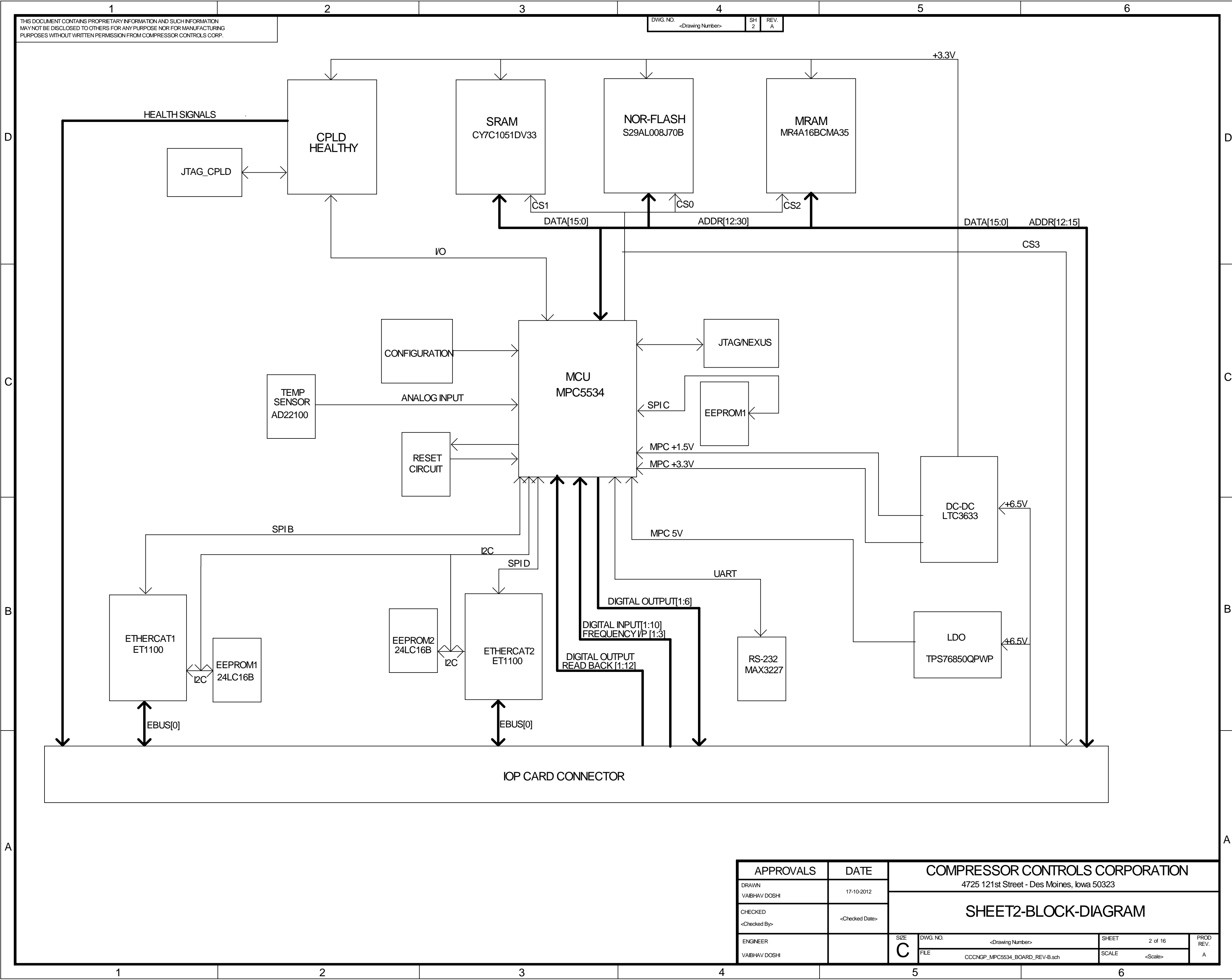
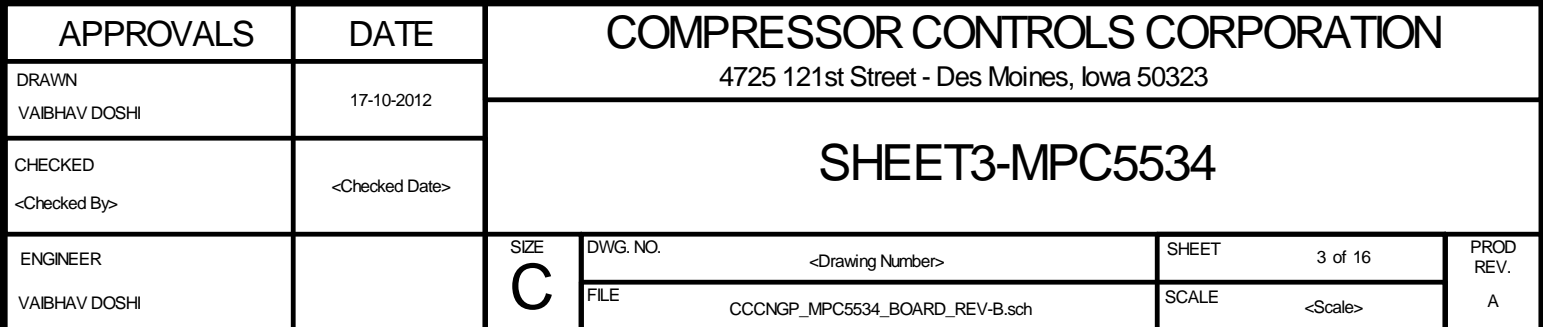


1	2	3	4	5	6																														
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<div>PRODIGY</div> <div>MPC5534 MICROCONTROLLER BOARD</div> <div>REVISION HISTORY</div> <table><thead><tr><th>REV</th><th>DATE</th><th>AUTHOR</th><th>DESCRIPTION/MODIFICATIONS</th></tr></thead><tbody><tr><td>1.0</td><td>29.04.11</td><td>R. Vasavi</td><td>Preliminary release</td></tr><tr><td>1.1</td><td>06.06.11</td><td>R. Vasavi</td><td>Added IOP board connectors Changed the JTAG/Nexus, CPLD & RS232 to right angled type</td></tr><tr><td>1.2</td><td>30.06.11</td><td>R. Vasavi</td><td>Changed the RS232 debug console to RS485 Moved the second SPI EEPOM to IOP board eTPU & eMIOS interfaces support for 16 DI & 16 DO Addition of mictor connectors</td></tr><tr><td>2.0</td><td>3.10.11</td><td>AJM</td><td>Added Termination on ECAT RX Lines Changed value of C218-C220</td></tr><tr><td>A</td><td>12.12.12</td><td>VAIBHAV DOSHI</td><td>Power supply for 1.5V,3.3V,5V changed MPC_CLK signal routed to IOP CPLD Voltage monitoring Op-Amp replaced EEPROM programming through MPC5534 availed MRAM replaced by 4MB MRAM eTPU and eMIOS lines powered by 3.3V Fault_LED circuitry added Programming connector replaced by Board edge type ECAT port 1 used to reduce power consumption</td></tr><tr><td>B</td><td>12.03.13</td><td>VAIBHAV DOSHI</td><td>U39 & U40 buffers added U35 & U36 replaced by inverting buffers CPLD(U9) replaced by 100TQFP package ESC GPIO connections added C15,C332 package changed Dimension change of 3mm on top and bottom edge on PCB R173,R175,R180,R181 added</td></tr></tbody></table>						REV	DATE	AUTHOR	DESCRIPTION/MODIFICATIONS	1.0	29.04.11	R. Vasavi	Preliminary release	1.1	06.06.11	R. Vasavi	Added IOP board connectors Changed the JTAG/Nexus, CPLD & RS232 to right angled type	1.2	30.06.11	R. Vasavi	Changed the RS232 debug console to RS485 Moved the second SPI EEPOM to IOP board eTPU & eMIOS interfaces support for 16 DI & 16 DO Addition of mictor connectors	2.0	3.10.11	AJM	Added Termination on ECAT RX Lines Changed value of C218-C220	A	12.12.12	VAIBHAV DOSHI	Power supply for 1.5V,3.3V,5V changed MPC_CLK signal routed to IOP CPLD Voltage monitoring Op-Amp replaced EEPROM programming through MPC5534 availed MRAM replaced by 4MB MRAM eTPU and eMIOS lines powered by 3.3V Fault_LED circuitry added Programming connector replaced by Board edge type ECAT port 1 used to reduce power consumption	B	12.03.13	VAIBHAV DOSHI	U39 & U40 buffers added U35 & U36 replaced by inverting buffers CPLD(U9) replaced by 100TQFP package ESC GPIO connections added C15,C332 package changed Dimension change of 3mm on top and bottom edge on PCB R173,R175,R180,R181 added		
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<table><tr><td colspan="2">APPROVALS</td><td>DATE</td><td colspan="3">COMPRESSOR CONTROLS CORPORATION</td></tr><tr><td colspan="2">DRAWN VAIBHAV DOSHI</td><td>17-10-2012</td><td colspan="3">4725 121st Street - Des Moines, Iowa 50323</td></tr><tr><td colspan="2">CHECKED <Checked By></td><td><Checked Date></td><td colspan="3">SHEET1-TITLE</td></tr><tr><td colspan="2">ENGINEER VAIBHAV DOSHI</td><td></td><td>SIZE C</td><td>DWG. NO. <Drawing Number></td><td>SHEET 1 of 16</td></tr><tr><td colspan="2"></td><td></td><td>FILE CCCNBP_MPC5534_BOARD_REV-B.sch</td><td>SCALE <Scale></td><td>PROD REV. A</td></tr></table>						APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			DRAWN VAIBHAV DOSHI		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			CHECKED <Checked By>		<Checked Date>	SHEET1-TITLE			ENGINEER VAIBHAV DOSHI			SIZE C	DWG. NO. <Drawing Number>	SHEET 1 of 16				FILE CCCNBP_MPC5534_BOARD_REV-B.sch	SCALE <Scale>	PROD REV. A
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CHECKED <Checked By>		<Checked Date>	SHEET1-TITLE																																
ENGINEER VAIBHAV DOSHI			SIZE C	DWG. NO. <Drawing Number>	SHEET 1 of 16																														
			FILE CCCNBP_MPC5534_BOARD_REV-B.sch	SCALE <Scale>	PROD REV. A																														
1	2	3	4	5	6																														



APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			
DRAWN VAIBHAV DOSHI		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED <Checked By>		<Checked Date>	SHEET2-BLOCK-DIAGRAM			
ENGINEER VAIBHAV DOSHI			SIZE C	DWG. NO. <Drawing Number>	SHEET 2 of 16	PROD REV. A
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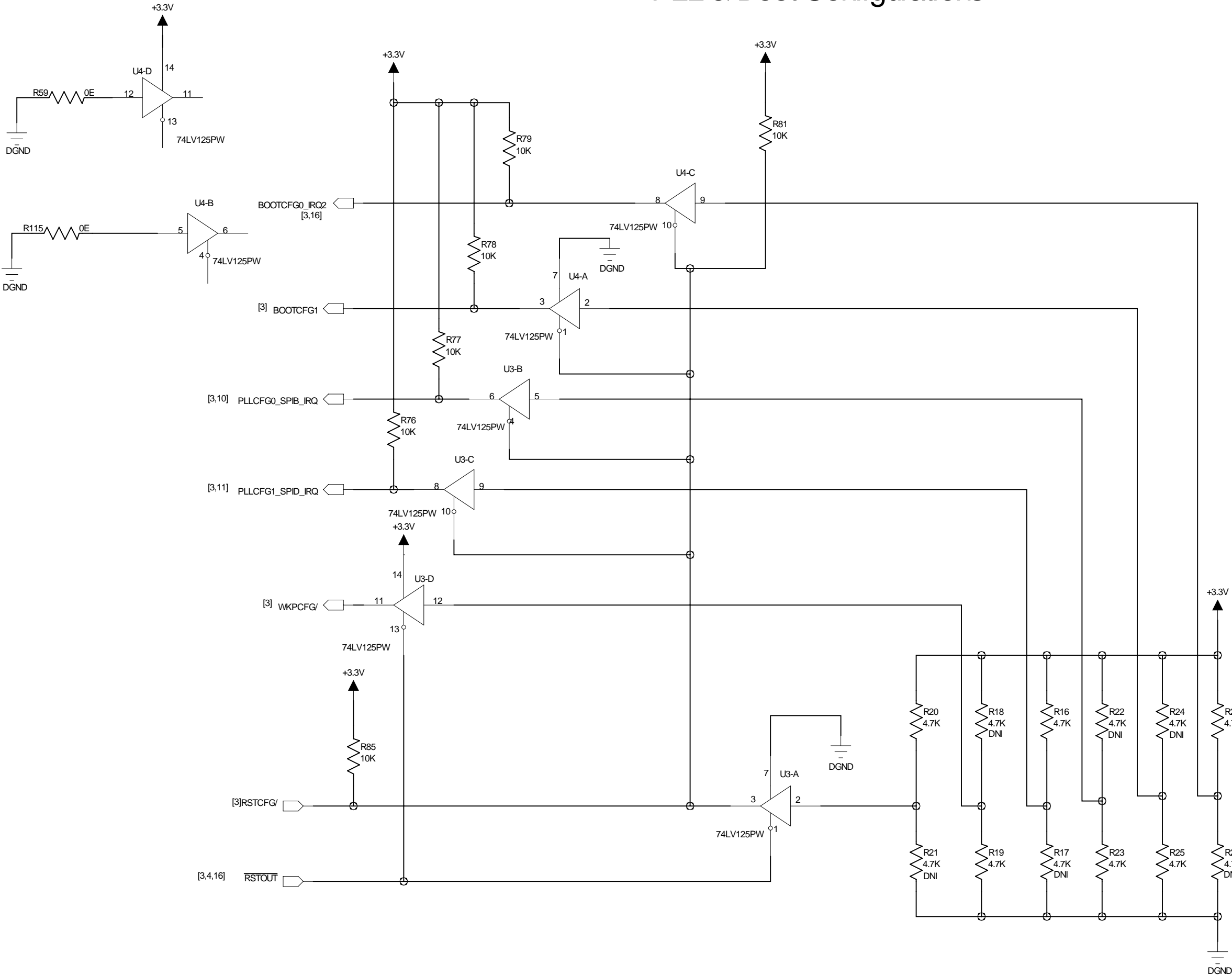
Clock to IOP-CPLD



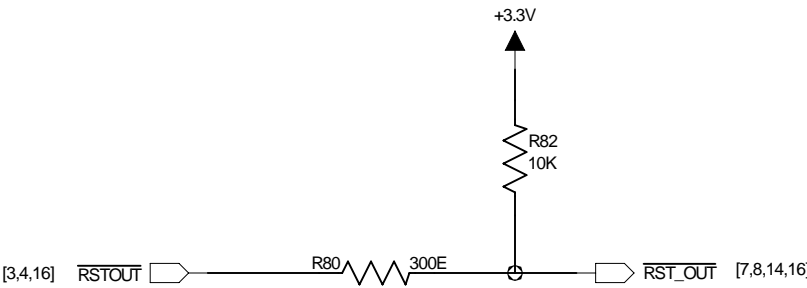
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PLL & Boot Configurations

DWG. NO. <Drawing Number> SH 4 REV. A



Reset Out signal to devices on-board



Configuration Table

RSTCFG	PLLCFG[1:0]	BOOTCFG[1:0]	Description
Load R20 DNI R21	Load R16,R23 DNI R17,R22		Clock Mode-Crystal Reference
Load R21 DNI R20	Load R17,R22 DNI R16,R23		Clock Mode-External Oscillator
Load R21 DNI R20		Load R24,R27 DNI R25,R26	Boot from external FLASH - CS0/
Load R20 DNI R21		Load R25,R26 DNI R24, R27	Boot from internal FLASH

Configurations,
PLLCFG[1:0]= 10, crystal reference is used
BOOTCFG[1:0]=01, internal boot option is selected
RSTCFG=1, Boot from internal flash and clock source is crystal
WKPCFG=0, Weak pull down applied to eTPU and eMIOS pins at reset

APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			
DRAWN VAIBHAV DOSHI		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED <Checked By>		<Checked Date>	SHEET4-MPC-CONFIGURATIONS			
ENGINEER VAIBHAV DOSHI			SIZE C	DWG. NO. <Drawing Number>	SHEET 4 of 16	PROD REV. A
			FILE CCCNBP_MPC5534_BOARD_REV-B.sch	SCALE <Scale>		

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DWG. NO.
<Drawing Number>

SH
5

REV.
A

FIDUCIALS

FD1

FD2

FD3

FD4

FD5

FD6

MOUNTING HOLES

MH1

MH2

MH3

MH4

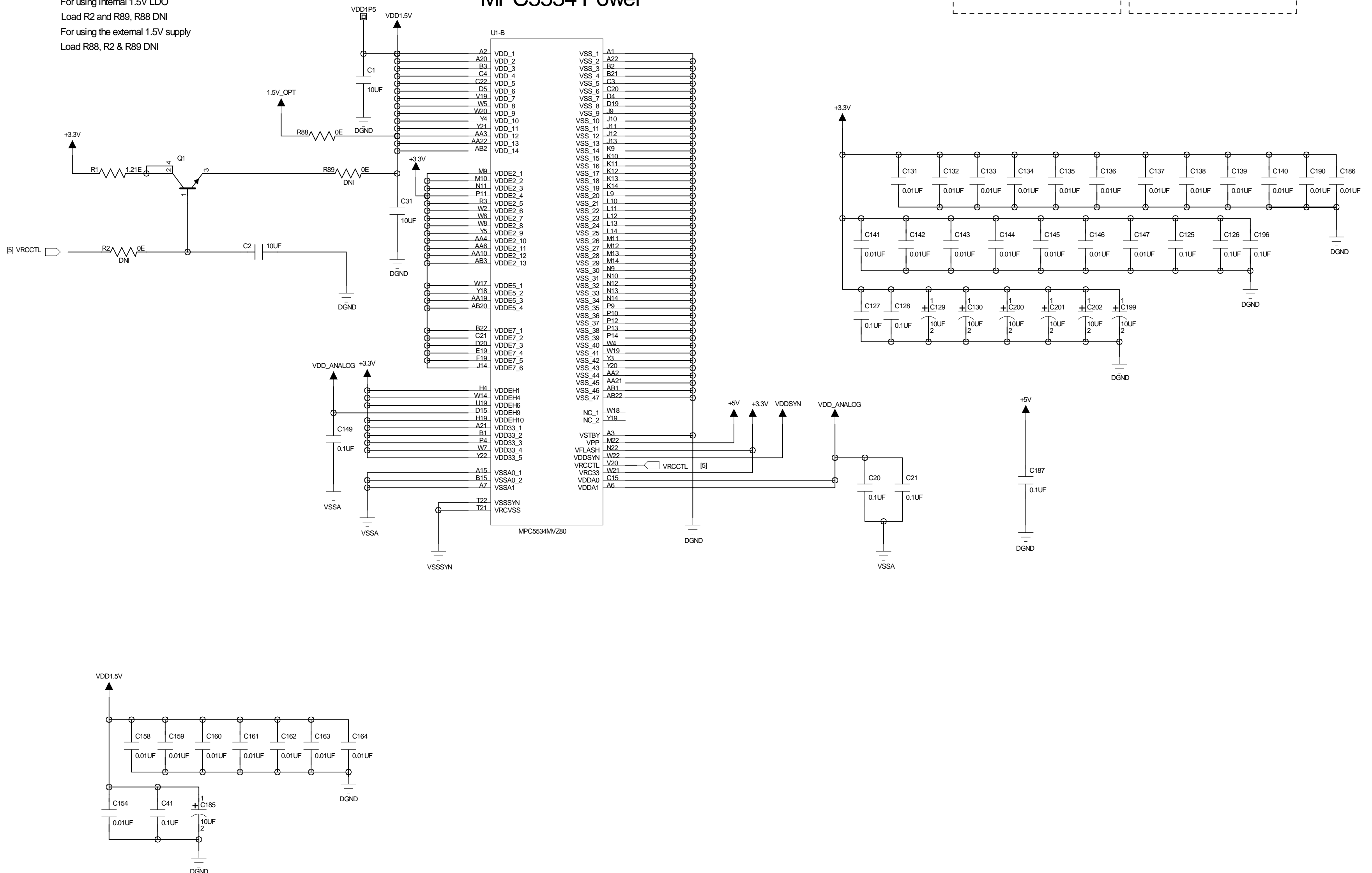
MPC5534 Power

For using internal 1.5V LDO

Load R2 and R89, R88 DNI

For using the external 1.5V supply

Load R88, R2 & R89 DNI



APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			
DRAWN		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED		<Checked Date>	SHEET5-MPC5534_POWER			
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VAIBHAV DOSHI			C	<Drawing Number>	5 of 16	A
			FILE	CCCNPG_MPC5534_BOARD_REV-B.sch	SCALE	<Scale>

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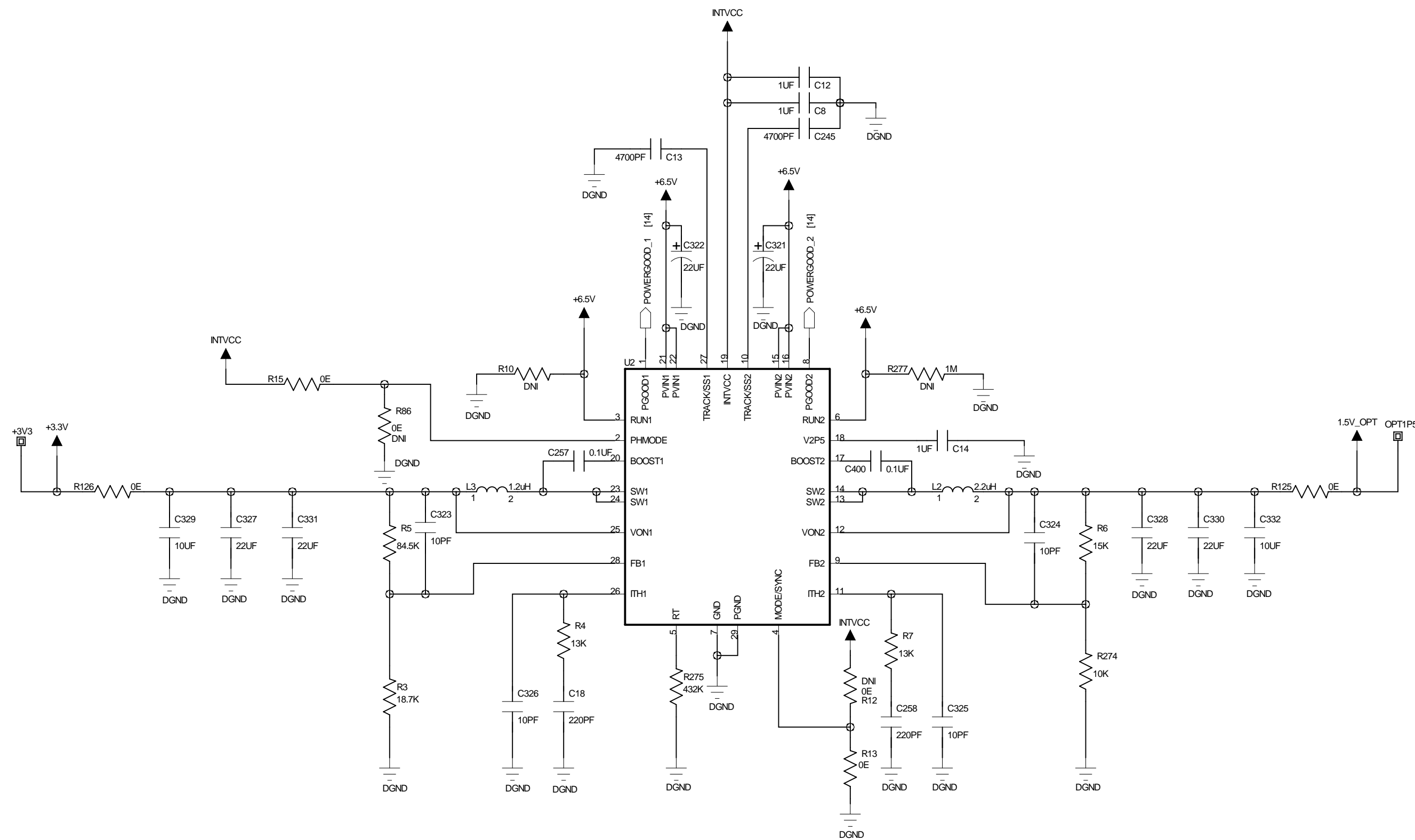
SH

6

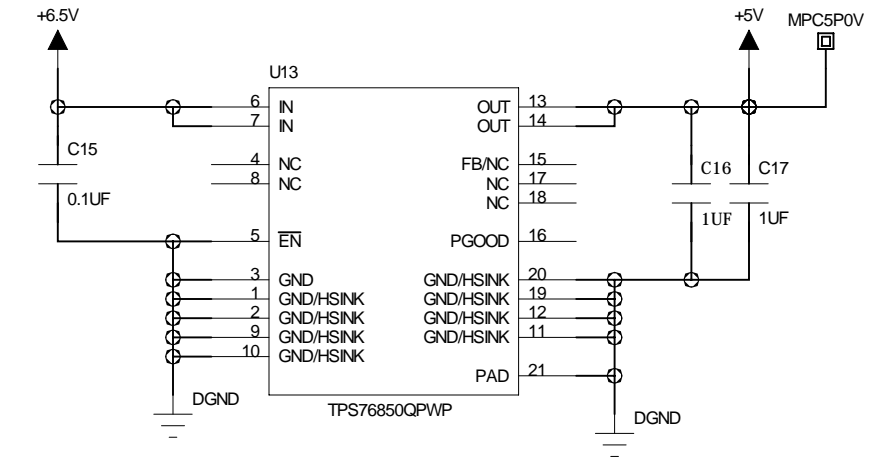
REV.

A

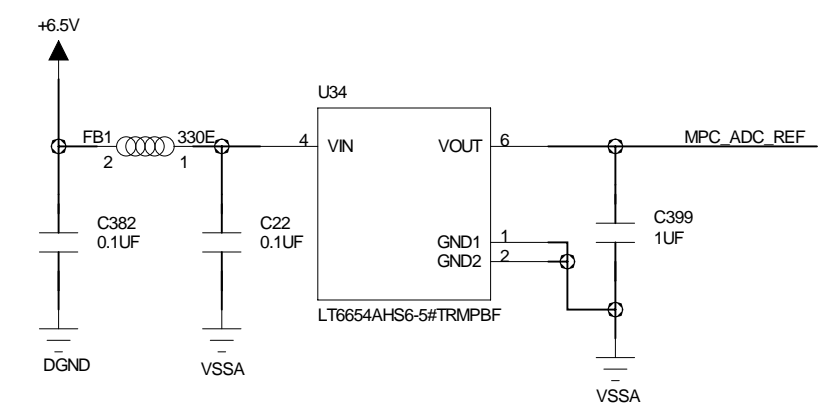
DC-DC CONVERTER-3.3v,1.5v



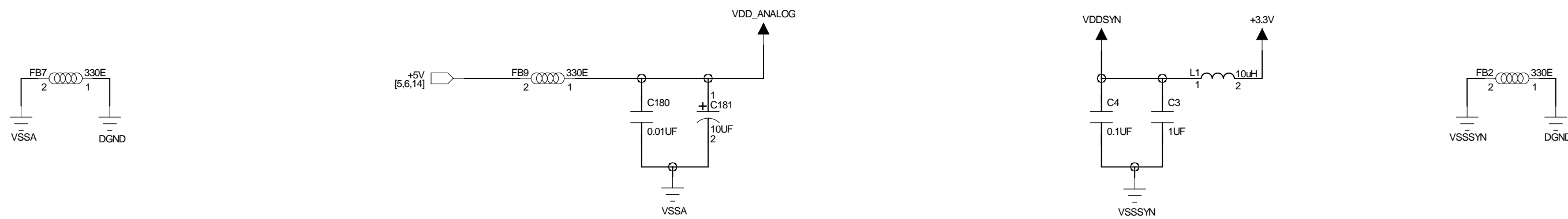
LDO-5V



5V REFERENCE



Analog Reference Voltage



APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			
DRAWN		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED		<Checked Date>	SHEET6-POWER_SUPPLY			
ENGINEER			SIZE	DWG. NO.	SHEET	6 of 16
VAIBHAV DOSHI			C	<Drawing Number>	SCALE	<Scale>
			FILE	CCNGP_MPC5534_BOARD_REV-B.sch	PROD REV.	A

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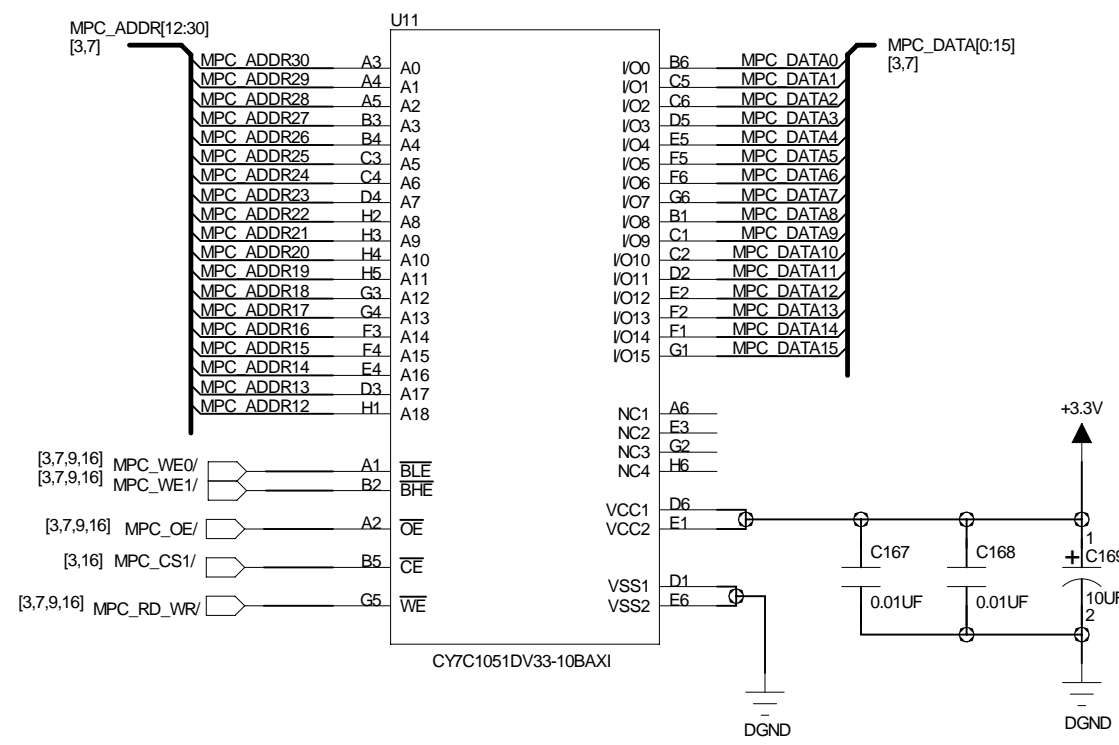
SH

7

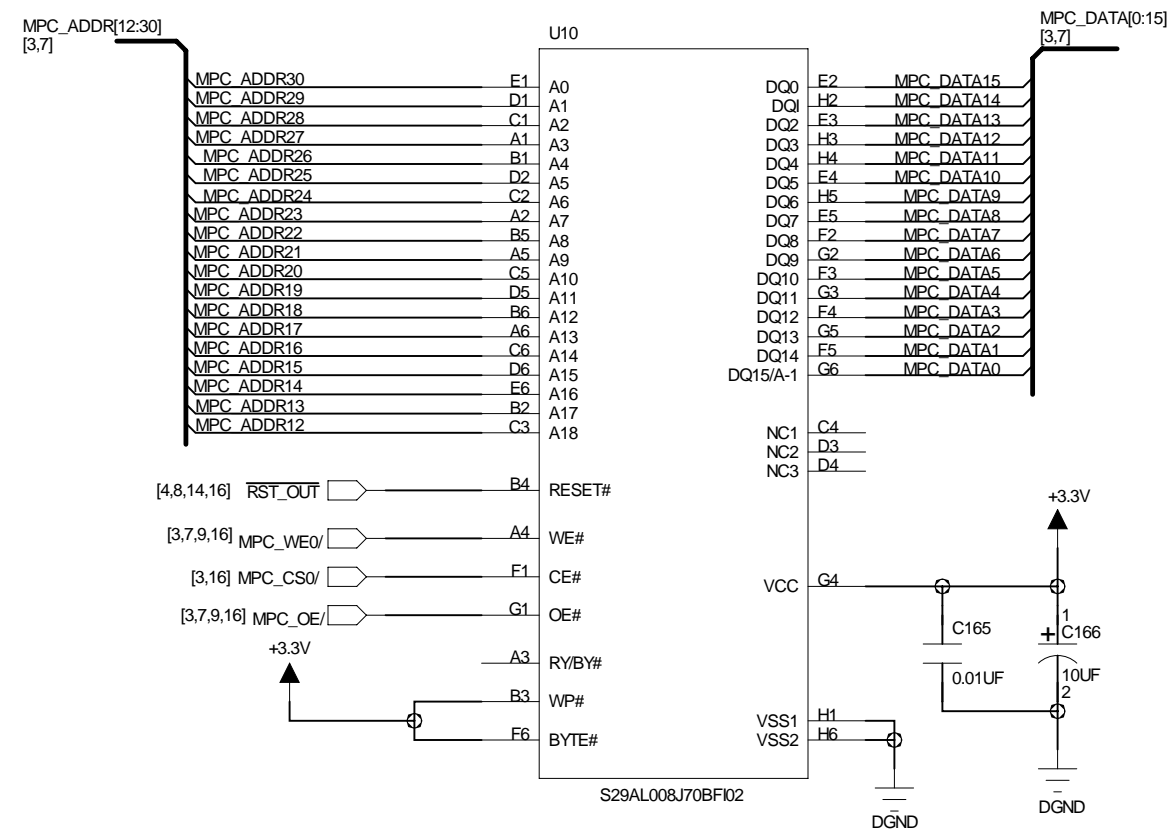
REV.

A

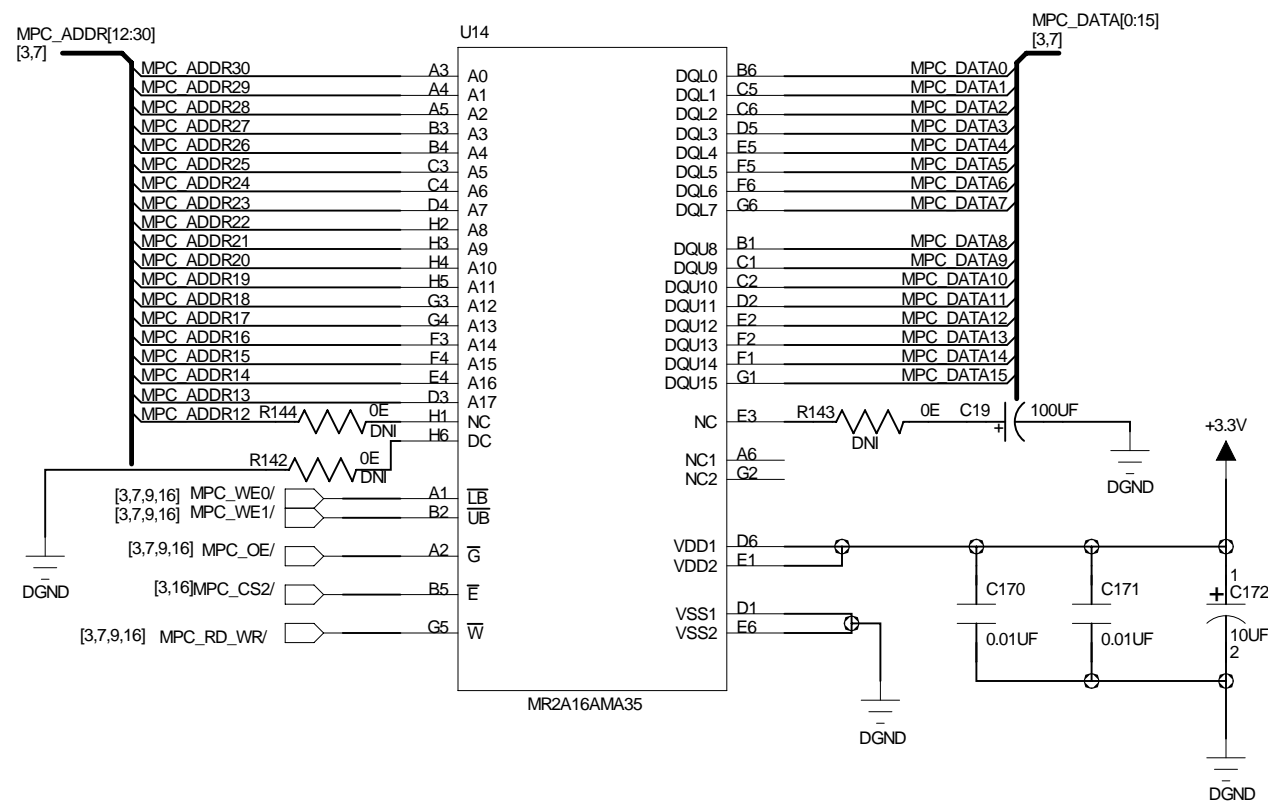
SRAM



NOR-FLASH



MRAM



Note: Footprint is compatible to nvSRAM and 16M MRAM
LOAD R143 for nvSRAM CY14B104NA

APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			
DRAWN		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED		<Checked By>	SHEET7-NOR_FLASH,SRAM,MRAM			
ENGINEER			SIZE	DWG. NO.	SHEET	PROD REV.
VAIBHAV DOSHI			C	<Drawing Number>	7 of 16	A
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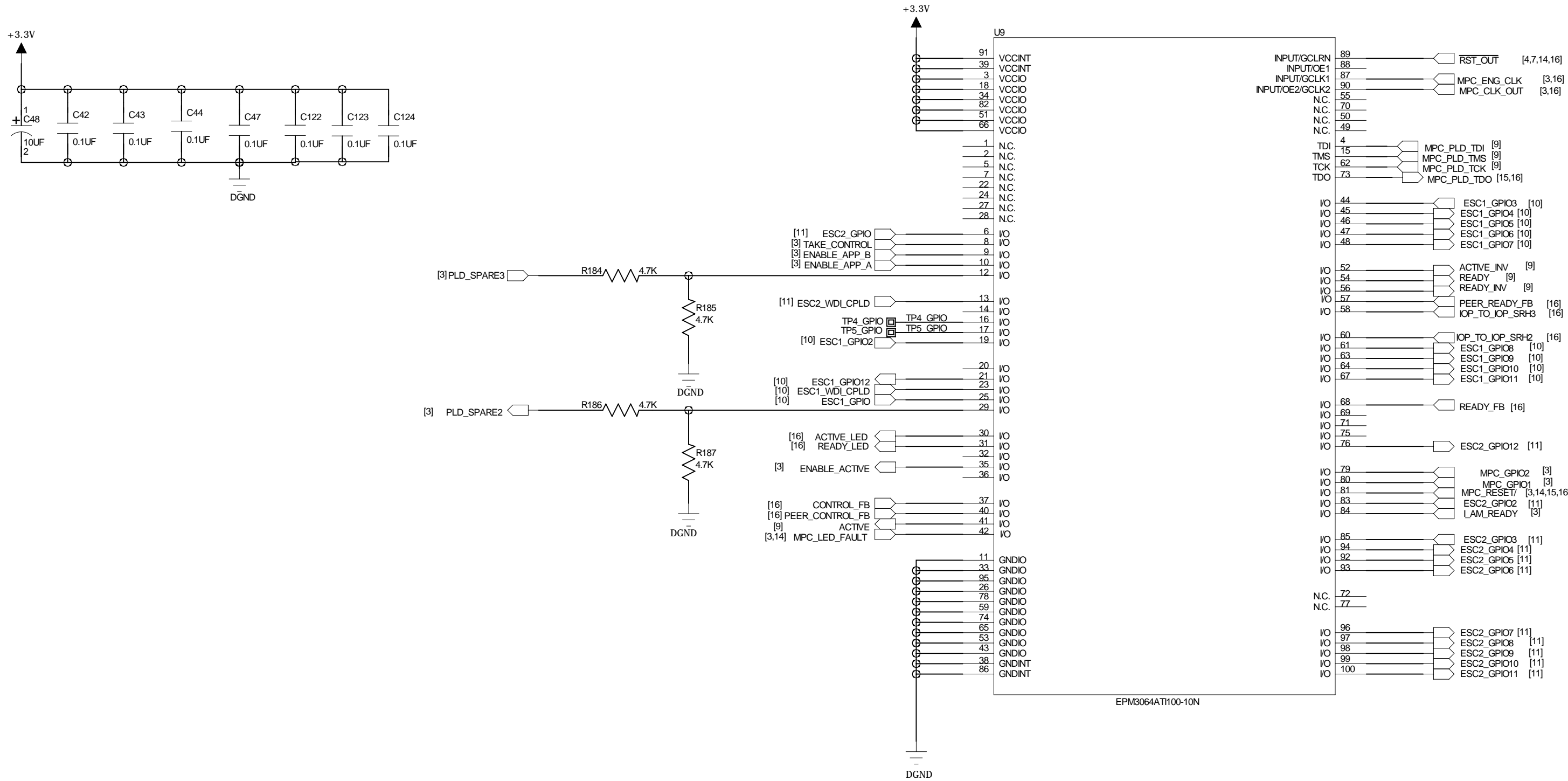
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DWG. NO.
<Drawing Number>

SH
8

REV.
A

Health monitor CPLD



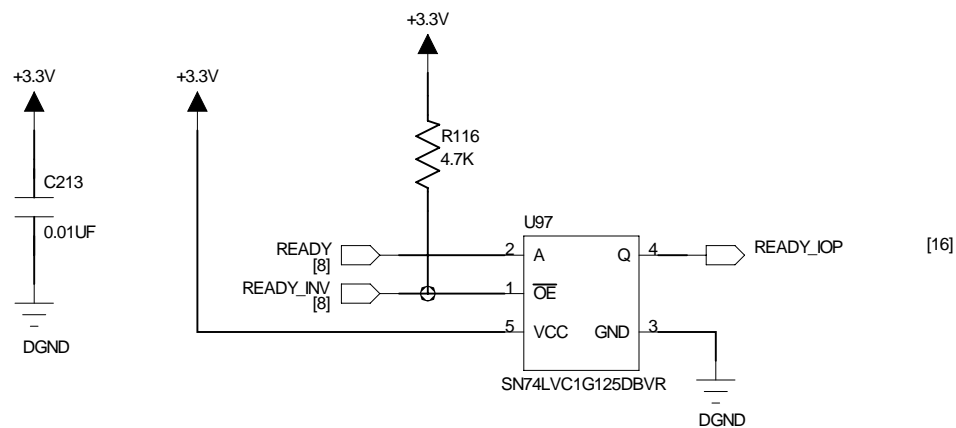
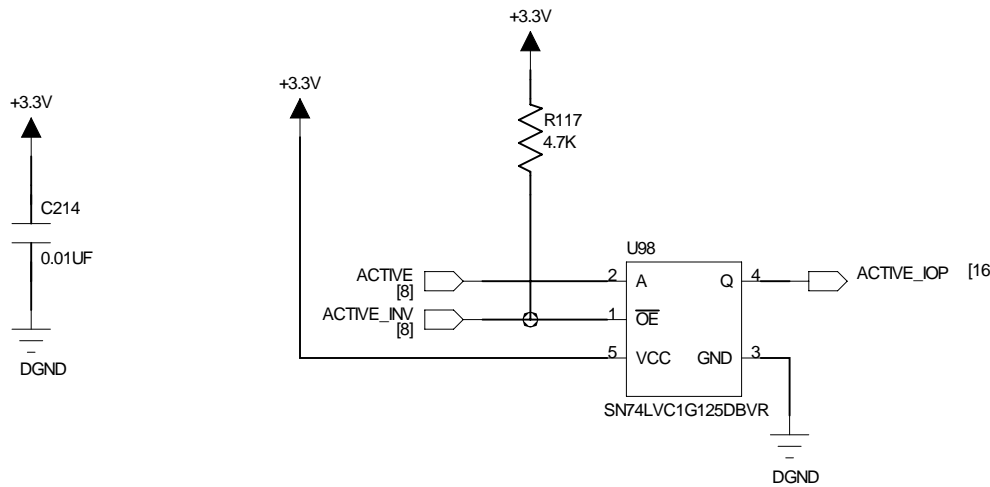
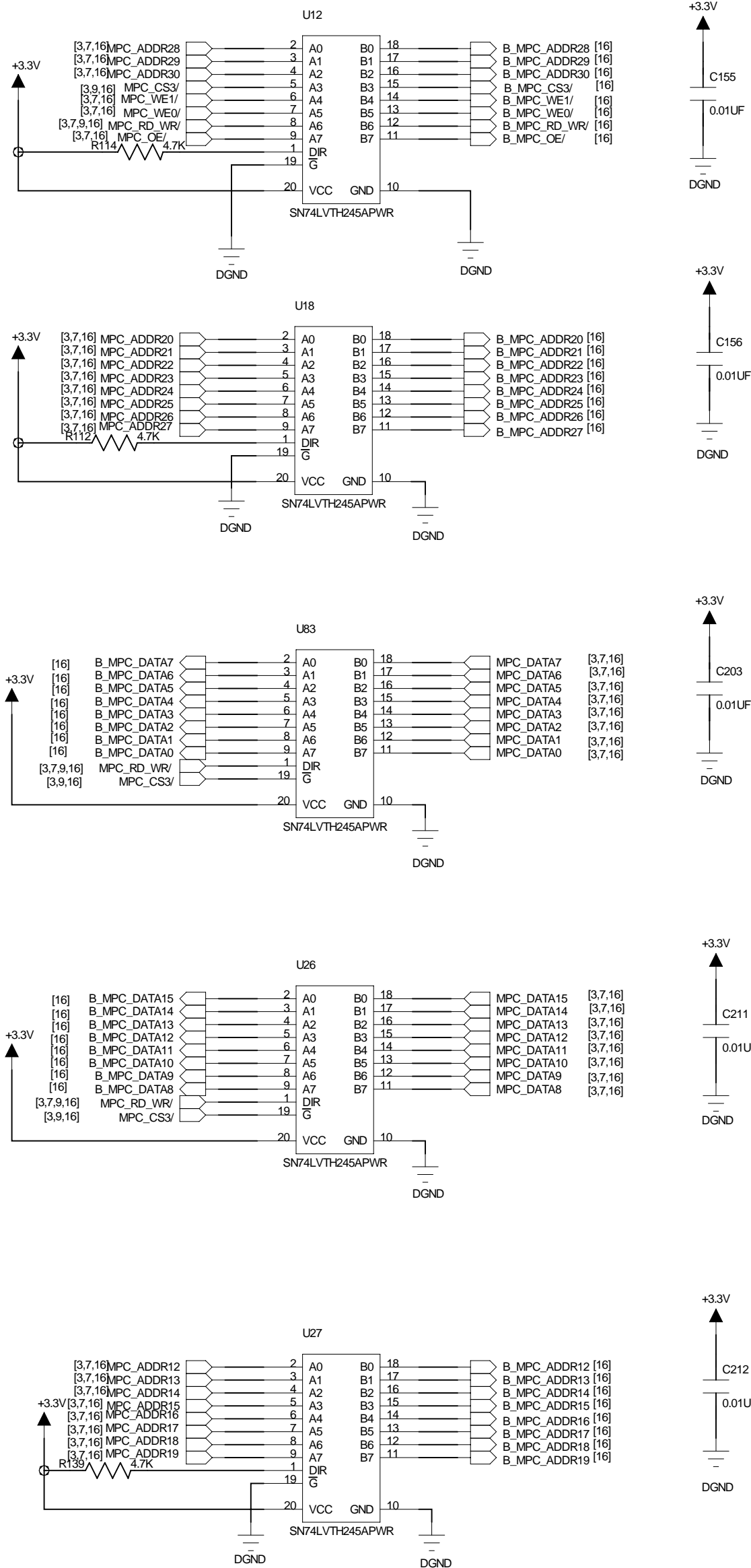
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DRAWN VAIBHAV DOSHI		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED <Checked By>		<Checked Date>	SHEET8-CPLD			
ENGINEER VAIBHAV DOSHI			SIZE C	DWG. NO. <Drawing Number>	SHEET 8 of 16	PROD REV. A
			FILE CCCNCP_MPC5534_BOARD_REV-B.sch	SCALE <Scale>		

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DWG. NO. <Drawing Number> SH 9 REV. A

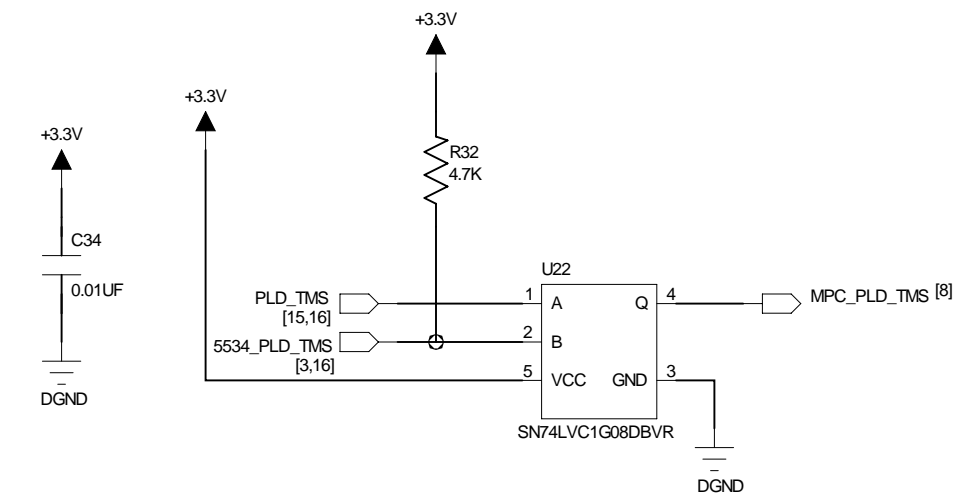
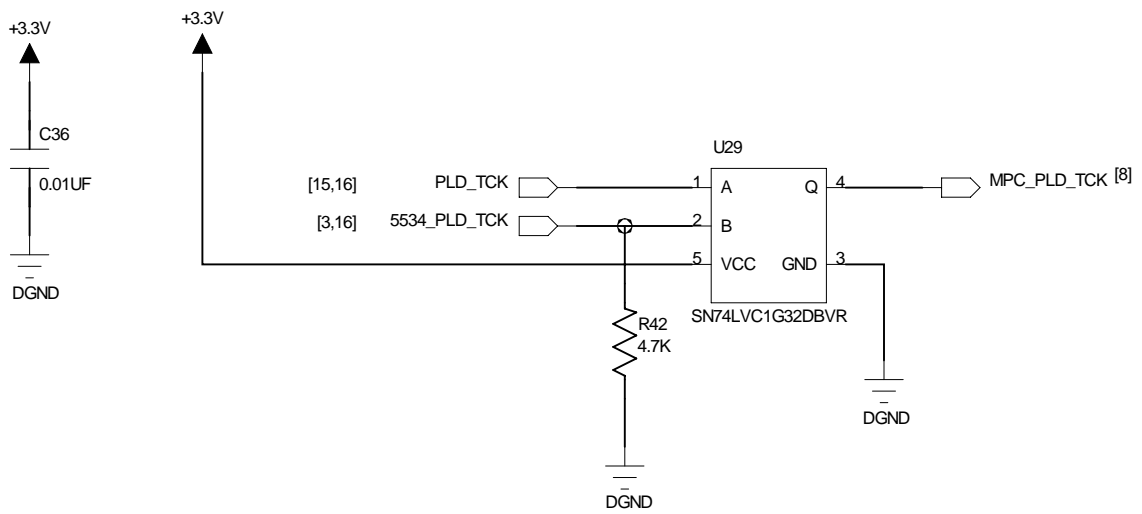
Buffers on MPC Addr, data bus going to connector

Buffers for Health signals

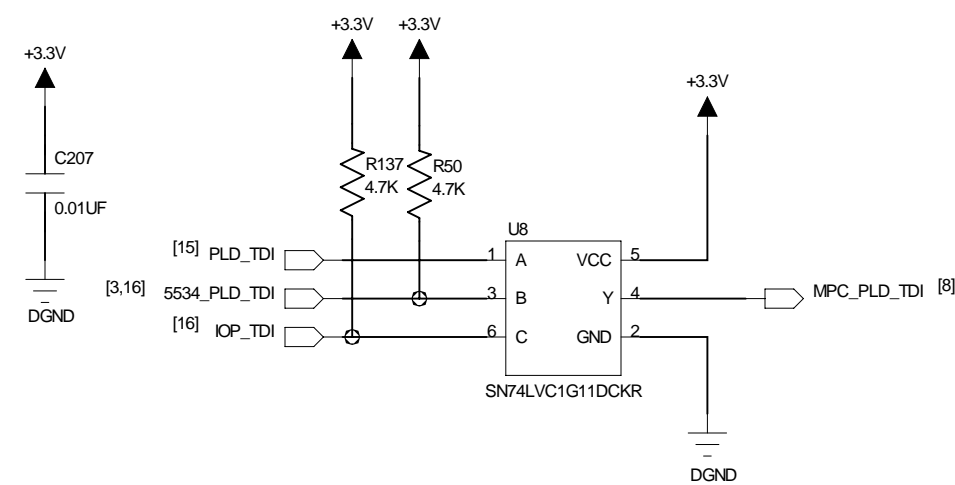
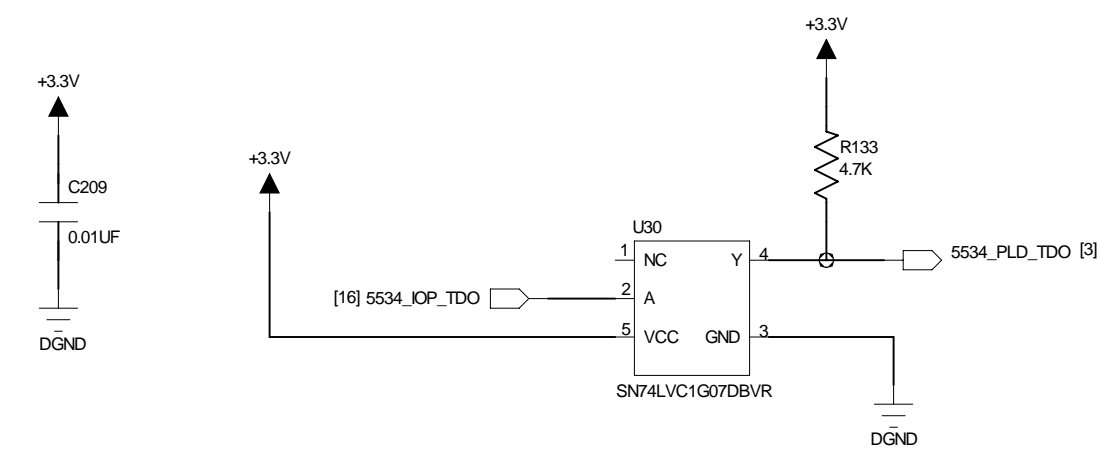


TCK signal generation

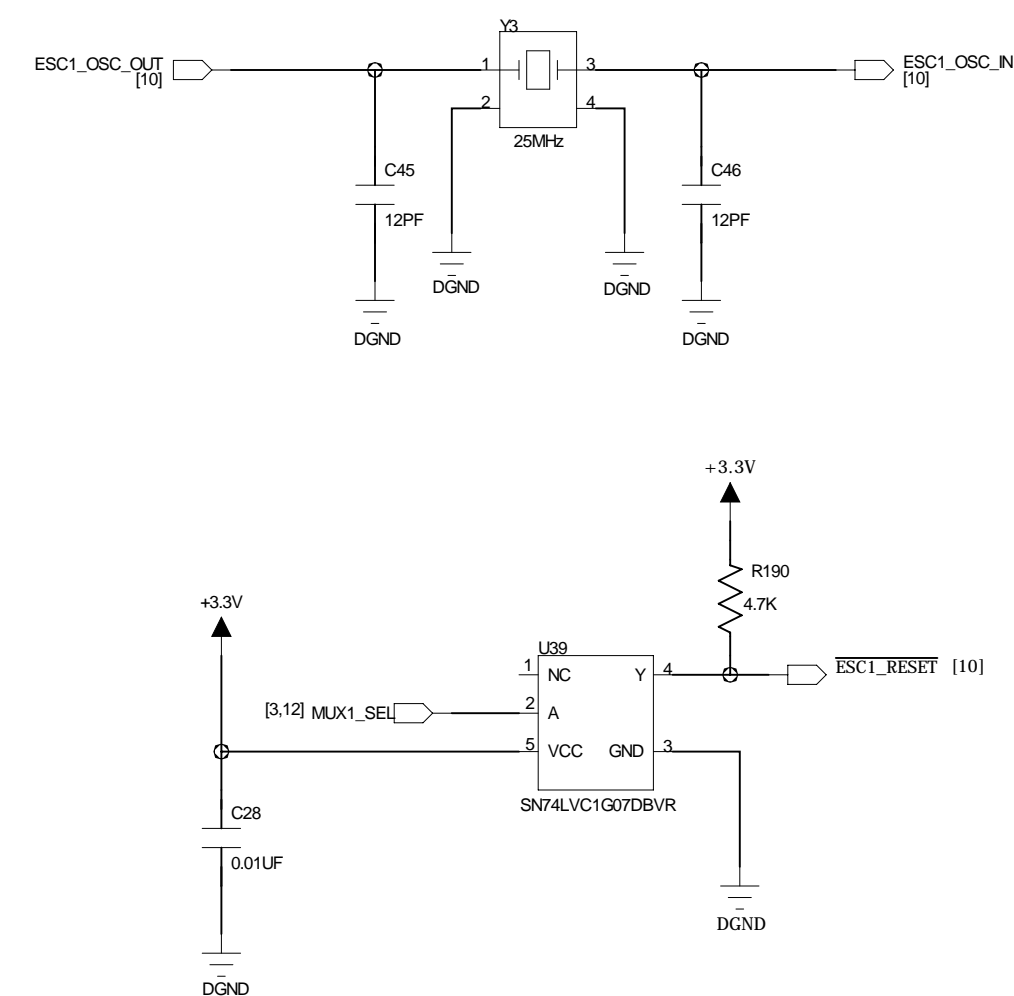
TMS signal generation



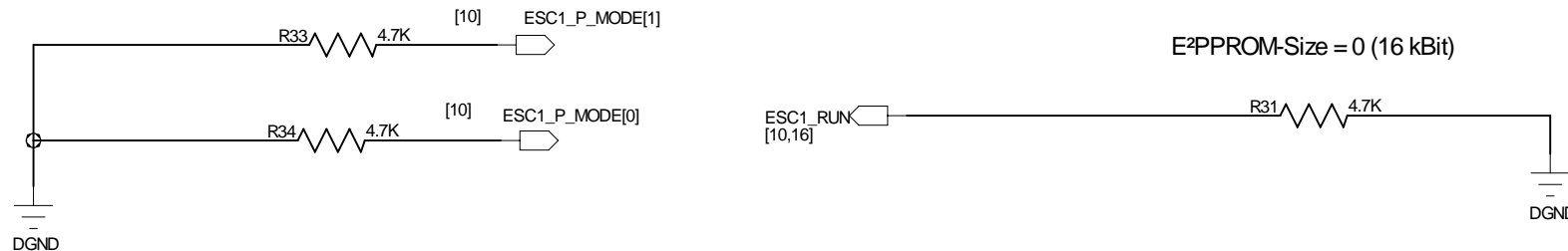
TDI signal generation



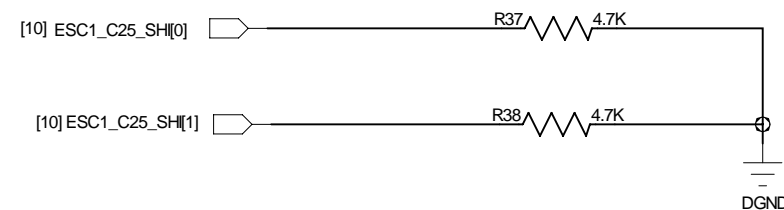
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DRAWN		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED		<Checked Date>	SHEET9-EBI_BUFFERS			
ENGINEER			SIZE	DWG. NO.	SHEET	PROD
VAIBHAV DOSHI			C	<Drawing Number>	9 of 16	REV.
			FILE	CCCNCP_MPC5534_BOARD_REV-B.sch	SCALE	A



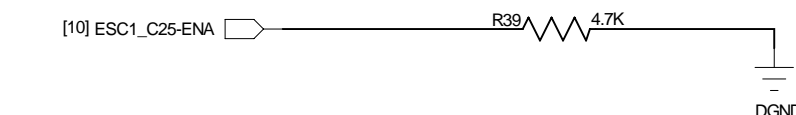
PHY offset address = 0 (unused)




Link Polarity = 0 (unused)



Digital I/O control status signals not moved (unused)



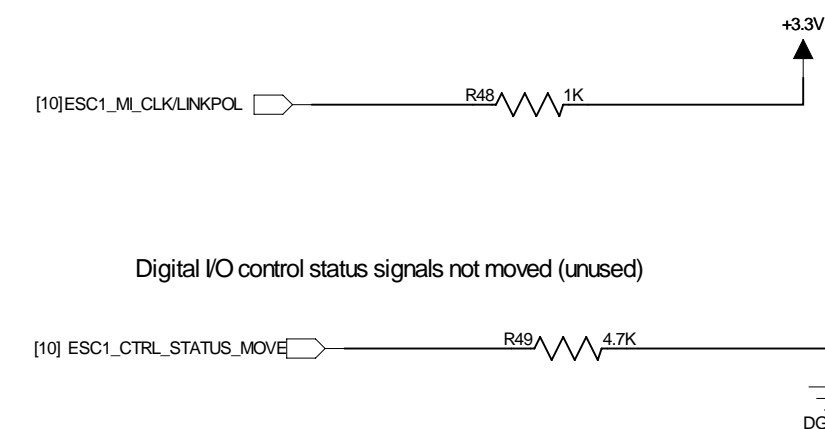
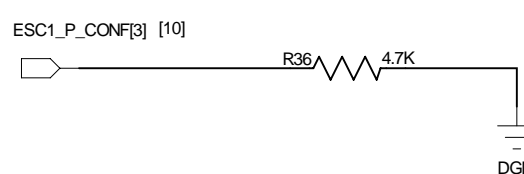
Transparent Mode disabled (TRANS_MODE_ENA = 0)



[10] ESC1_TRANSMODE-ENA

4.7K

DGN1

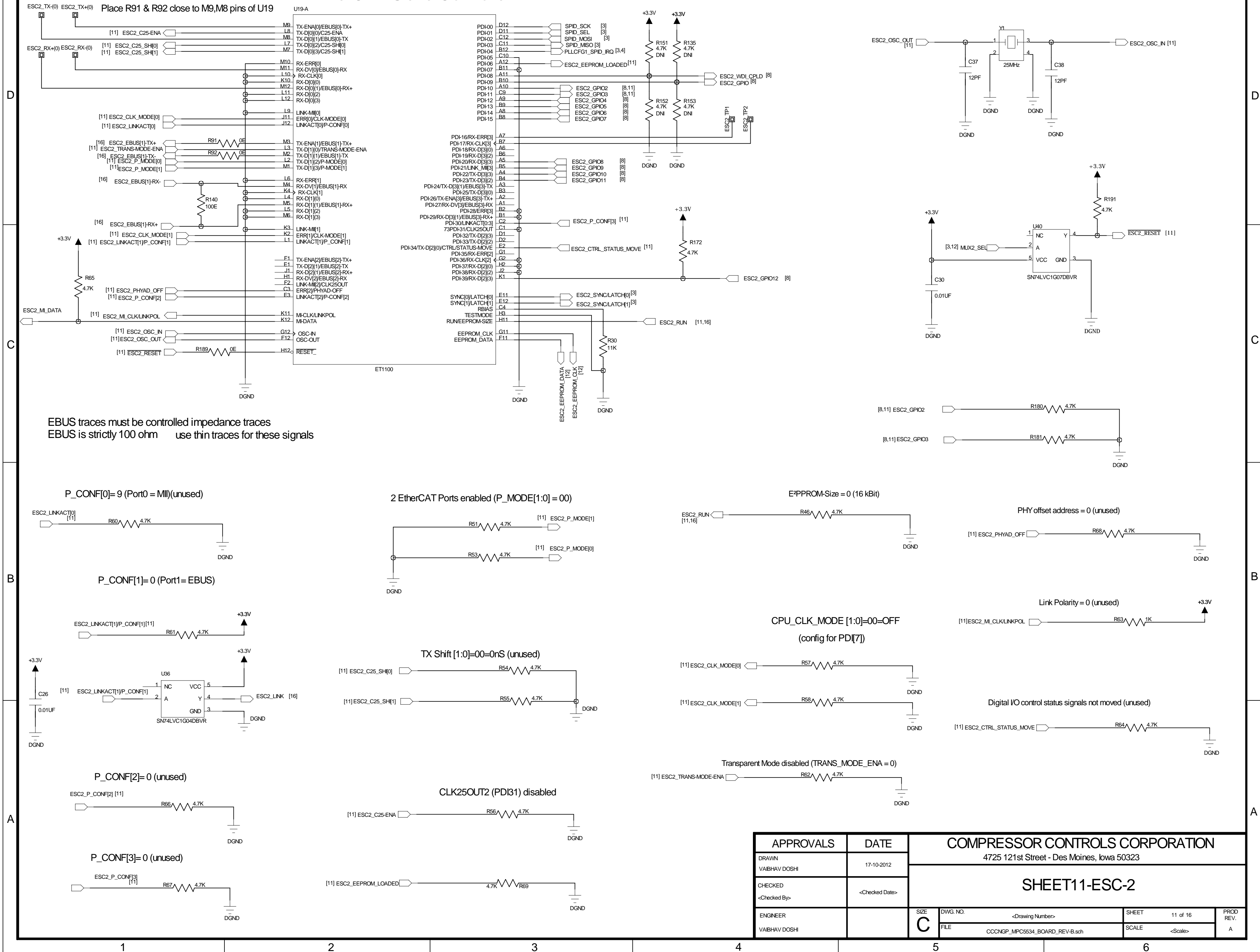


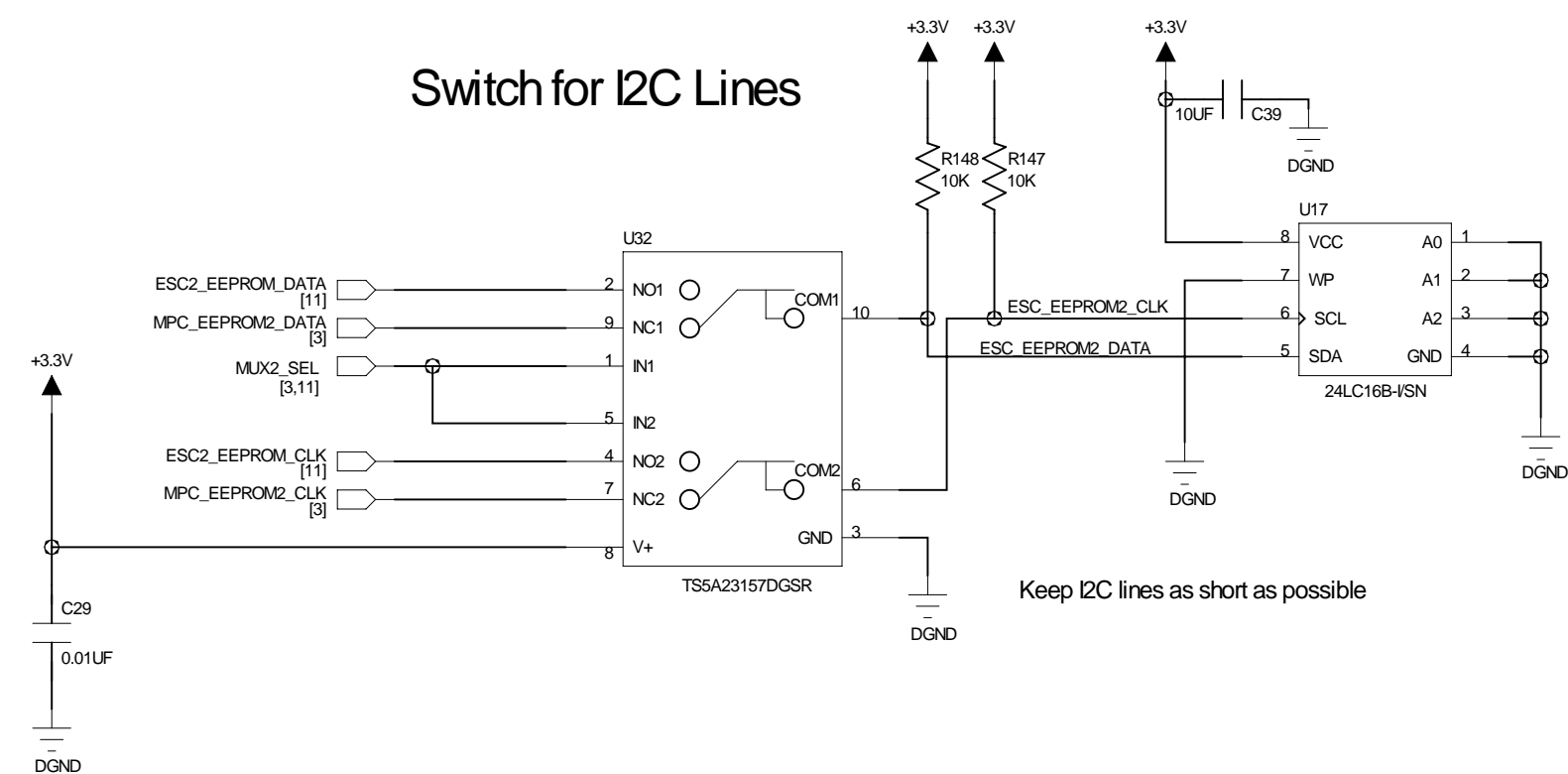
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DRAWN VAIBHAV DOSHI		17-10-2012		4725 121st Street - Des Moines, Iowa 50323			
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ENGINEER VAIBHAV DOSHI				SIZE C	DWG. NO. <Drawing Number>	SHEET 10 of 16	PROD REV.
				FILE CCCNCP_MPC5534_BOARD_REV-B.sch	SCALE <Scale>	A	

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EtherCAT Slave Controller 2

DWG. NO. <Drawing Number> SH 11 REV. A

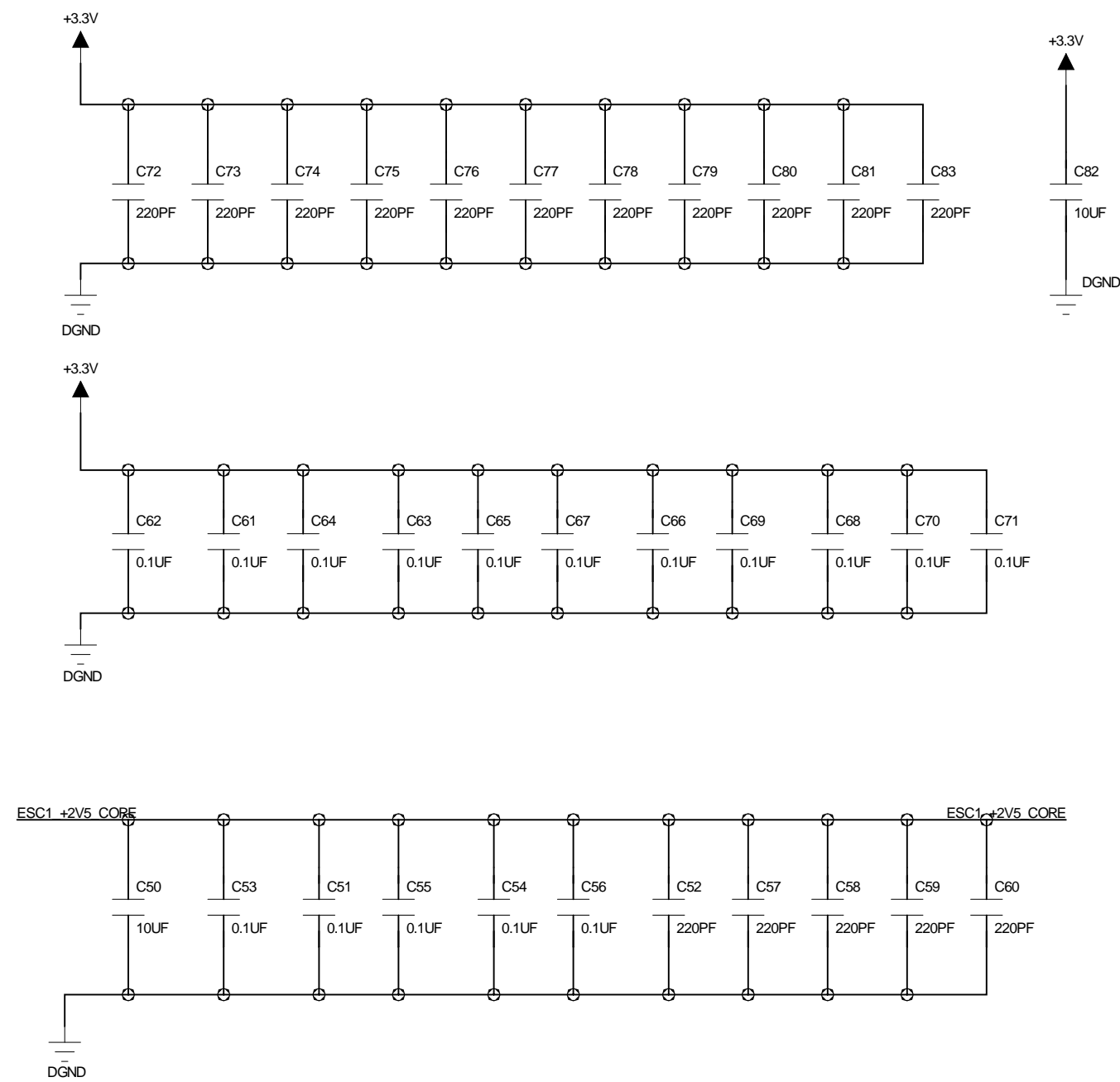




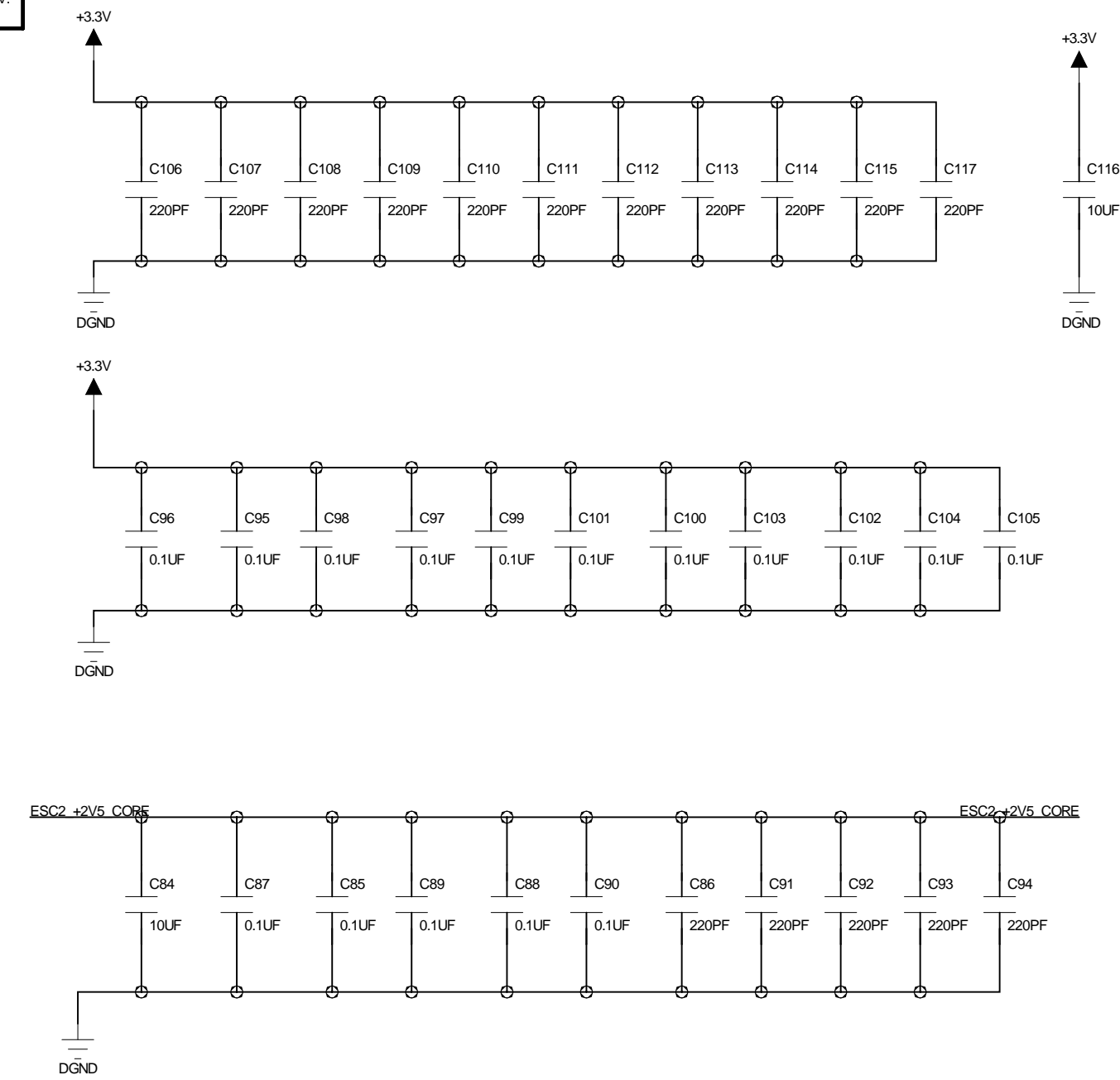
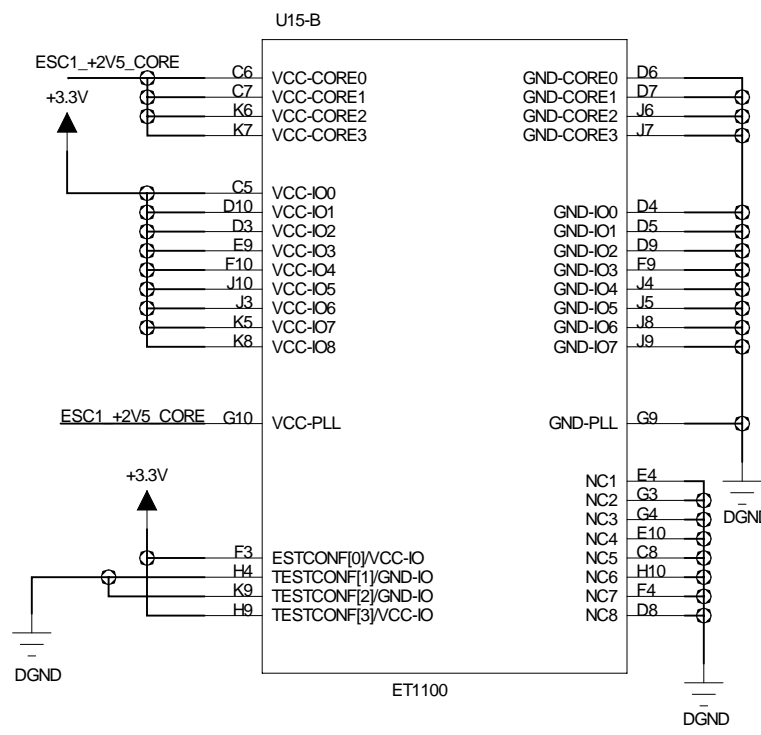
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DRAWN VAIBHAV DOSHI		17-10-2012		4725 121st Street - Des Moines, Iowa 50323				
CHECKED <Checked By>		<Checked Date>		SHEET12-ET1100_EEPROMS				
ENGINEER VAIBHAV DOSHI		SIZE C	DWG. NO. FILE	<Drawing Number> CCONGP_MPC5534_BOARD_REV-B.sch		SHEET SCALE	12 of 16 <Scale>	PROD REV. A

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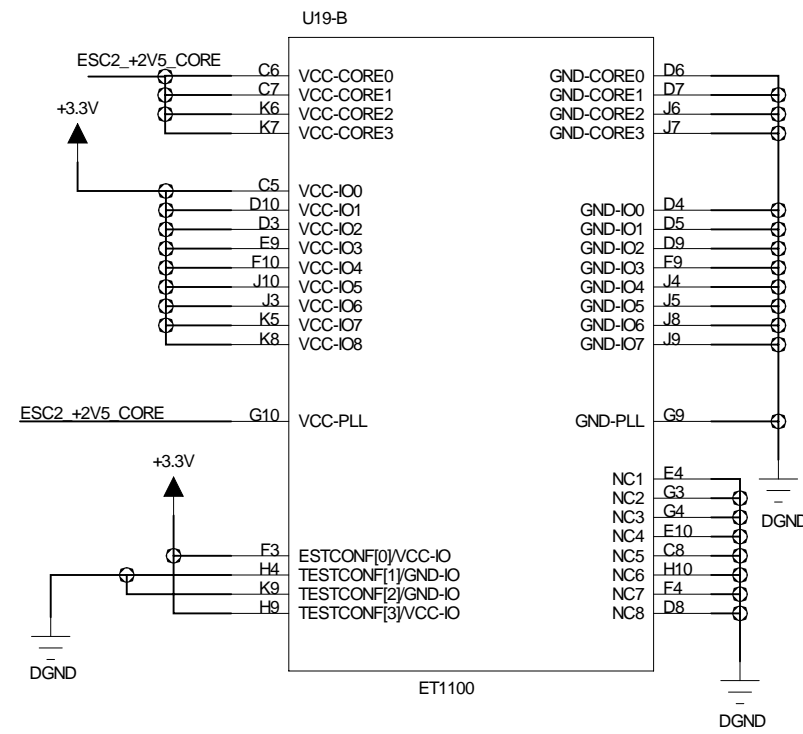
DWG. NO. <Drawing Number> SH 13 REV. A



EtherCAT Slave Controller 1- Power



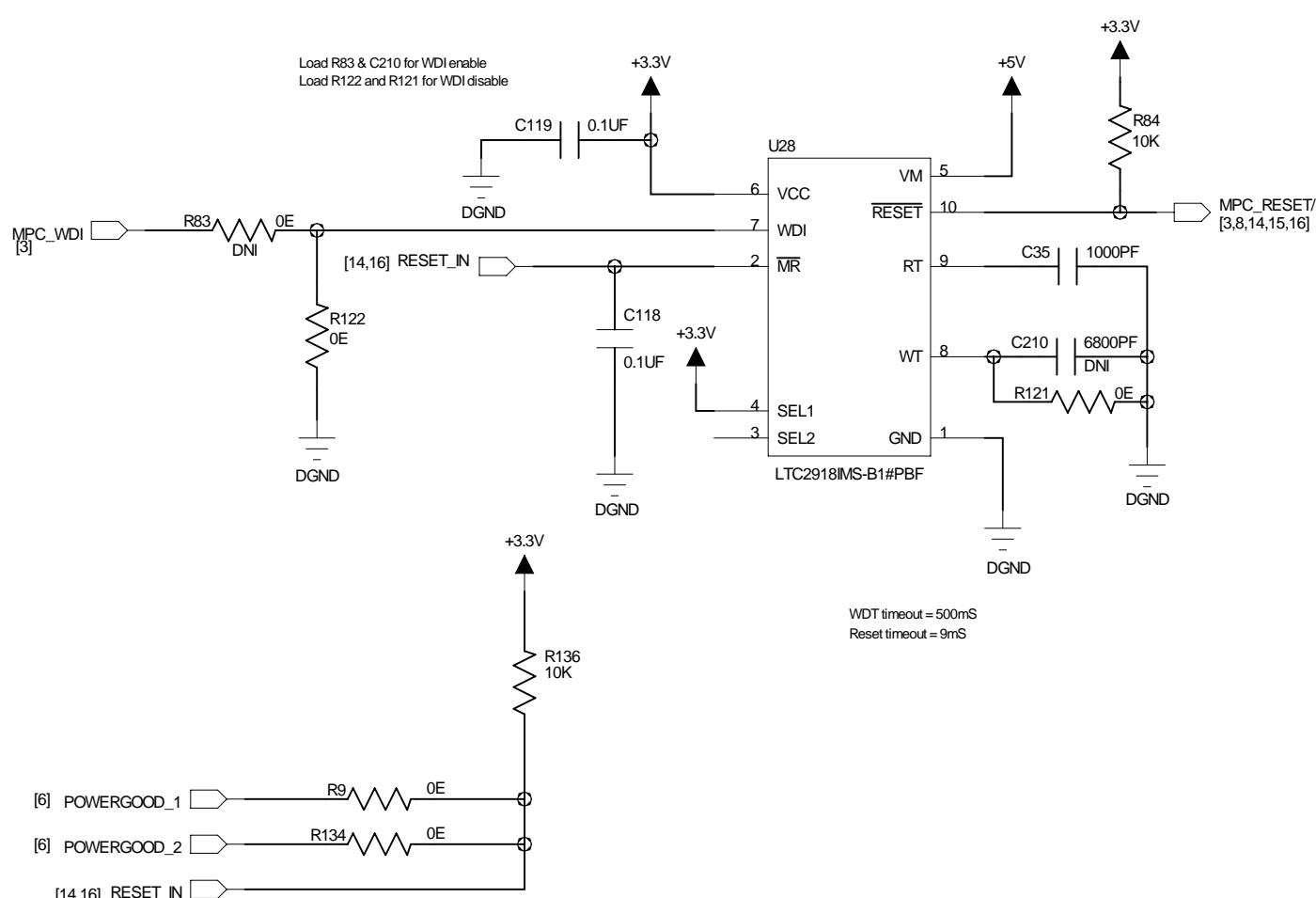
EtherCAT Slave Controller 2- Power



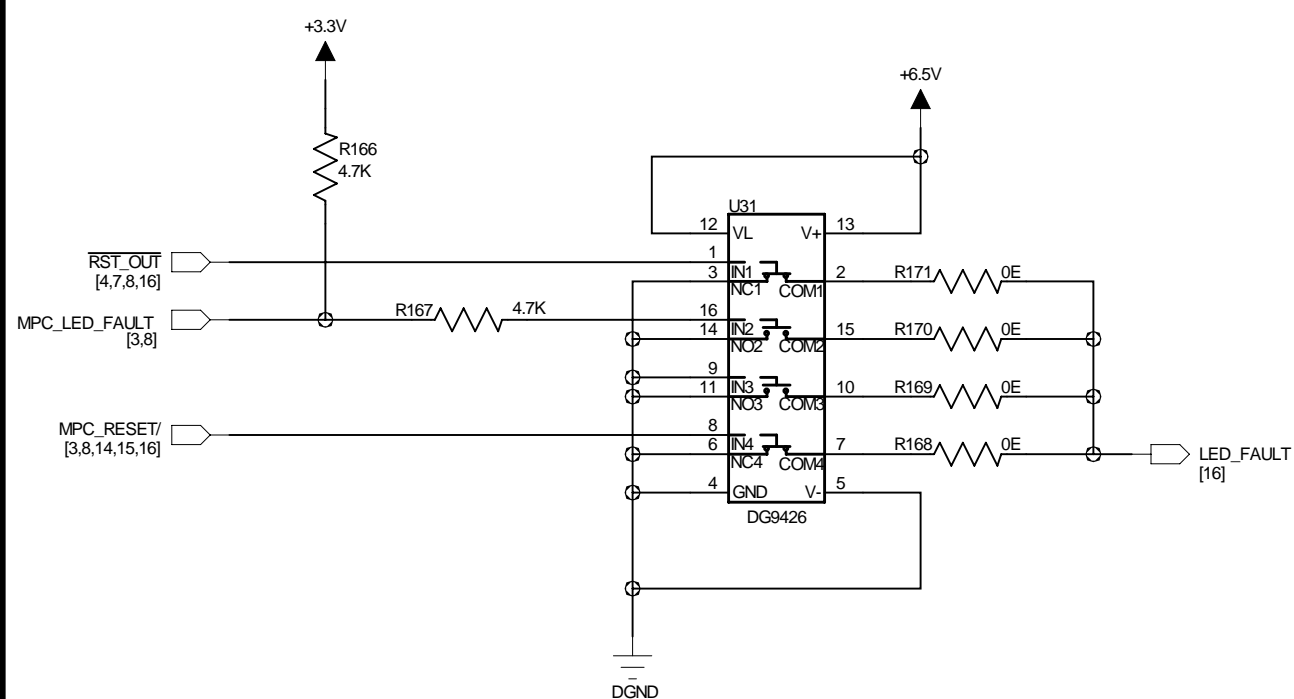
APPROVALS		DATE	COMPRESSOR CONTROLS CORPORATION			
DRAWN		17-10-2012	4725 121st Street - Des Moines, Iowa 50323			
CHECKED		<Checked Date>	SHEET13-ESC_POWER			
ENGINEER			SIZE	DWG. NO.	SHEET	PROD REV.
VAIBHAV DOSHI			C	<Drawing Number>	13 of 16	A
			FILE	CCCNPG_MPC5534_BOARD_REV-B.sch	SCALE	<Scale>

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PURPOSES WITHOUT WRITTEN PERMISSION FROM COMPRESSOR CONTROLS CORP.

RESET CIRCUIT

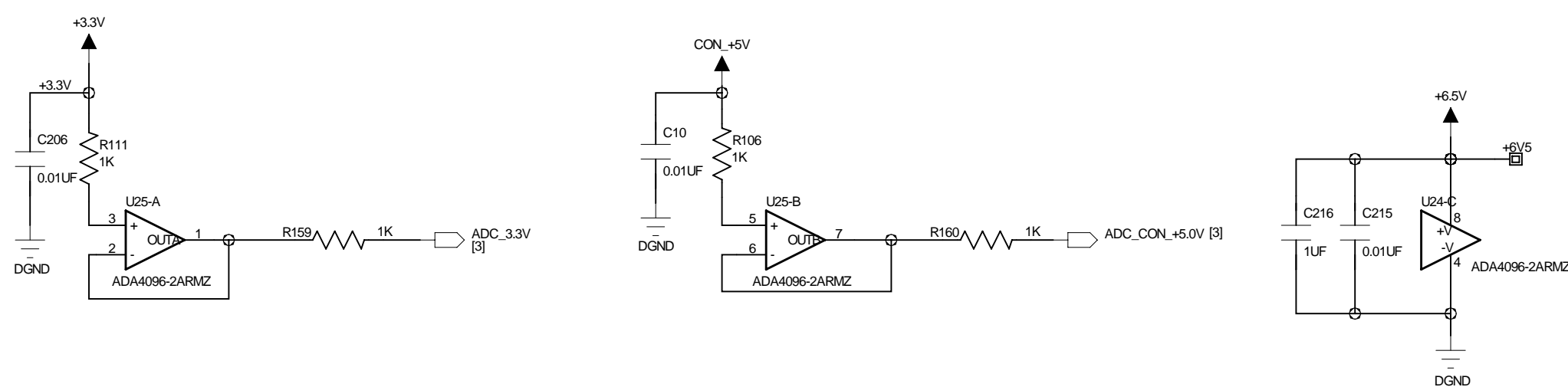
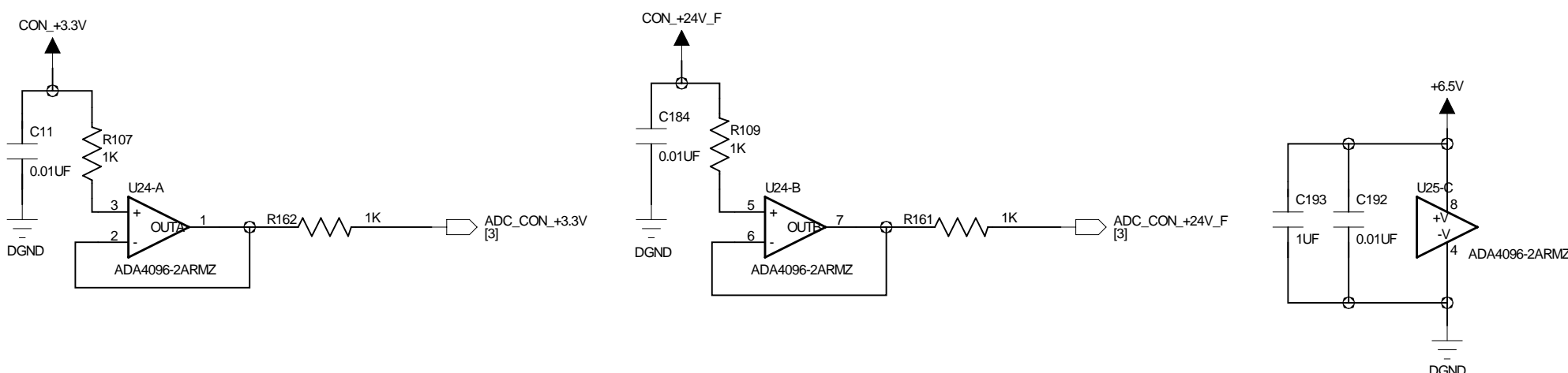
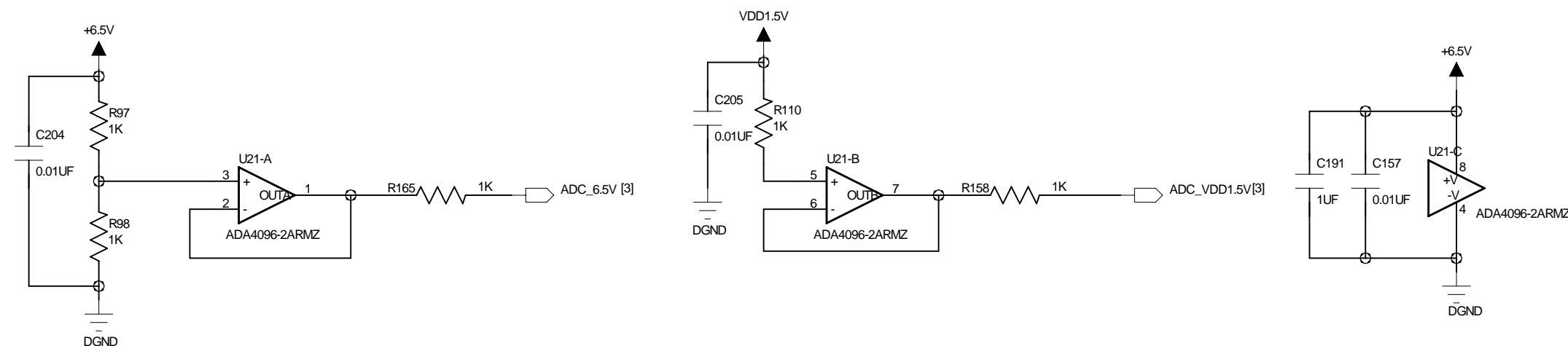
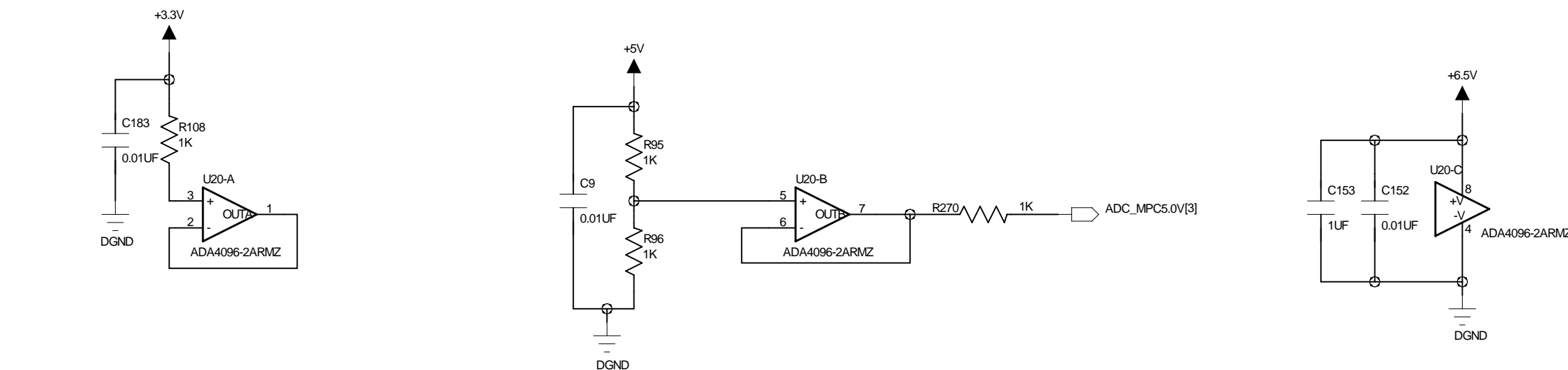


FAULT LED



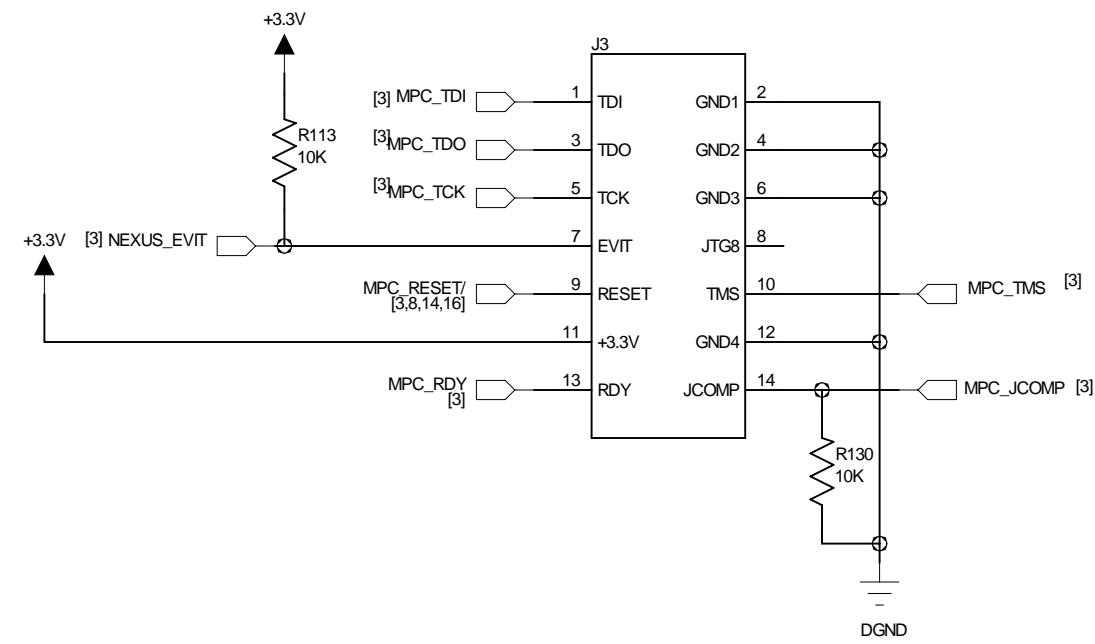
Note:
LED to be connected to this signal via resistor on IOP board

UNIT GAIN OP-AMP FOR VOLTAGE MONITOR

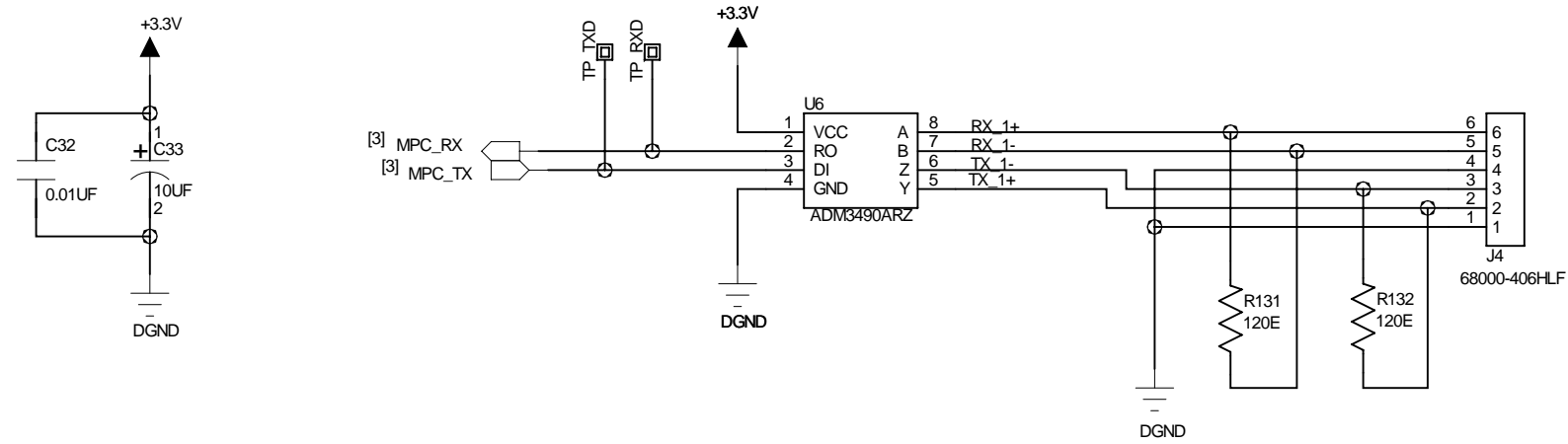


APPROVALS		DATE		COMPRESSOR CONTROLS CORPORATION			
DRAWN VAIBHAV DOSHI		17-10-2012		4725 121st Street - Des Moines, Iowa 50323			
CHECKED <Checked By>		<Checked Date>		SHEET14-RESET,POWER_MONITOR			
ENGINEER VAIBHAV DOSHI		SIZE C	DWG. NO. <Drawing Number>		SHEET 14 of 16		PROD REV.
			FILE CCCGNP_MPC5634_BOARD_REV-B.sch		SCALE <Scale>		A

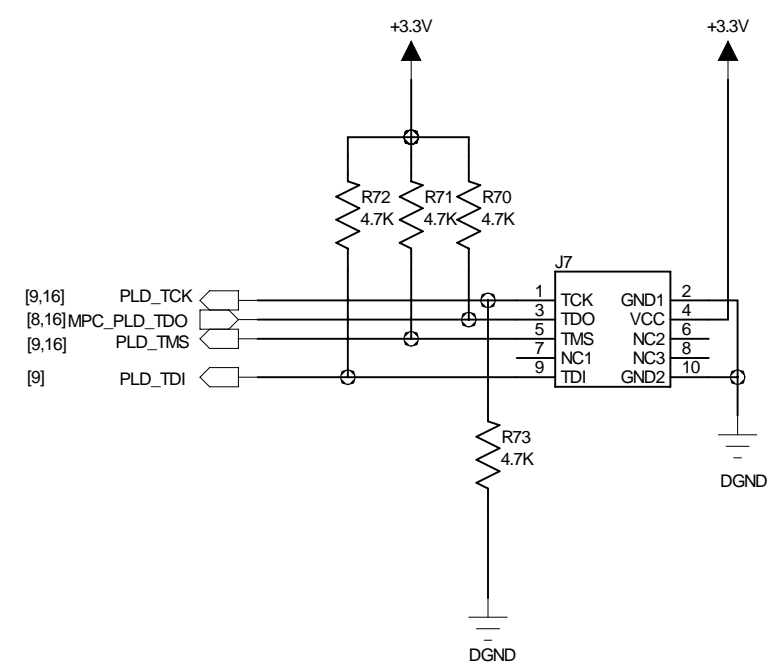
JTAG/NEXUS



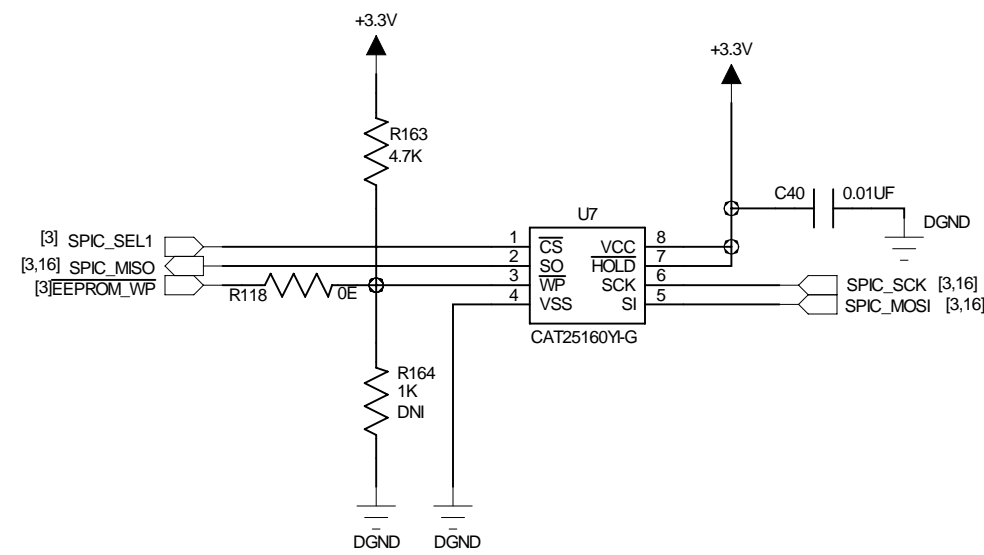
RS-485



JTAG programming for CPLD

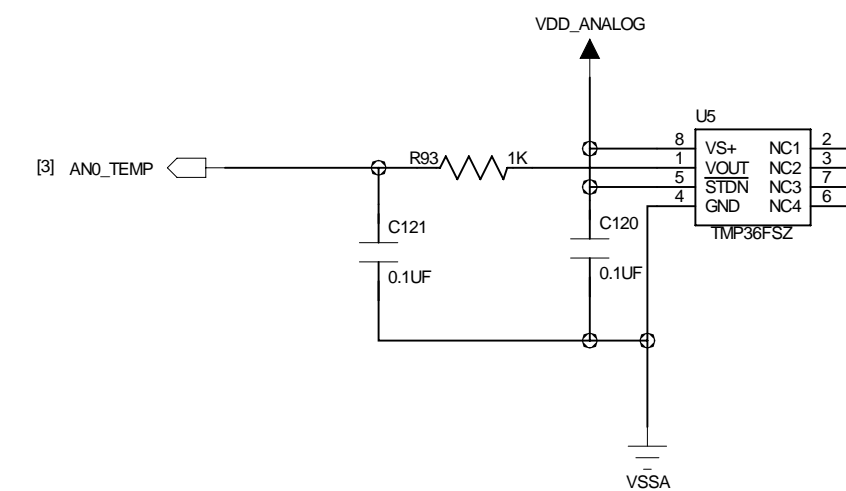


SPI-EEPROM1



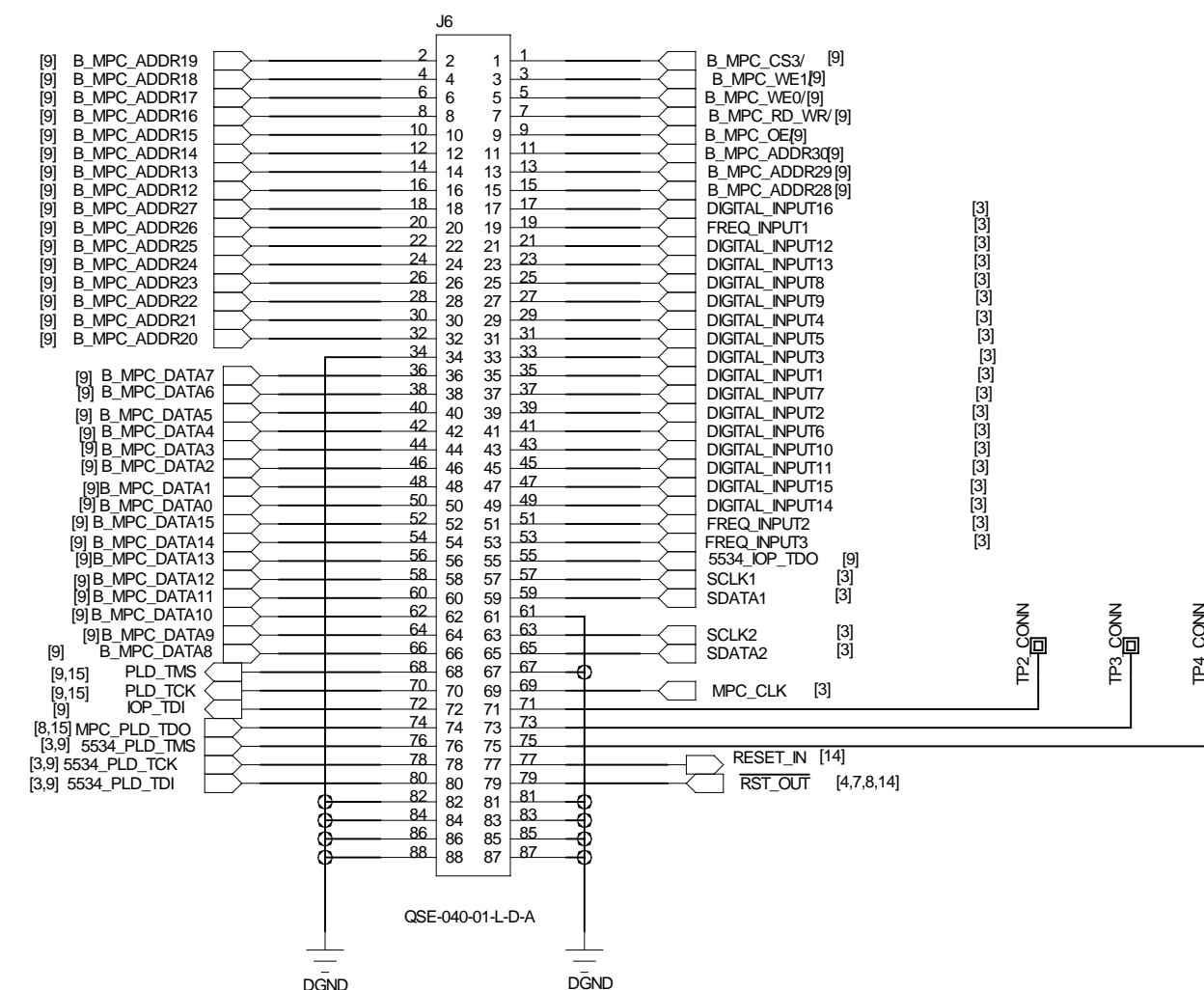
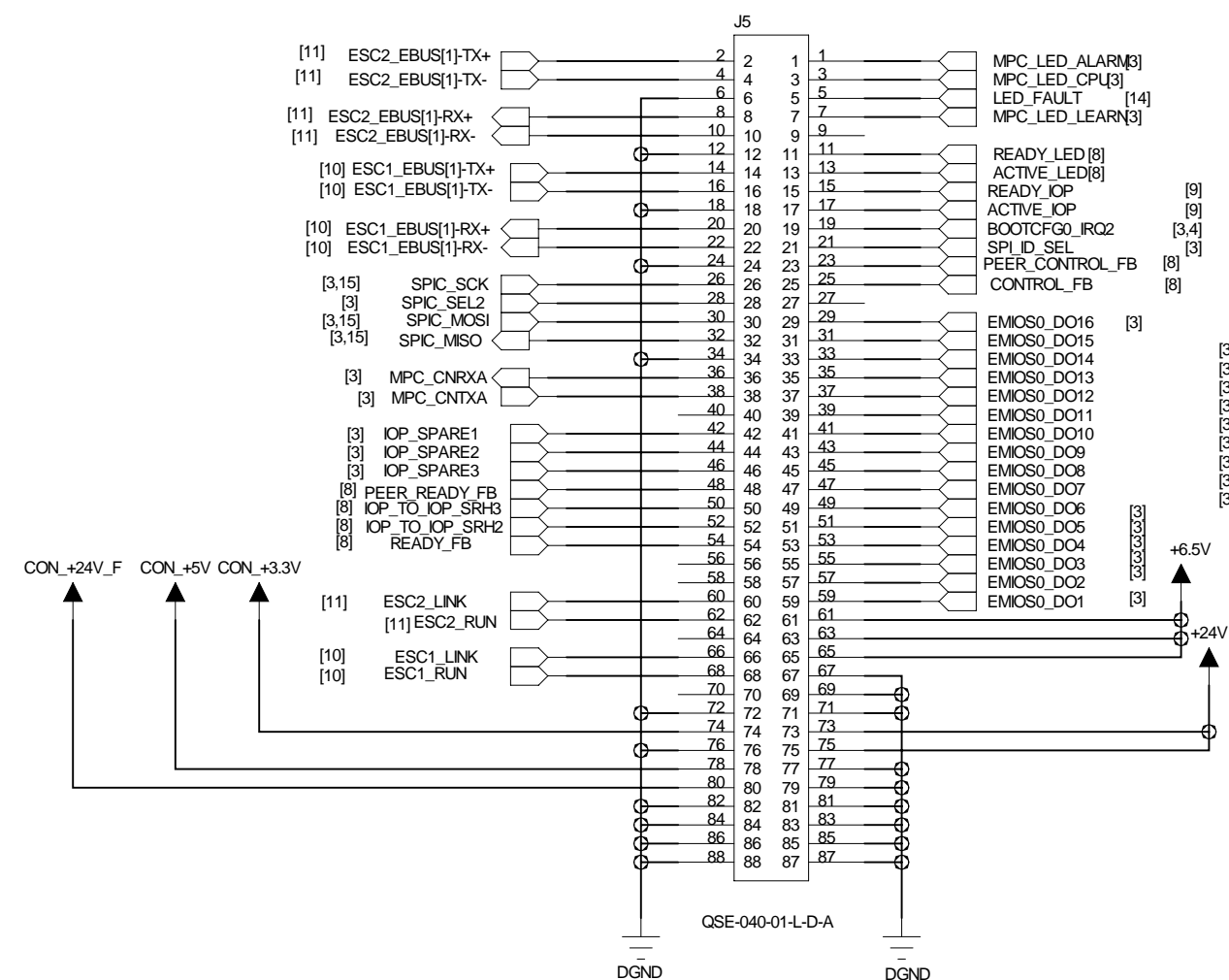
Note
'Write Protect' conditions are controlled by WPEN bit

TEMPERATURE SENSOR

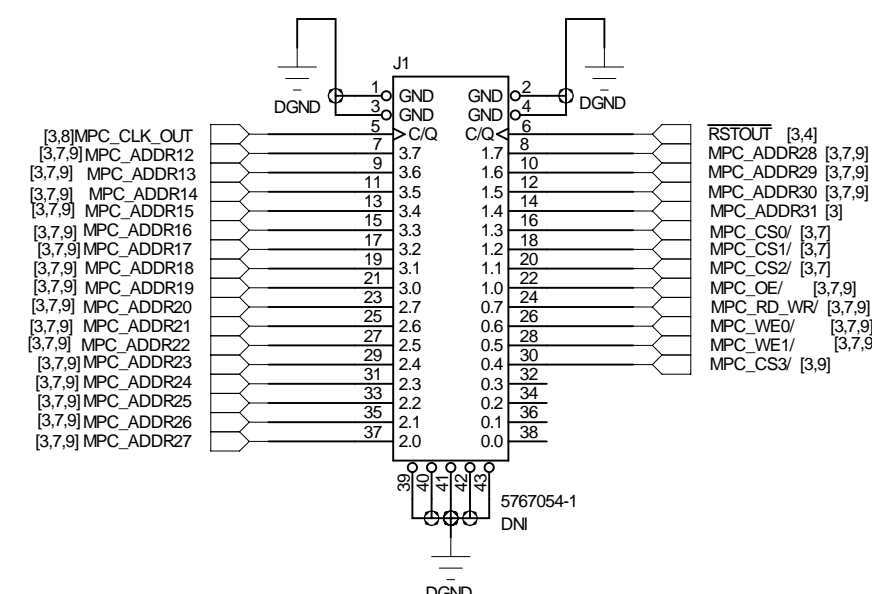
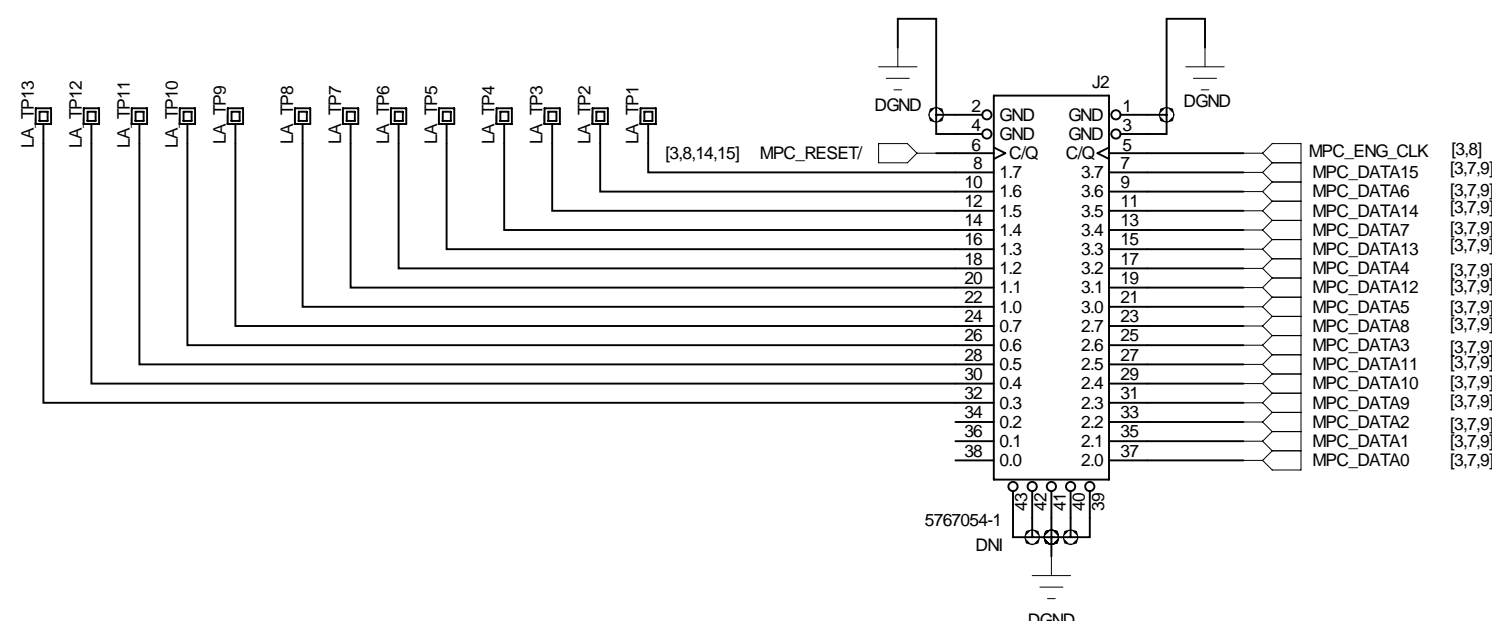


APPROVALS		DATE		COMPRESSOR CONTROLS CORPORATION			
DRAWN VAIBHAV DOSHI		17-10-2012		4725 121st Street - Des Moines, Iowa 50323			
CHECKED <Checked By>		<Checked Date>		SHEET15-JTAG,RS485,TEMP_SENSOR,			
ENGINEER VAIBHAV DOSHI		SIZE C	DWG. NO. <Drawing Number>		SHEET 15 of 16		PROD REV. A
			FILE CCNGP_MPC5534_BOARD_REV-B.sch		SCALE <Scale>		

IOP-CARD_CONNECTOR



MICTOR_CONNECTORS
 LOGIC ANALYZERS



APPROVALS		DATE		COMPRESSOR CONTROLS CORPORATION				
DRAWN VAIBHAV DOSHI		17-10-2012		4725 121st Street - Des Moines, Iowa 50323				
CHECKED <Checked By>		<Checked Date>		SHEET16-CONNECTOR				
ENGINEER VAIBHAV DOSHI		SIZE C	DWG. NO. FILE	<Drawing Number> CCONGP_MPC5634_BOARD_REV-B.sch		SHEET SCALE	16 of 16 <Scale>	PROD REV. A