



**Notes:**

1. FPGA Schematic Symbol Breakdown:
  - (a) Bank2 - IO
  - (b) Bank3 - IO
  - (c) Bank4 - IO
  - (d) Bank5 - IO
  - (e) Bank6 - IO
  - (f) Bank7 - IO
  - (g) Bank8 - IO
  - (h) Bank9 - IO
  - (i) Configuration
  - (j) Clocks
  - (k) VCCint, GND
  - (l) VCC0, GND

2. PCB Supports 2C70 - 2C50 - 2C70 Migration  
 No additional IO of 2C70 or 2C50 used as the 2C70 has the fewest IO of the group due to additional VCCINT, GND, and VREF pins on the larger 2C50 and 2C70 devices.

3. Some IO pins are connected to 1.2V and GND. These are the additional VCC and GND pins of the larger 2C50 and 2C70.

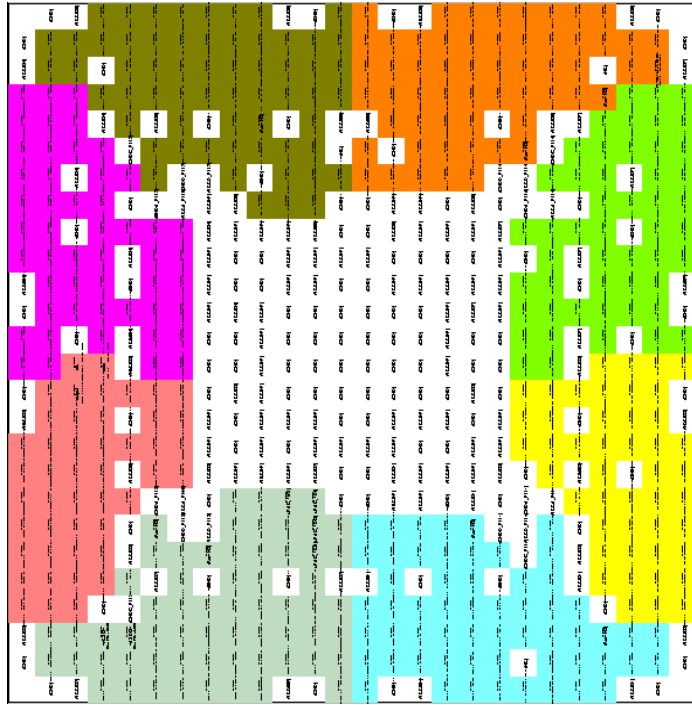
**--- WARNING ---**

**DO NOT DRIVE UNUSED IO TO GND IN QUARTUS**  
 Leaving 1.2V-connected IO pins as outputs driving GND causes high IO current and increased temperature which can lead to device damage if left over a long period of time.

**FPGA Package Top View  
 (2C70 Device Shown)**

**BANK 3**  
**VCCIO = 1.8V**  
 DDR2 DIMM DATA LANES  
 ADC Channel 2

**BANK 4**  
**VCCIO = 1.8V**  
 DDR2 DIMM DATA LANES  
 ADC Channel 1  
 ADC Channel 2



**BANK 2**  
**VCCIO = 3.3V**  
 Proto Bus  
 Video DAC  
 DAC Channel 1

**BANK 1**  
**VCCIO = 3.3V**  
 DAC Channel 1  
 DAC Channel 2  
 Video DAC

**BANK 5**  
**VCCIO = 3.3V**  
 Shared Bus  
 DAC Channel 2

**BANK 6**  
**VCCIO = 3.3V**  
 Shared Bus  
 DAC Channel 1  
 DAC Channel 2  
 Video DAC

**BANK 8**  
**VCCIO = 1.8V**  
 DDR2 DIMM DATA LANES, ADDRESS  
 Pushbuttons

**BANK 7**  
**VCCIO = 1.8V**  
 DDR2 DIMM DATA LANES, CNTL, CLOCK  
 Pushbuttons  
 Dipswitch



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Title		Cyclone II DSP Board	
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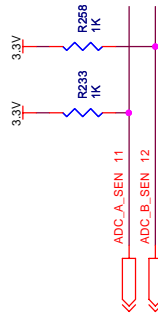
# CYCLONE II BANKS 3 & 4

- ◀◀ DIMM\_DQ[7..0] 7.8.9
- ◀◀ DIMM\_DQS[8..0] 7.8.9
- ◀◀ DIMM\_A\_R[15..0] 7.9
- ◀◀ DIMM\_BA\_R[2..0] 7.9
- ◀◀ DIMM\_DM[8..0] 7.8.9

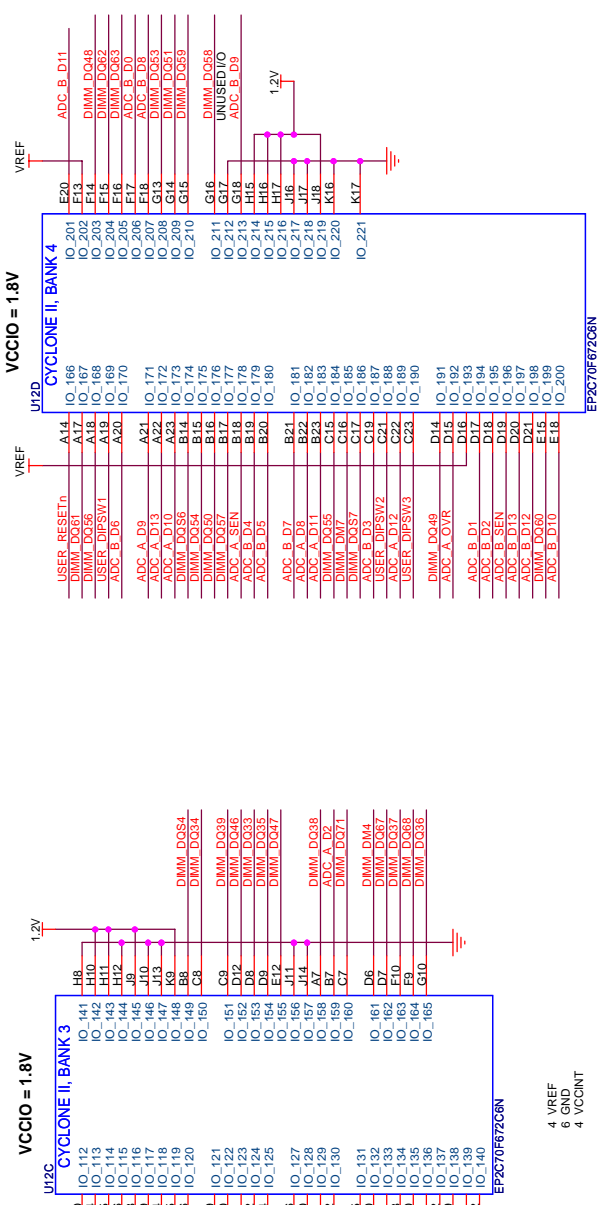
- ◀◀ DIMM\_RASn\_R 7.9
- ◀◀ DIMM\_CASn\_R 7.9
- ◀◀ DIMM\_WEn\_R 7.9
- ◀◀ DIMM\_CSn\_R0 7.9
- ◀◀ DIMM\_CSn\_R1 7.9
- ◀◀ DIMM\_CKE\_R0 7.9

- ◀◀ DIMM\_DQ[0] 7.8.9
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- ◀◀ DIMM\_DQ[2] 7.8.9
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- ◀◀ DIMM\_DQ[199] 7.8.9
- ◀◀ DIMM\_DQ[200] 7.8.9

- ◀◀ USER\_DIPSW[7..0] 3.7.17
- ◀◀ USER\_RESETn\_17..19



1.8V driving 3.3V logic must be driven as open-drain



4 VREF  
6 GND  
4 VCCINT

2 VREF  
5 GND  
4 VCCINT



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DAC.A [13.0] 413  
 DAC.B [13.0] 34,14

EVM\_A121.21 18  
 EVM\_D31.01 18  
 EVM\_BE13.01 18  
 EVM\_INT13.01 18  
 EVM\_CE13.21 10,18  
 EVM\_DX0.18

EVM\_CNTLD 18  
 EVM\_STATO 18  
 EVM\_DMACO 18  
 EVM\_AWEN.18

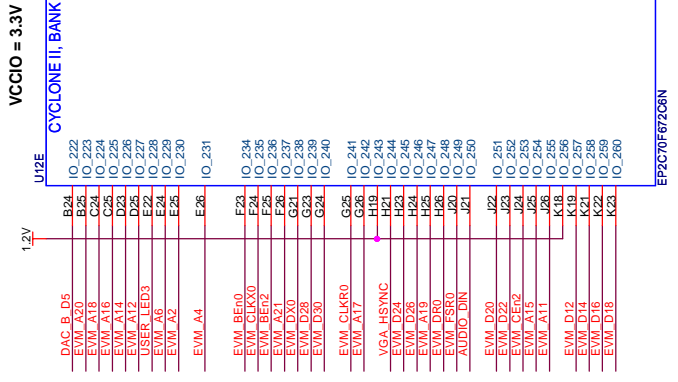
EVM\_DR0.18  
 EVM\_OEn 18  
 EVM\_ARDY 18  
 EVM\_CLKX0.18  
 EVM\_FSX0.18  
 EVM\_CLKR0.18  
 EVM\_FSR0.18

USER\_LED1Z.01 3,4,10,17  
 AUDIO\_CSn 16  
 AUDIO\_DIN. 16  
 EVM\_RESET\_318

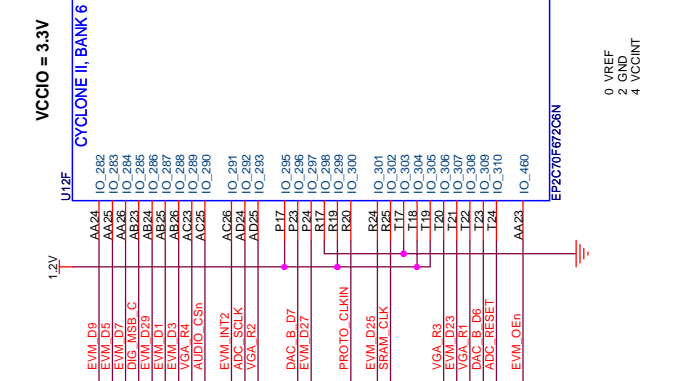
VGA\_HSYN. 15  
 VGA\_RT.01 4,15  
 VGA\_BIT.01 4,15

DIG\_MSB.A17  
 DIG\_MSB.C17  
 DIG\_MSB.G17  
 DIG\_LSB.B.17  
 DIG\_LSB.F.17  
 ADC\_RESET.11,12  
 ADC\_SCLK.11,12  
 ADC\_B\_SEN.5,12  
 EP1CS\_USER\_CSn 10

SRAM\_CLK 18  
 PROTO\_CLKIN 19



0 VREF  
 2 GND  
 2 VCCINT



0 VREF  
 2 GND  
 4 VCCINT

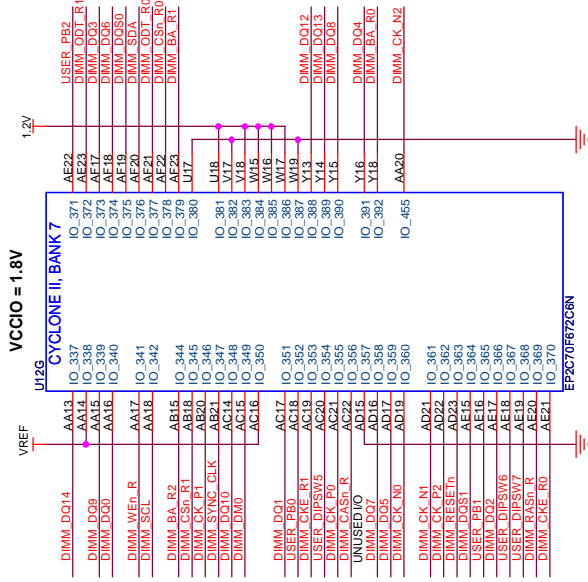
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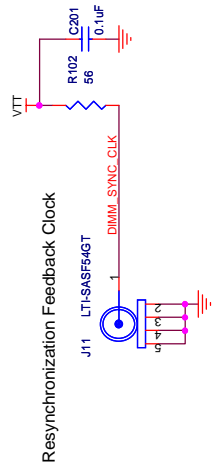
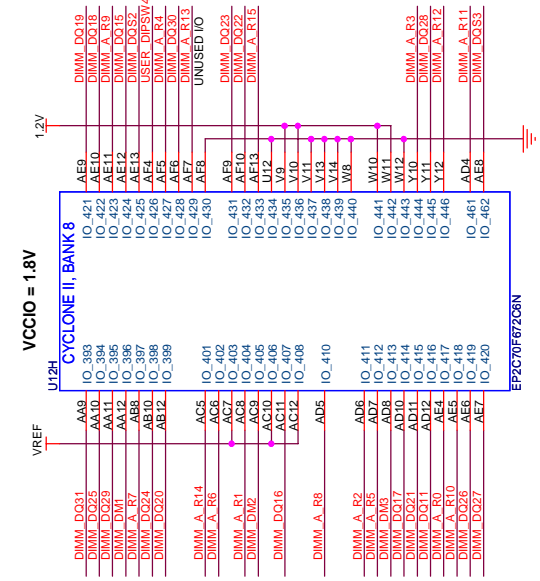
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# CYCLONE II BANKS 7 & 8

- << DIMM\_DQ[71..0] 5.8,9
- << DIMM\_DQS[8..0] 5.8,9
- << DIMM\_A\_R[15..0] 9
- << DIMM\_BA\_R[2..0] 9
- << DIMM\_DM[8..0] 5.8,9
- << DIMM\_RASn\_R 9
- << DIMM\_CASn\_R 9
- << DIMM\_WEn\_R 9
- << DIMM\_CSn\_R0 9
- << DIMM\_CSn\_R1 9
- << DIMM\_CKE\_R0 9
- << DIMM\_CKE\_R1 9
- << DIMM\_ODT\_R0 9
- << DIMM\_ODT\_R1 9
- << DIMM\_CK\_P[2..0] 8
- << DIMM\_CK\_N[2..0] 8
- << DIMM\_SDA 8
- << DIMM\_SCL 8
- << DIMM\_RESETn 8
- << USER\_PB[3..0] 3,17
- << USER\_DIPS[W7..0] 3,5,17
- << PROTO\_CLKIN 6,19
- << DIMM\_SYNC\_CLK 3



- 2 VREF
- 4 GND
- 5 VCCINT



SMA for External Clock Input / Eye Diagram Output  
(secondary use)

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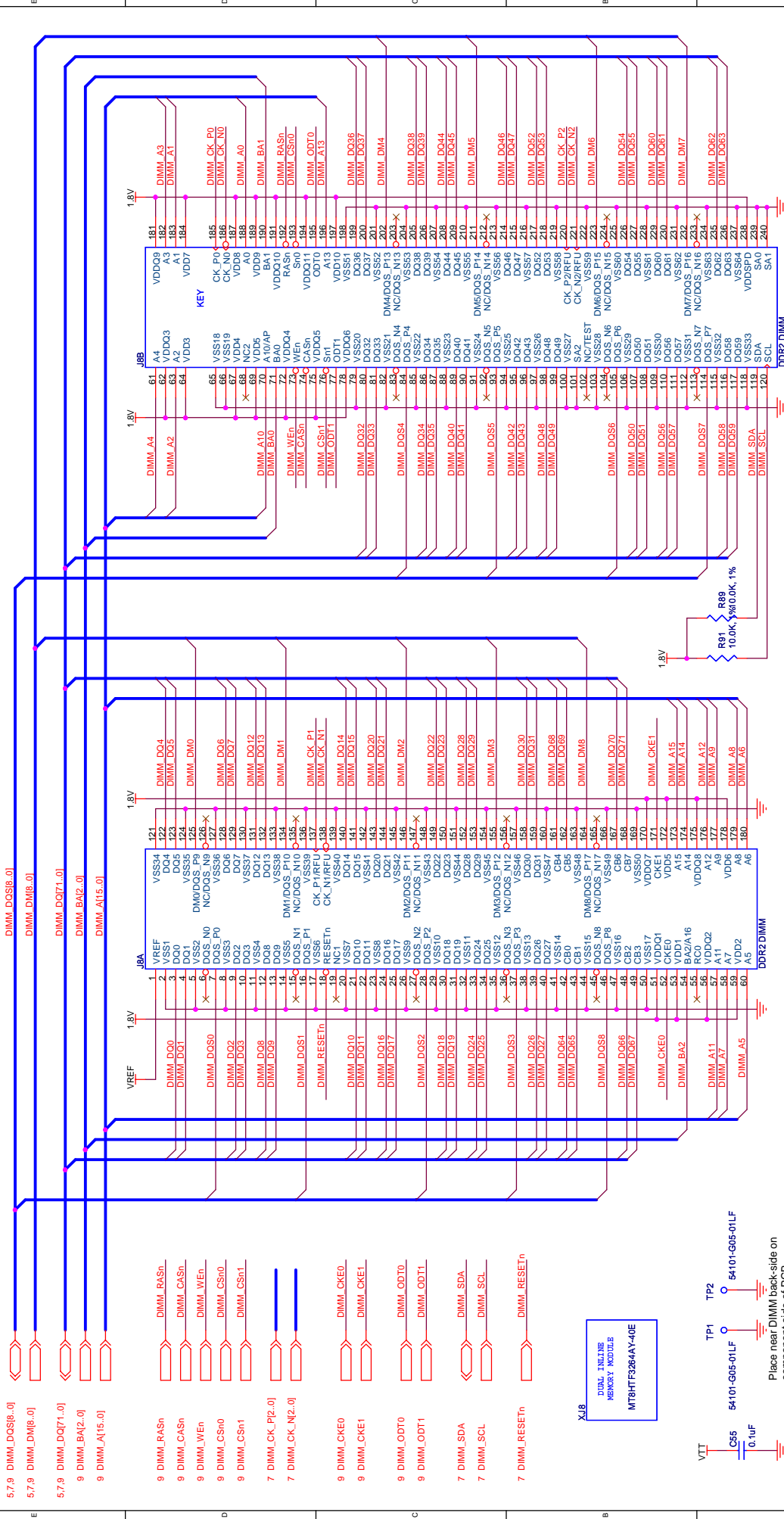
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# DDR2 SDRAM DIMM



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TP2 54101-G05-01LF

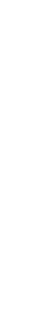
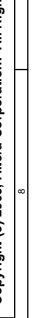
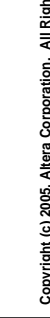
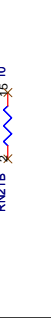
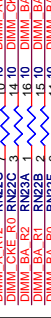
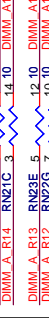
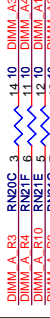
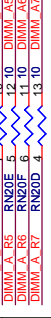
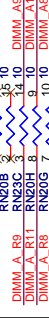
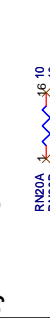
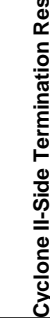
0.1uF

Place near DIMM back-side on component side of PCB

**ALTERA**

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- 5.7.8 DIMM\_DQ7[1..0]
- 5.7.8 DIMM\_DQS[8..0]
- 7 DIMM\_A\_R[15..0]
- 7 DIMM\_BA\_R[2..0]
- 5.7.8 DIMM\_DM[8..0]
- 7 DIMM\_RASn\_R
- 7 DIMM\_CASn\_R
- 7 DIMM\_WEN\_R
- 7 DIMM\_CS0n\_R0
- 7 DIMM\_CS0n\_R1
- 7 DIMM\_CKE\_R0
- 7 DIMM\_CKE\_R1
- 7 DIMM\_ODT\_R0
- 7 DIMM\_ODT\_R1
- 8 DIMM\_A[15..0]
- 8 DIMM\_BA[2..0]
- 8 DIMM\_RASn
- 8 DIMM\_CASn
- 8 DIMM\_WEN
- 8 DIMM\_CS0
- 8 DIMM\_CS1
- 8 DIMM\_CKE0
- 8 DIMM\_CKE1
- 8 DIMM\_ODT0
- 8 DIMM\_ODT1



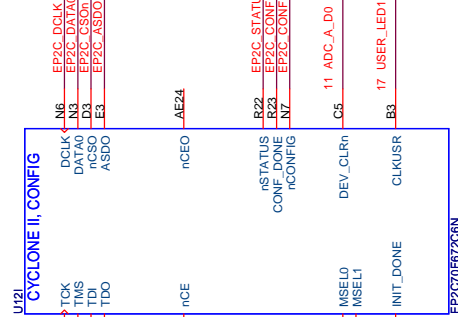
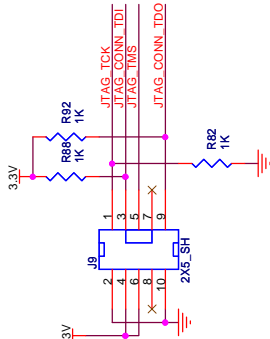
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#### DIMM-Side Termination Resistors

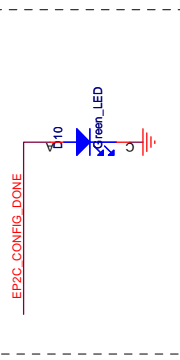
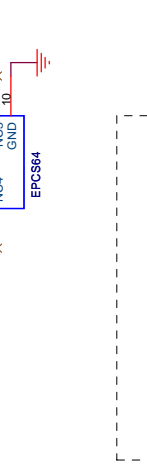
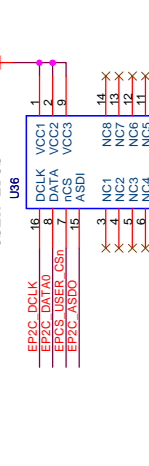
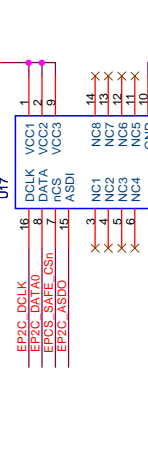
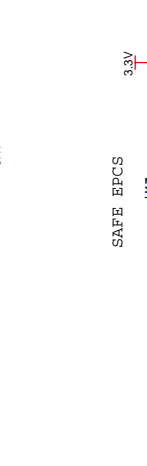
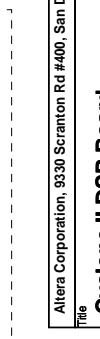
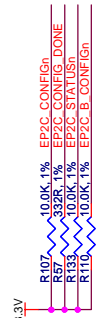
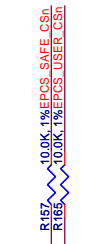
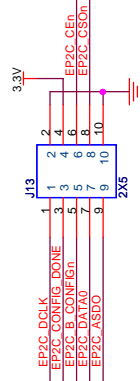
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DIMM_DQ267	276.56	276.56
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# CONFIGURATION CIRCUITRY

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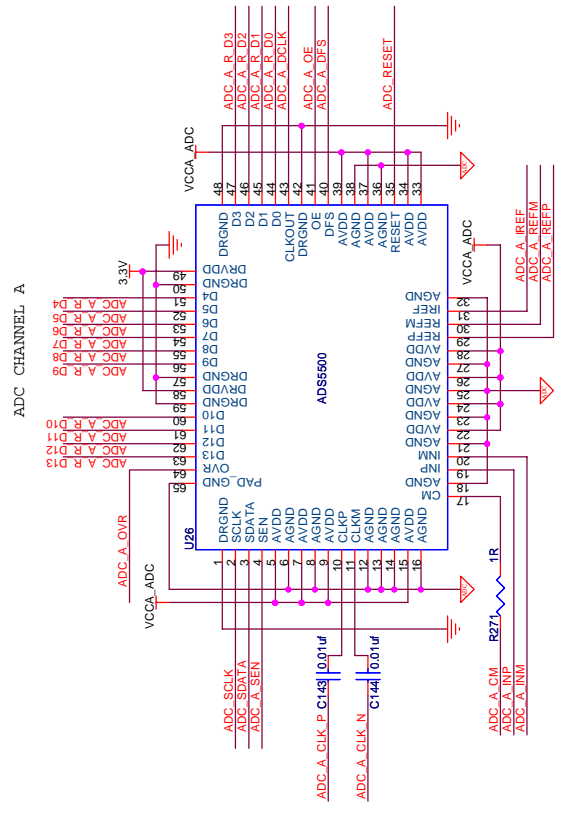
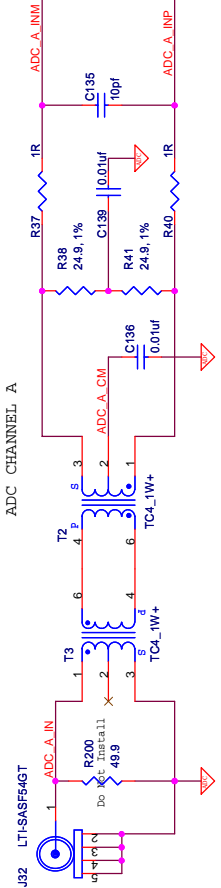
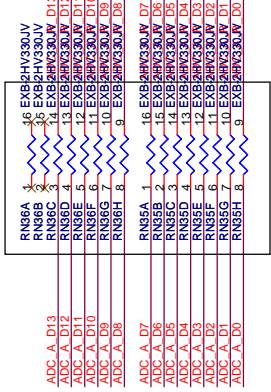
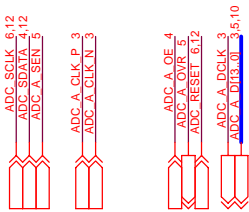


SURFACE MOUNT ACTIVE SERIAL HEADER

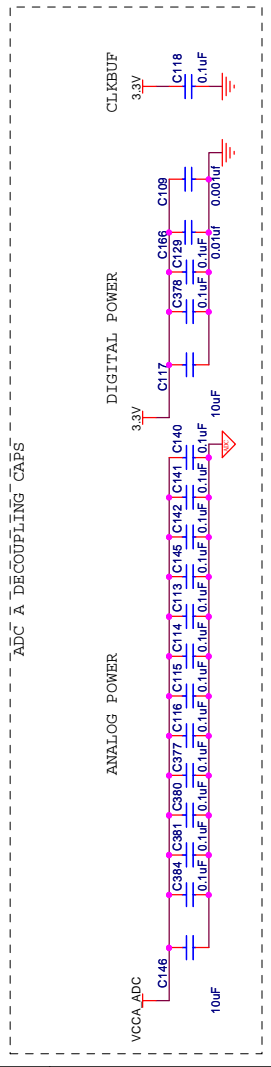
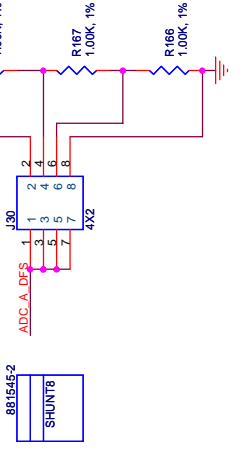


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 The Cyclone II DSP Board  
 Size B Document Number 150-0310202-C-1  
 Date: Sunday, August 19, 2006 Sheet 10 of 22

# ADC Channel A



J30 Position	Data Output Format
Pin 1-2	2's Complement data valid falling edge
Pin 3-4	Straight Binary data valid falling edge
Pin 5-6	2's Complement data valid rising edge
Pin 7-8	Straight Binary data valid rising edge



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The **Cyclone II DSP Board**

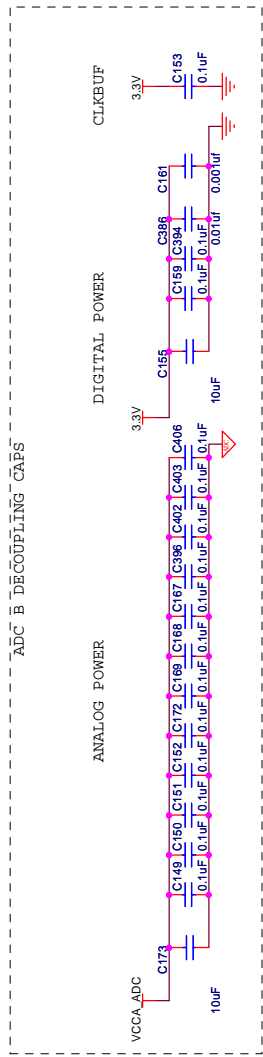
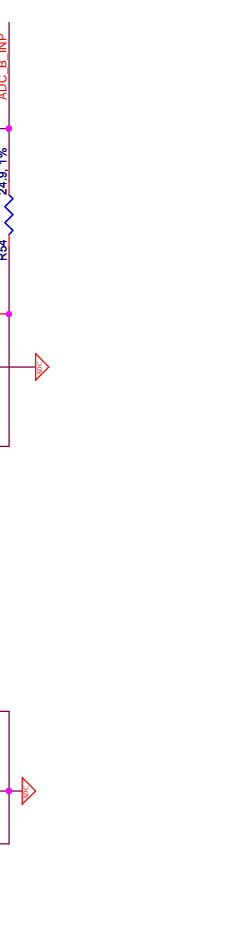
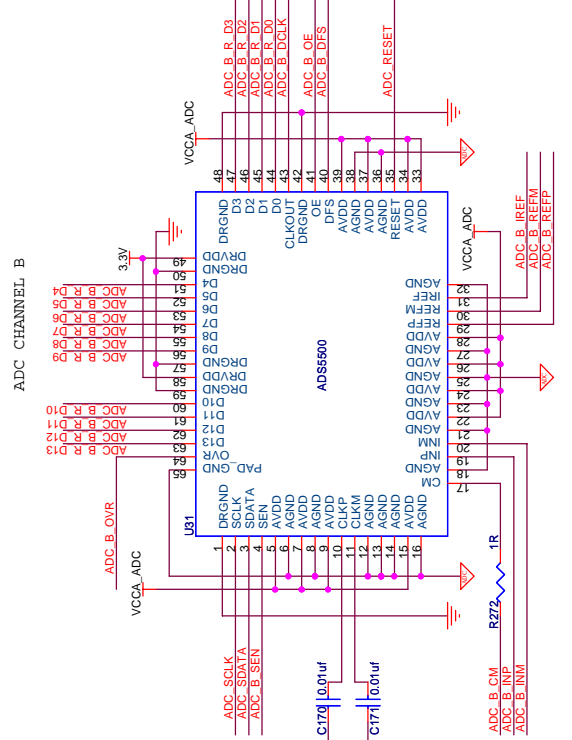
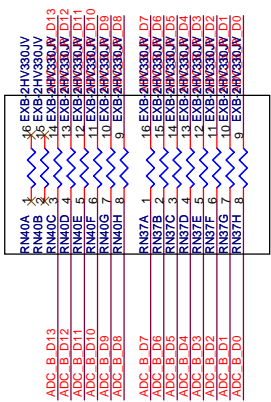
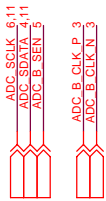
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Rev C

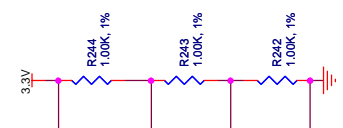
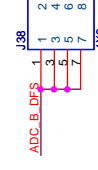
Date: Sunday, August 13, 2006 Sheet 11 of 22



# ADC Channel B



J38 Position	Data Output Format
Pin 1-2	2's Complement data valid falling edge
Pin 3-4	Straight Binary data valid falling edge
Pin 5-6	2's Complement data valid rising edge
Pin 7-8	Straight Binary data valid rising edge



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The Cyclone II DSP Board

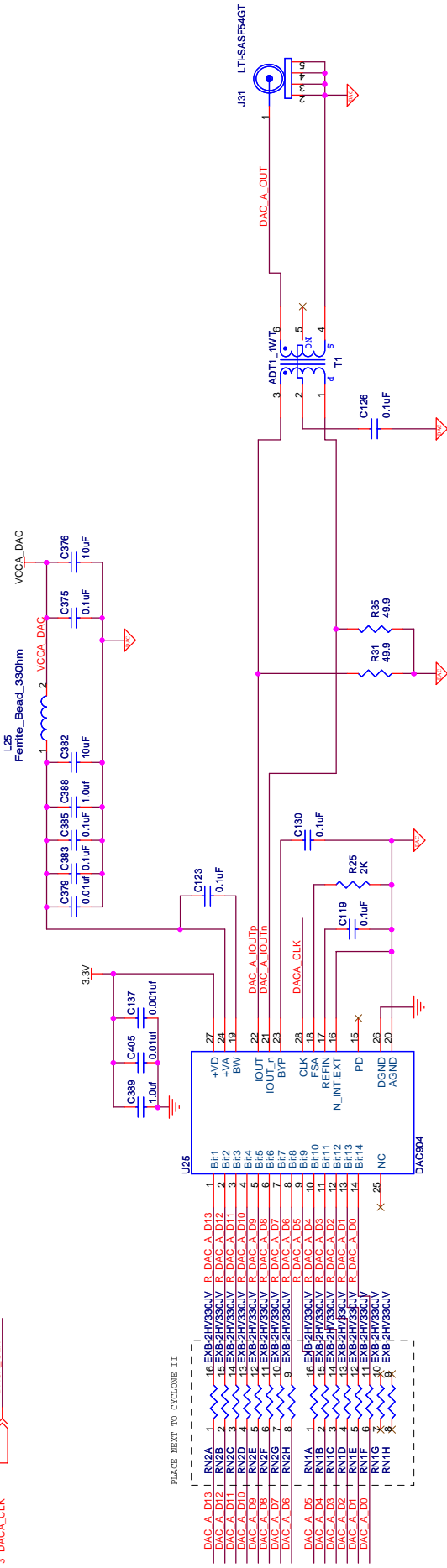
Size B Document Number 150-0310202-C1

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# DAC CHANNEL A

4 DAC\_A\_D[13:0] 

3 DAC\_A\_CLK 



DAC\_A\_IOUTn TP4  
54101-016-01LF

<Variant Name>

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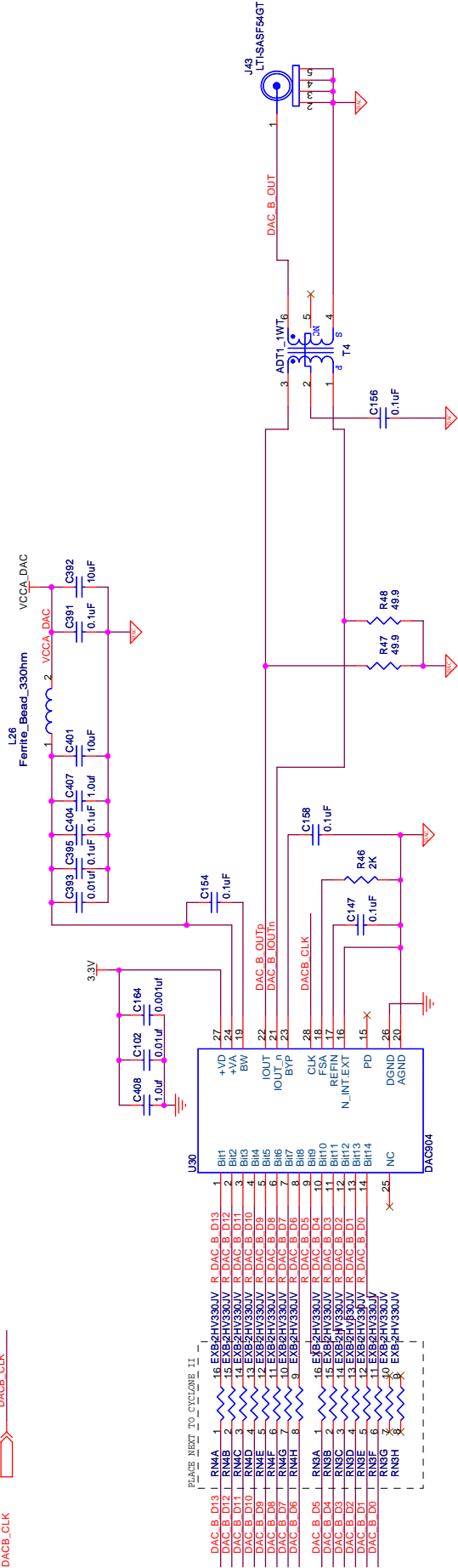
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Size	Document Number
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Date	Sunday, August 13, 2006
Sheet	13 of 22




# DAC CHANNEL B

3,4,6 DAC\_B\_D[13:0] 

3 DACB\_CLK 



DAC\_B\_IOUTn  TP3  
54101-005-01LF

PLACE NEXT TO CYCLOPS II -

DAC_B_D13	RMA	1	EXB2HV330JV	R	DAC_B_D13
DAC_B_D12	RMAB	2	EXB2HV330JV	R	DAC_B_D12
DAC_B_D11	RMAC	3	EXB2HV330JV	R	DAC_B_D11
DAC_B_D10	RMAD	4	EXB2HV330JV	R	DAC_B_D10
DAC_B_D9	RM4E	5	EXB2HV330JV	R	DAC_B_D9
DAC_B_D8	RM4F	6	EXB2HV330JV	R	DAC_B_D8
DAC_B_D7	RM4G	7	EXB2HV330JV	R	DAC_B_D7
DAC_B_D6	RM4H	8	EXB2HV330JV	R	DAC_B_D6
DAC_B_D5	RM5A	1	EXB2HV330JV	R	DAC_B_D5
DAC_B_D4	RM5B	2	EXB2HV330JV	R	DAC_B_D4
DAC_B_D3	RM5C	3	EXB2HV330JV	R	DAC_B_D3
DAC_B_D2	RM5D	4	EXB2HV330JV	R	DAC_B_D2
DAC_B_D1	RM5E	5	EXB2HV330JV	R	DAC_B_D1
DAC_B_D0	RM5F	6	EXB2HV330JV	R	DAC_B_D0
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	RM5H	8	EXB2HV330JV	R	

<Variant Name>

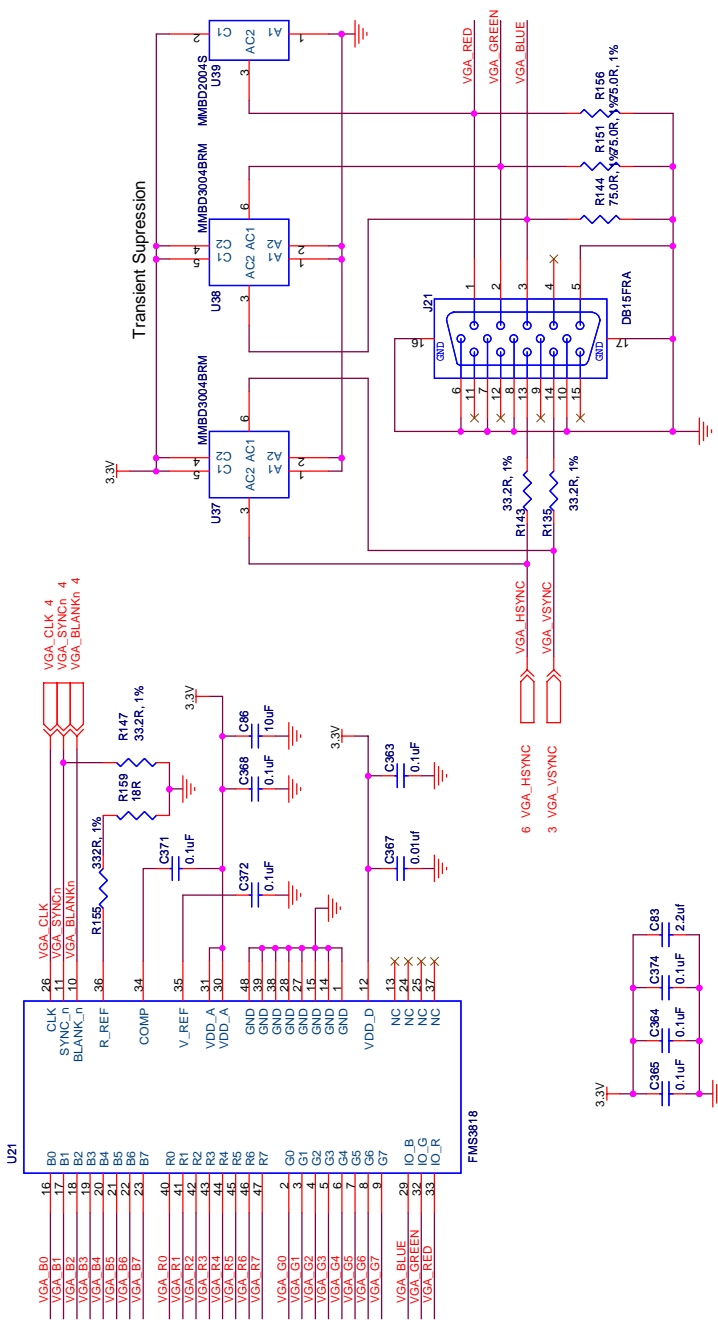
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Title	Cyclone II DSP Board		
Size	B	Document Number	150-0310202-C1
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# VIDEO DAC

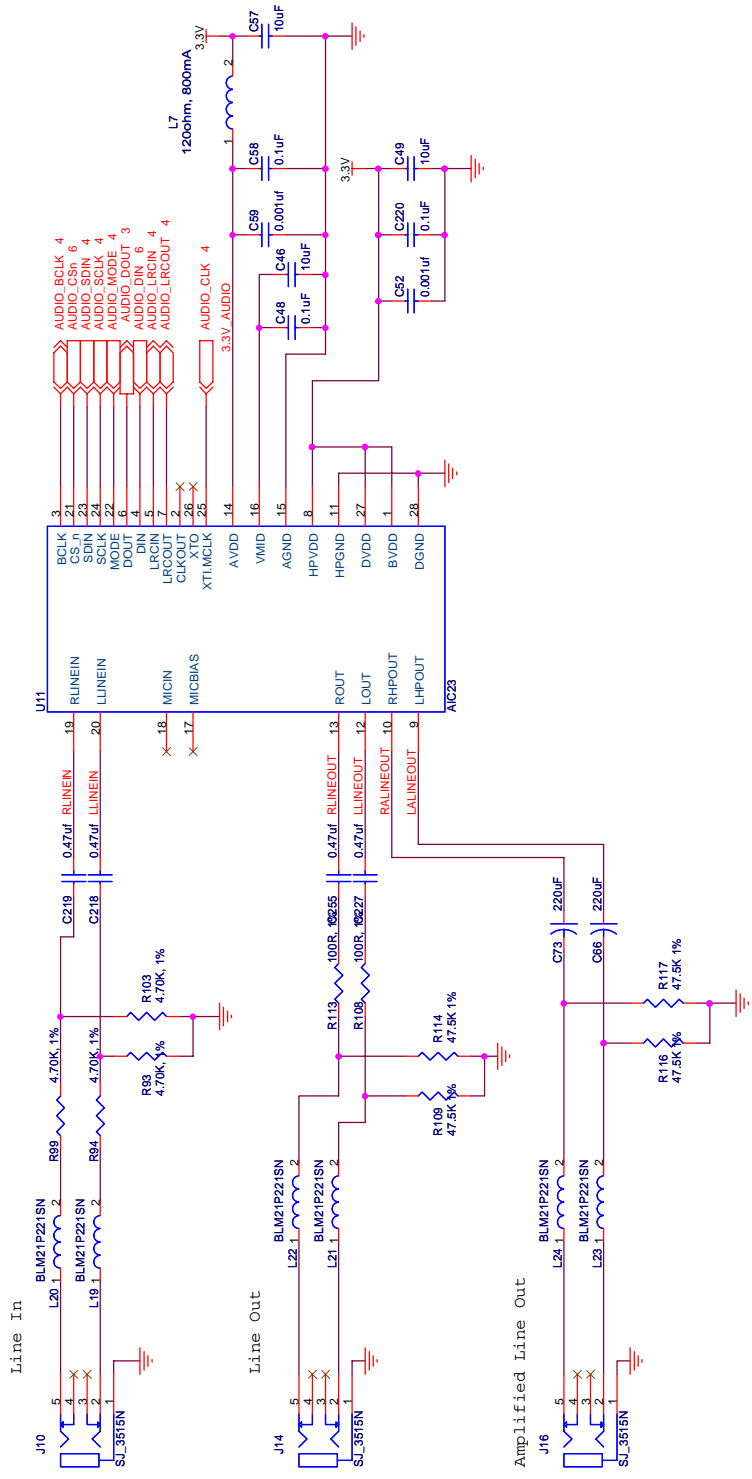
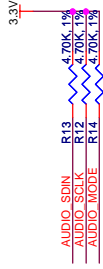
- 4 VGA\_B[7..0]
- 4.6 VGA\_R[7..0]
- 4 VGA\_G[7..0]



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# AIC23 AUDIO CODEC



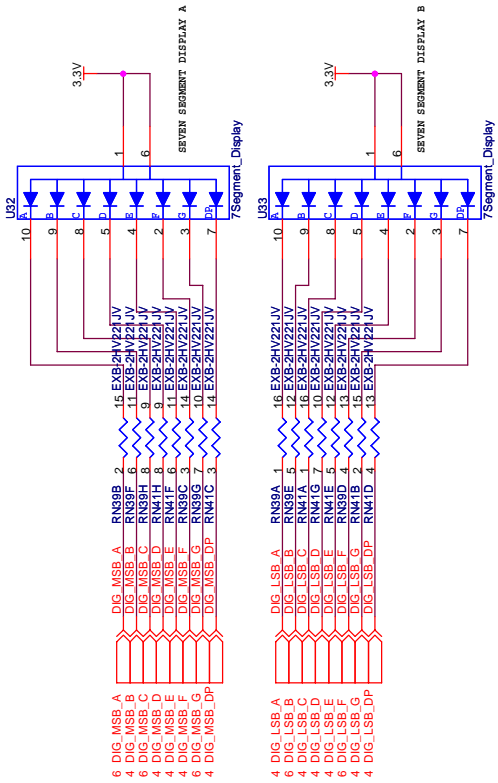
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# USER IO

## 7-Segment Displays



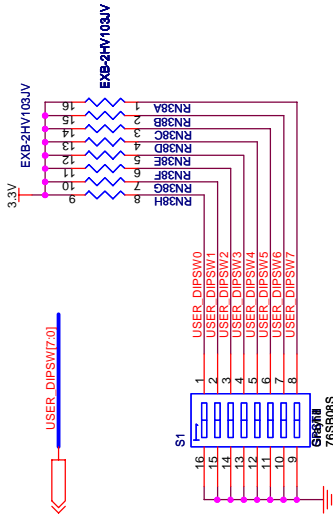
USER\_PB[3..0] 3,7

SYS\_RESETn 10

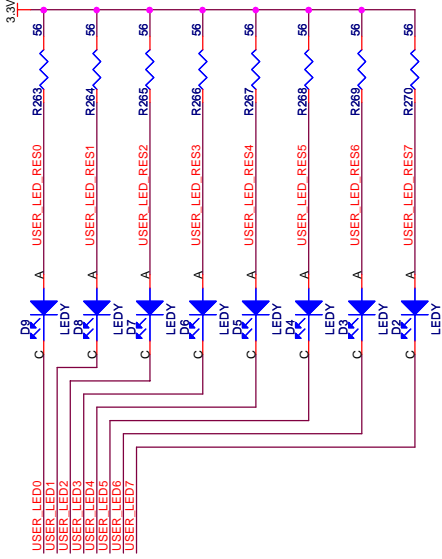
USER\_RESETn 5,19

USER\_LED7\_0j 3,4,6,10

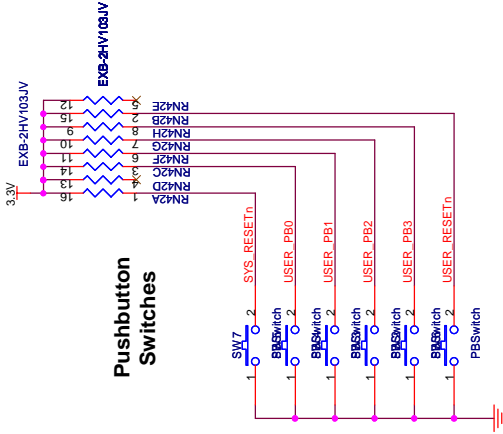
3.5.7 USER\_DIPS[W7..0]



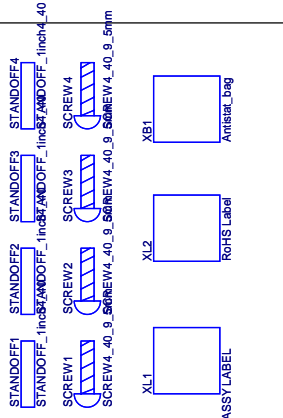
## User LEDs



## Pushbutton Switches



## Board Mounting Hardware



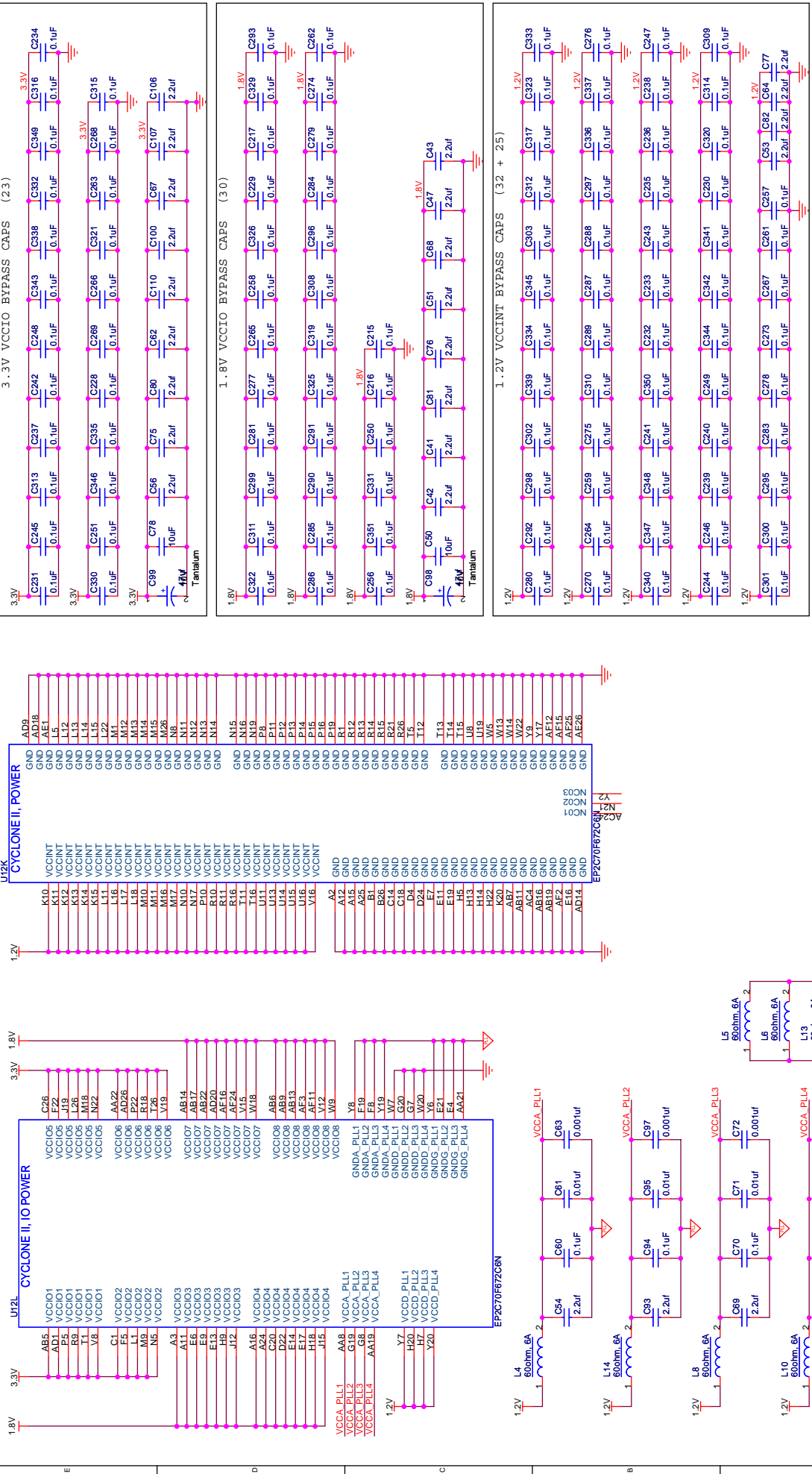
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# Cyclone II Power & Decoupling



3.3V VCCIO BYPASS CAPS (23)

C231	C245	C313	C237	C242	C248	C343	C338	C332	C349	C316	C234
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

3.3V

C330	C251	C246	C228	C269	C266	C321	C283	C288	C315
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

3.3V

C39	C78	C56	C62	C75	C60	C62	C110	C67	C107	C106
40nF	10uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF

1.8V VCCIO BYPASS CAPS (30)

C322	C311	C299	C281	C277	C266	C266	C229	C217	C289
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.8V

C286	C285	C250	C291	C325	C319	C308	C284	C279	C274	C282
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.8V

C256	C351	C250	C216	C215
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.8V

C388	C50	C42	C41	C76	C51	C68	C47	C43
40nF	10uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF	2.2uF

1.2V VCCINT BYPASS CAPS (32 + 25)

C280	C282	C288	C302	C389	C344	C303	C312	C317	C383
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.2V

C270	C264	C259	C275	C310	C288	C287	C288	C336	C337	C276
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.2V

C340	C347	C348	C241	C360	C232	C233	C243	C235	C236	C238	C247
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.2V

C244	C246	C239	C240	C249	C344	C342	C341	C230	C314	C309
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF

1.2V

C301	C300	C295	C283	C278	C273	C287	C261	C257	C55	C82	C64	C77
0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	0.1uF	2.2uF	2.2uF	2.2uF	2.2uF

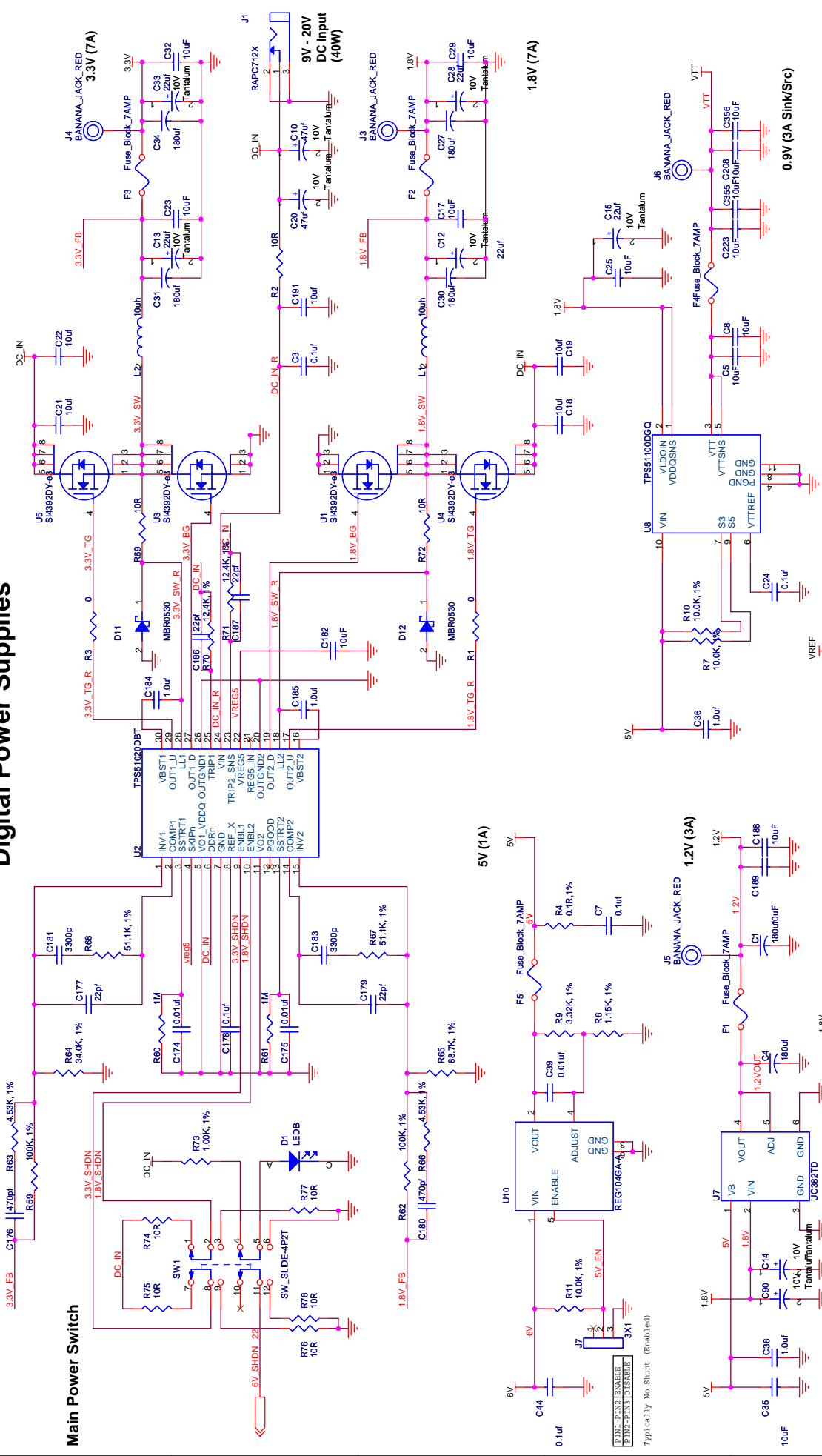


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# Digital Power Supplies

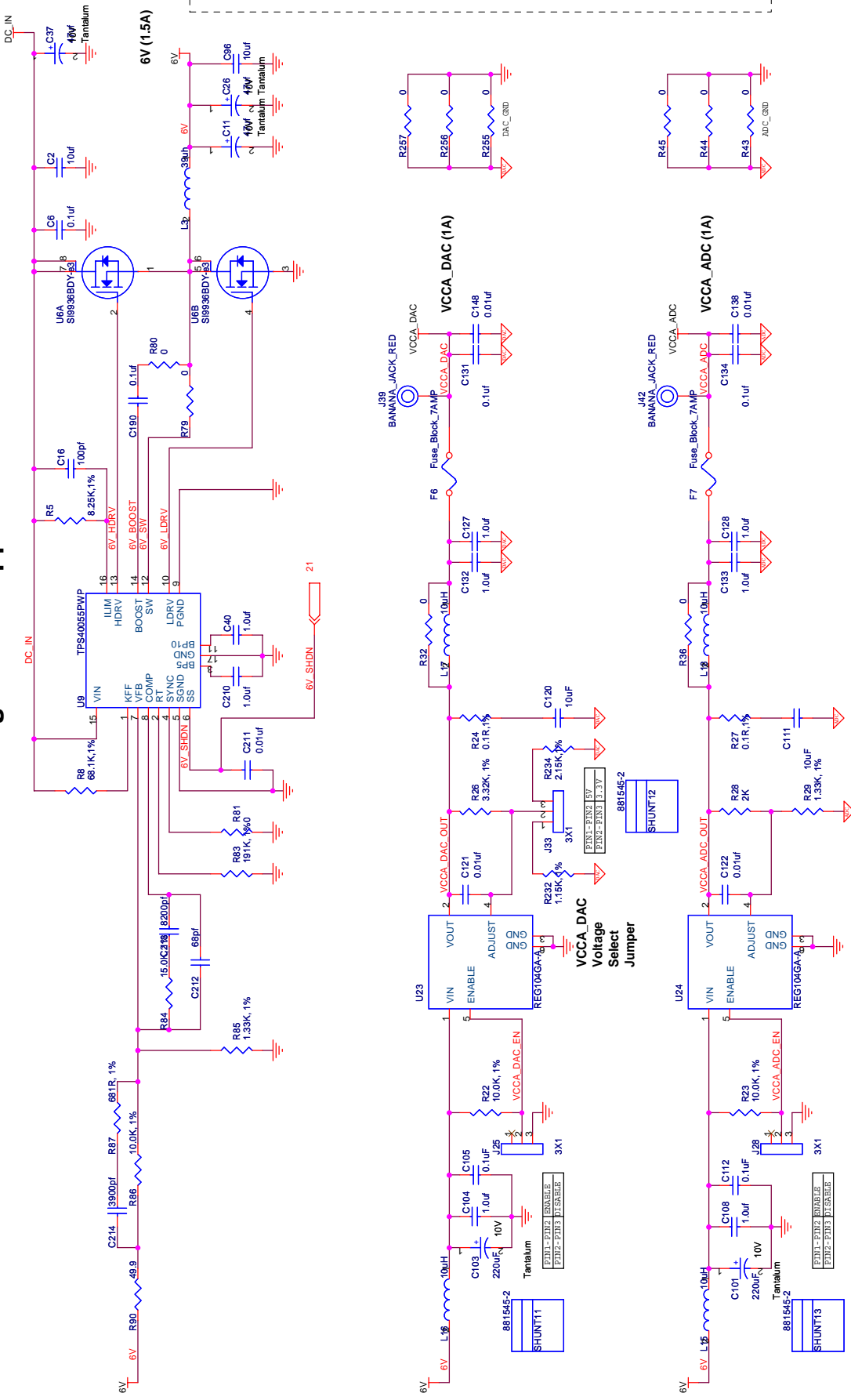
## Main Power Switch



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# Analog Power Supplies



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