	DATE:	DATE: 11/19/2013	
CHECKED:		DATE: 11/19/2013	
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.		SCHEMATIC REV: B	Sheet 1 OF 12
LAST MODIFIED: Monday, January 13, 2014		DOC #: SV600863	



3V0PLL - LMX2531 CLOCK GENERATOR SUPPLY




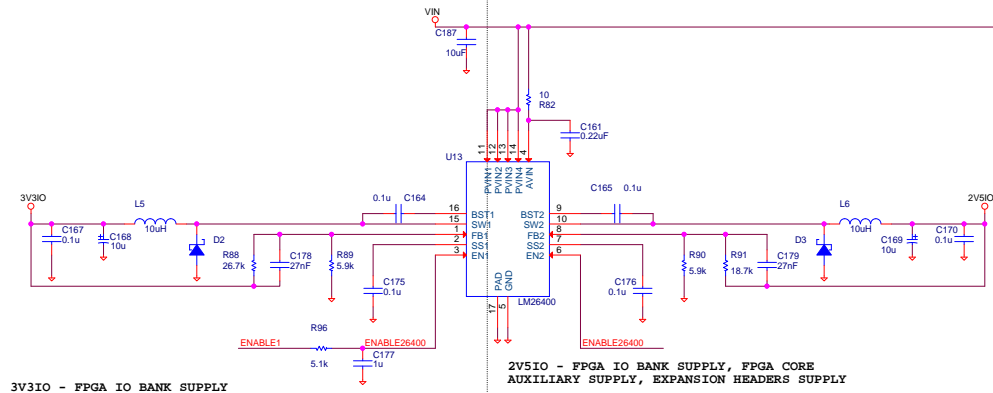
BOARD MOUNTING HOLES



HOLES FOR FMC CONNECTOR

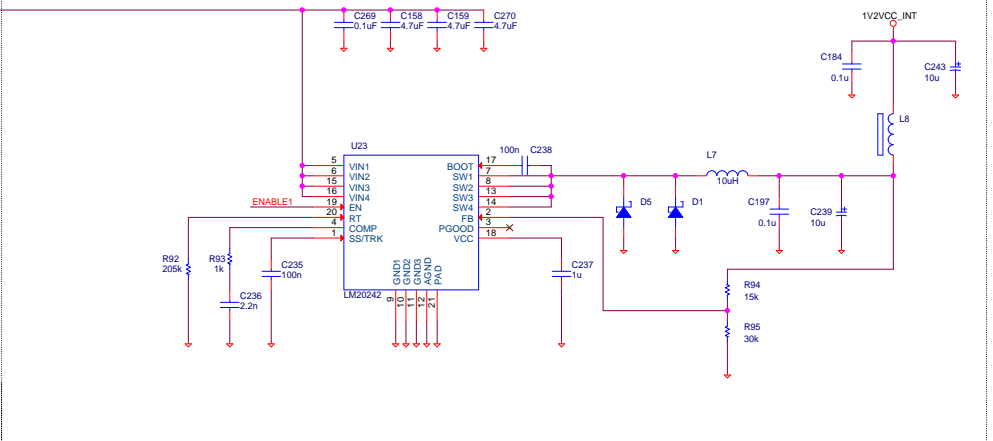


		TEXAS INSTRUMENTS 12500 TI Blvd Dallas, Texas 75243 USA (972) 644-5580 www.ti.com	
		PROJECT NAME: ADC1xDxxx(RF)RB	PAGE TITLE Title Page
DESIGNED:	DATE:	SCHEMATIC REV: B	
DRAWN:	DATE:		
CHECKED:	DATE: 11/19/2013		
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.		SHEET 1 OF 12	
LAST MODIFIED: Monday, January 13, 2014 DOC #: SV600863		Sheet 1 OF 12	

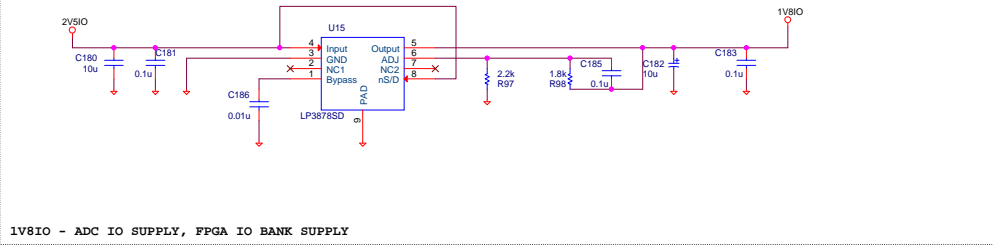


3V3IO - FPGA IO BANK SUPPLY

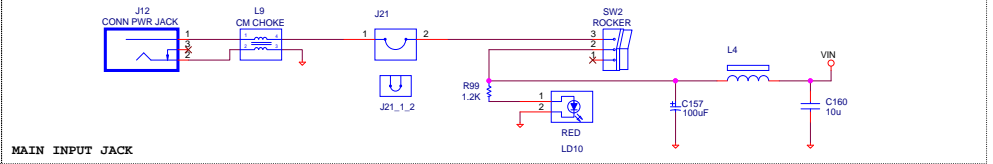
2V5IO - FPGA IO BANK SUPPLY, FPGA CORE AUXILIARY SUPPLY, EXPANSION HEADERS SUPPLY



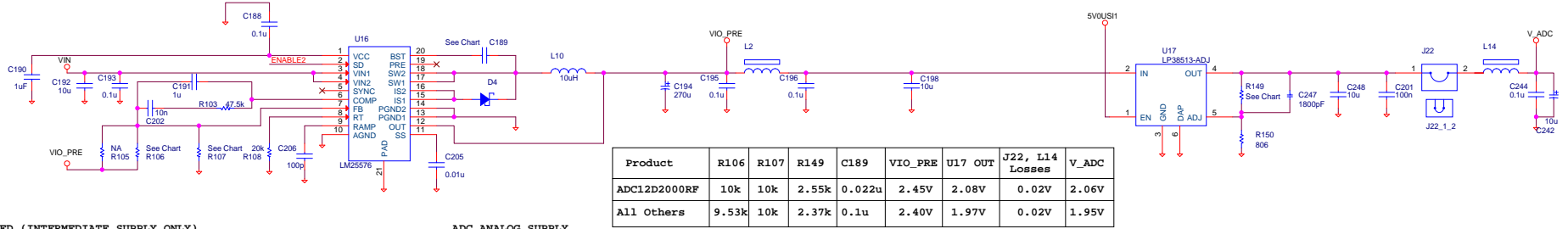
1V2VCC_INT - FPGA CORE SUPPLY



1V8IO - ADC IO SUPPLY, FPGA IO BANK SUPPLY

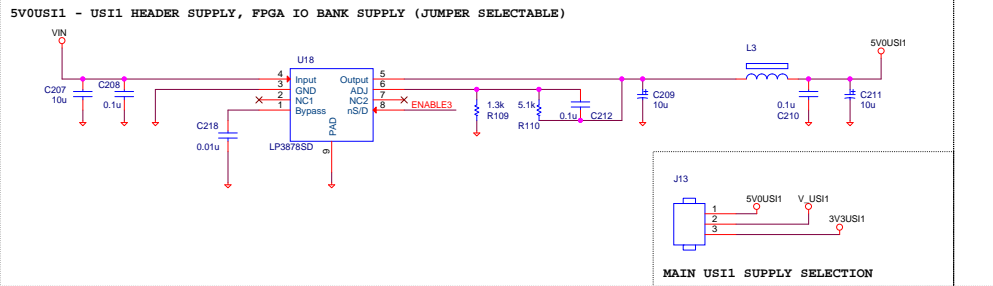


MAIN INPUT JACK



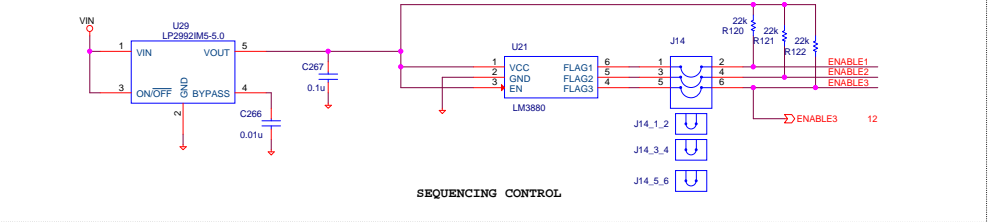
2V2IO/2V_PRE - NOT USED (INTERMEDIATE SUPPLY ONLY)

ADC ANALOG SUPPLY

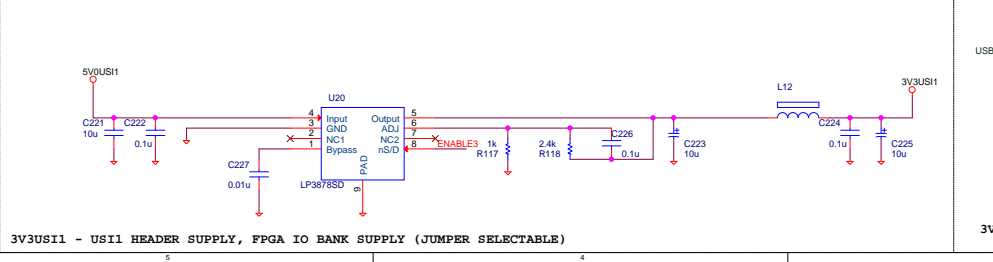


5V0US11 - US11 HEADER SUPPLY, FPGA IO BANK SUPPLY (JUMPER SELECTABLE)

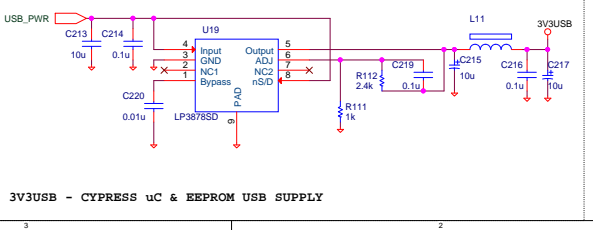
MAIN US11 SUPPLY SELECTION



SEQUENCING CONTROL



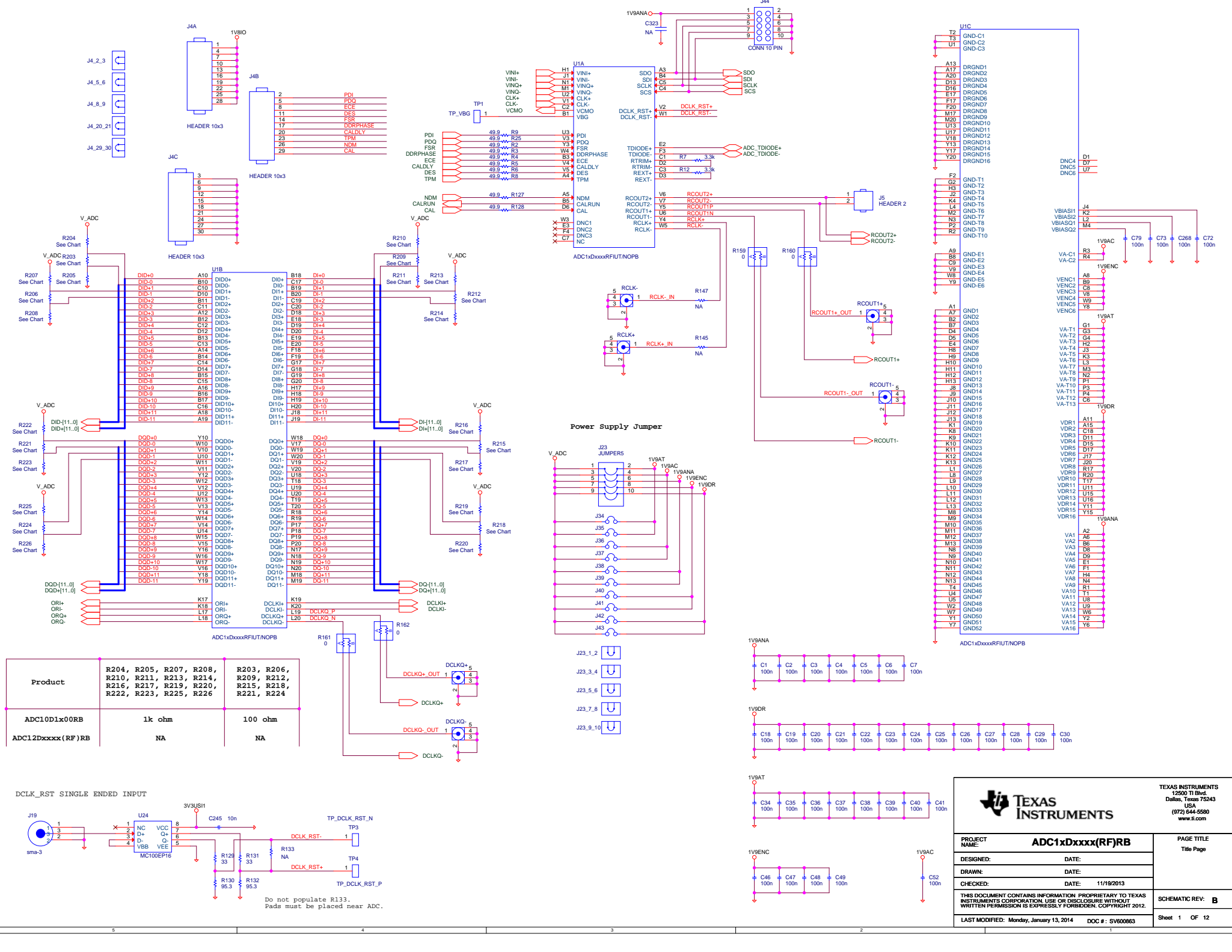
3V3US11 - US11 HEADER SUPPLY, FPGA IO BANK SUPPLY (JUMPER SELECTABLE)



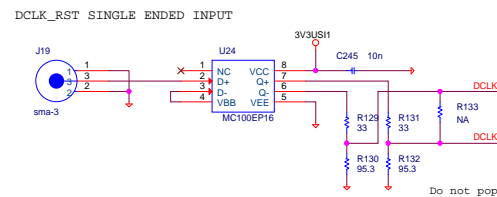
3V3USB - CYPRESS uC & EEPROM USB SUPPLY

TEXAS INSTRUMENTS
12500 TI Blvd
Dallas, Texas 75243
USA
(972) 644-5590
www.ti.com

PROJECT NAME: ADC1xDxxx(RF)RB		PAGE TITLE: Title Page
DESIGNED: _____	DATE: _____	SCHEMATIC REV: B
DRAWN: _____	DATE: _____	
CHECKED: _____	DATE: 11/19/2013	Sheet 1 OF 12
<small>THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.</small>		
LAST MODIFIED: Thursday, July 24, 2014		DOC #: SV600863



Product	R204, R205, R207, R208, R210, R211, R213, R214, R216, R217, R219, R220, R222, R223, R225, R226	R203, R206, R209, R212, R215, R218, R221, R224
ADC10D1x00RB	1k ohm	100 ohm
ADC12Dxxx(RF)RB	NA	NA



Do not populate R133.
Pads must be placed near ADC.

TEXAS INSTRUMENTS
15000 TI Blvd
Dallas, Texas 75243
USA
(972) 644-5590
www.ti.com

PROJECT NAME:	ADC12Dxxx(RF)RB	PAGE TITLE:	Title Page
DESIGNED:		DATE:	
DRAWN:		DATE:	
CHECKED:		DATE:	11/19/2013
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.			
LAST MODIFIED:	Monday, January 13, 2014	DOC #:	SV600863
SCHEMATIC REV: B			Sheet 1 OF 12

PROJECT NAME: **ADC1xDXxxx(RF)RB**

PAGE TITLE

DESIGNED: DATE:

Title Page

DRAWN: DATE:

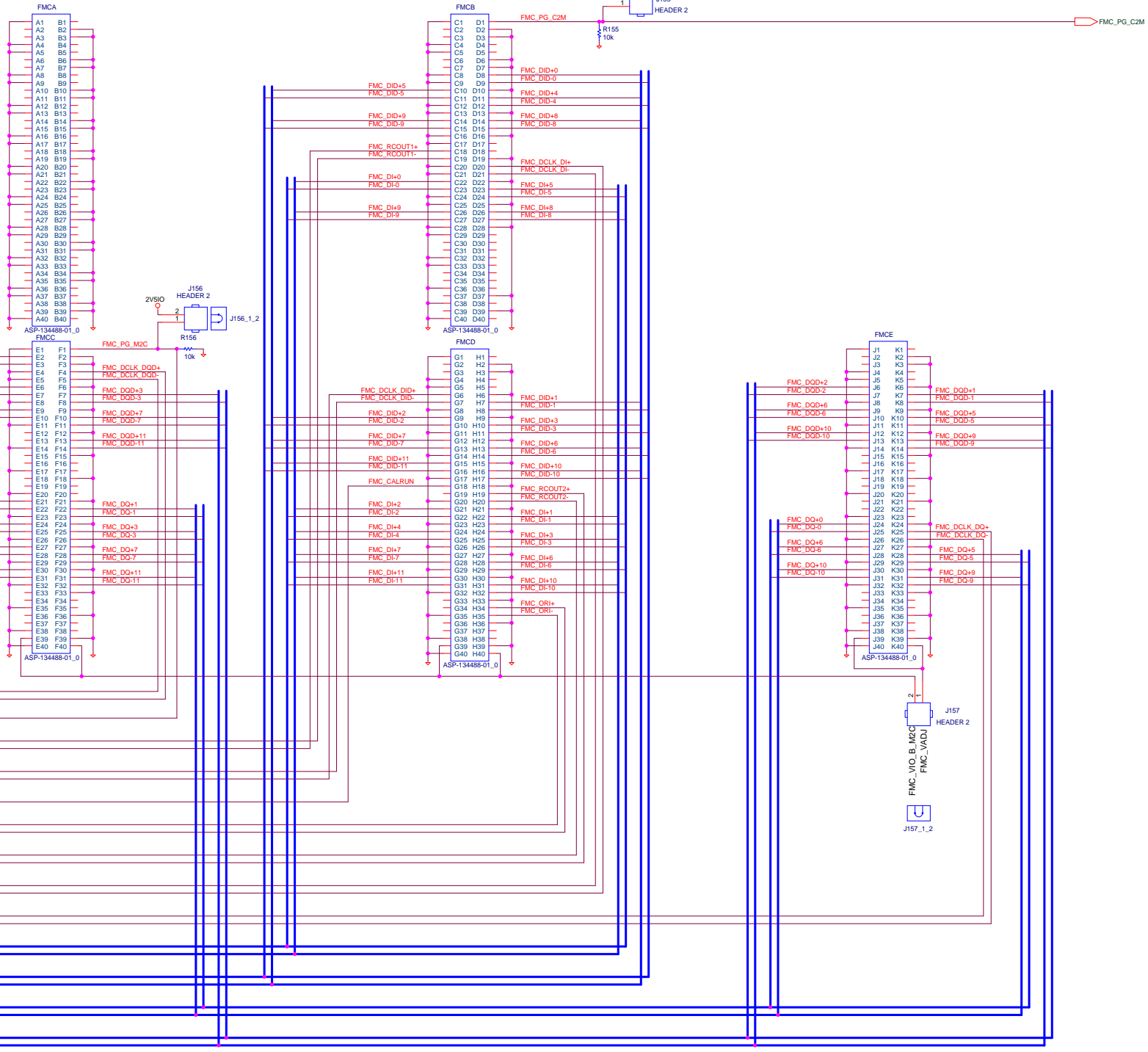
CHECKED: DATE: 11/19/2013

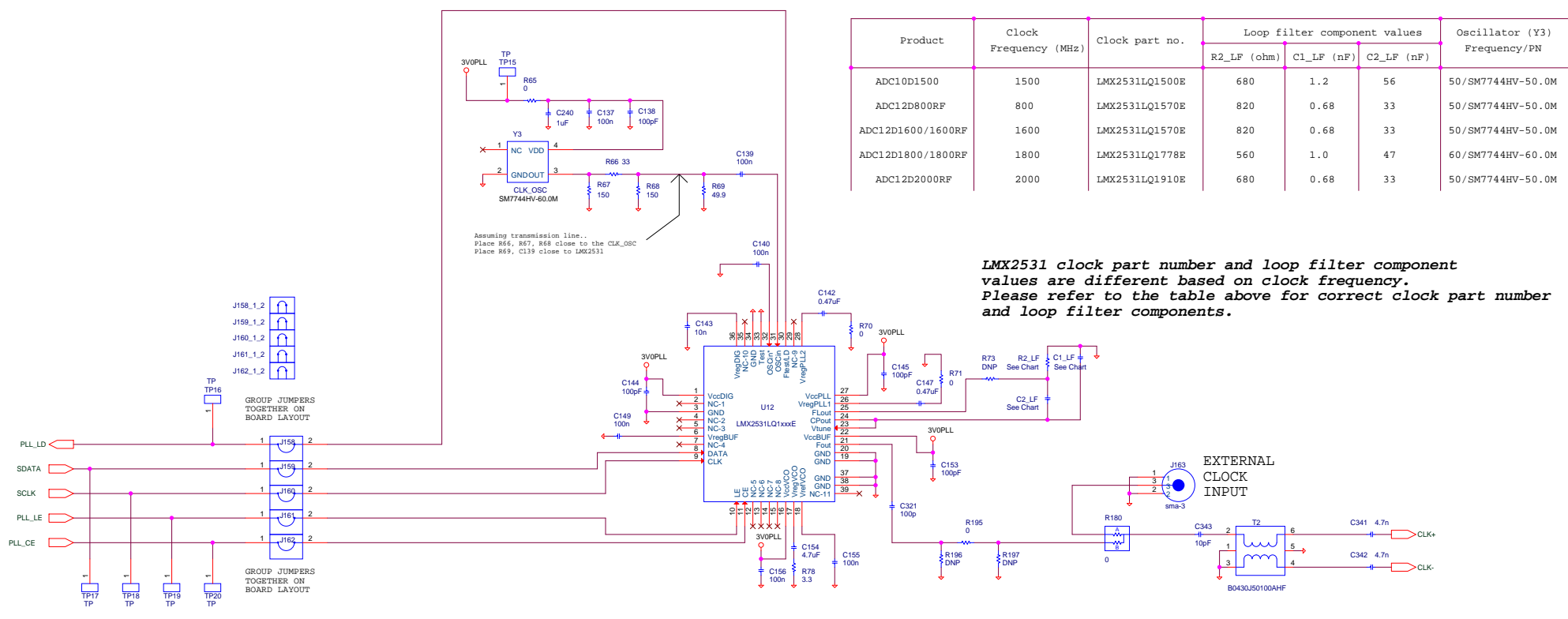
SCHEMATIC REV: **B**

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.

LAST MODIFIED: Monday, January 13, 2014 DOC #: SV900063

Sheet 1 OF 12

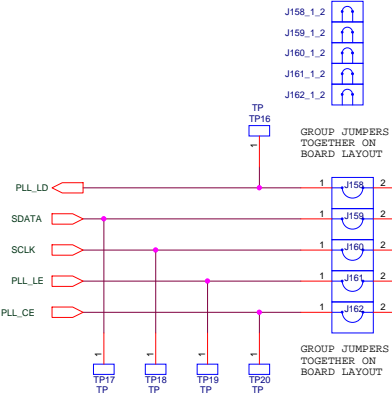




Product	Clock Frequency (MHz)	Clock part no.	Loop filter component values			Oscillator (Y3) Frequency/PN
			R2_LF (ohm)	C1_LF (nF)	C2_LF (nF)	
ADC10D1500	1500	LMX2531LQ1500E	680	1.2	56	50/SM7744HV-50.0M
ADC12D800RF	800	LMX2531LQ1570E	820	0.68	33	50/SM7744HV-50.0M
ADC12D1600/1600RF	1600	LMX2531LQ1570E	820	0.68	33	50/SM7744HV-50.0M
ADC12D1800/1800RF	1800	LMX2531LQ1778E	560	1.0	47	60/SM7744HV-60.0M
ADC12D2000RF	2000	LMX2531LQ1910E	680	0.68	33	50/SM7744HV-50.0M

LMX2531 clock part number and loop filter component values are different based on clock frequency. Please refer to the table above for correct clock part number and loop filter components.

Assuming transmission line...
Place R66, R67, R68 close to the CLK_OSC
Place R69, C139 close to LMX2531



LAYOUT NOTE: FOR CLOCK ROUTING DO NOT USE VIAS (LMX2531 FOUT, EXT CLK) ALL THE WAY TO VIAS AT SOCKET EDGE. AVOID STUBS AND CHOOSE SERIES COMPONENTS TO BE 0402 SIZE WHERE POSSIBLE.

LAYOUT NOTE: Use as short traces as possible from LMX2531-Fout (pin 21) and External Clock Input to VIAs at socket edge

TEXAS INSTRUMENTS

TEXAS INSTRUMENTS
 12500 TI Blvd
 Dallas, Texas 75243
 USA
 (972) 644-5580
 www.ti.com

PROJECT NAME: ADC1xDxxx(RF)RB	PAGE TITLE: Title Page
DESIGNED:	DATE:
DRAWN:	DATE:
CHECKED:	DATE: 11/19/2013
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO TEXAS INSTRUMENTS CORPORATION. USE OR DISCLOSURE WITHOUT WRITTEN PERMISSION IS EXPRESSLY FORBIDDEN. COPYRIGHT 2012.	
LAST MODIFIED: Monday, January 13, 2014 DOC #: SV600863	SCHEMATIC REV: B
	Sheet 1 OF 12

IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Buyers") who are developing systems that incorporate TI semiconductor products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products.

TI reference designs have been created using standard laboratory conditions and engineering practices. **TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.** TI may make corrections, enhancements, improvements and other changes to its reference designs.

Buyers are authorized to use TI reference designs with the TI component(s) identified in each particular reference design and to modify the reference design in the development of their end products. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI REFERENCE DESIGNS ARE PROVIDED "AS IS". TI MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. TI DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO TI REFERENCE DESIGNS OR USE THEREOF. TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY BUYERS AGAINST ANY THIRD PARTY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON A COMBINATION OF COMPONENTS PROVIDED IN A TI REFERENCE DESIGN. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING IN ANY WAY OUT OF TI REFERENCE DESIGNS OR BUYER'S USE OF TI REFERENCE DESIGNS.

TI reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques for TI components are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

Reproduction of significant portions of TI information in TI data books, data sheets or reference designs is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards that anticipate dangerous failures, monitor failures and their consequences, lessen the likelihood of dangerous failures and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in Buyer's safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed an agreement specifically governing such use.

Only those TI components that TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components that have **not** been so designated is solely at Buyer's risk, and Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.