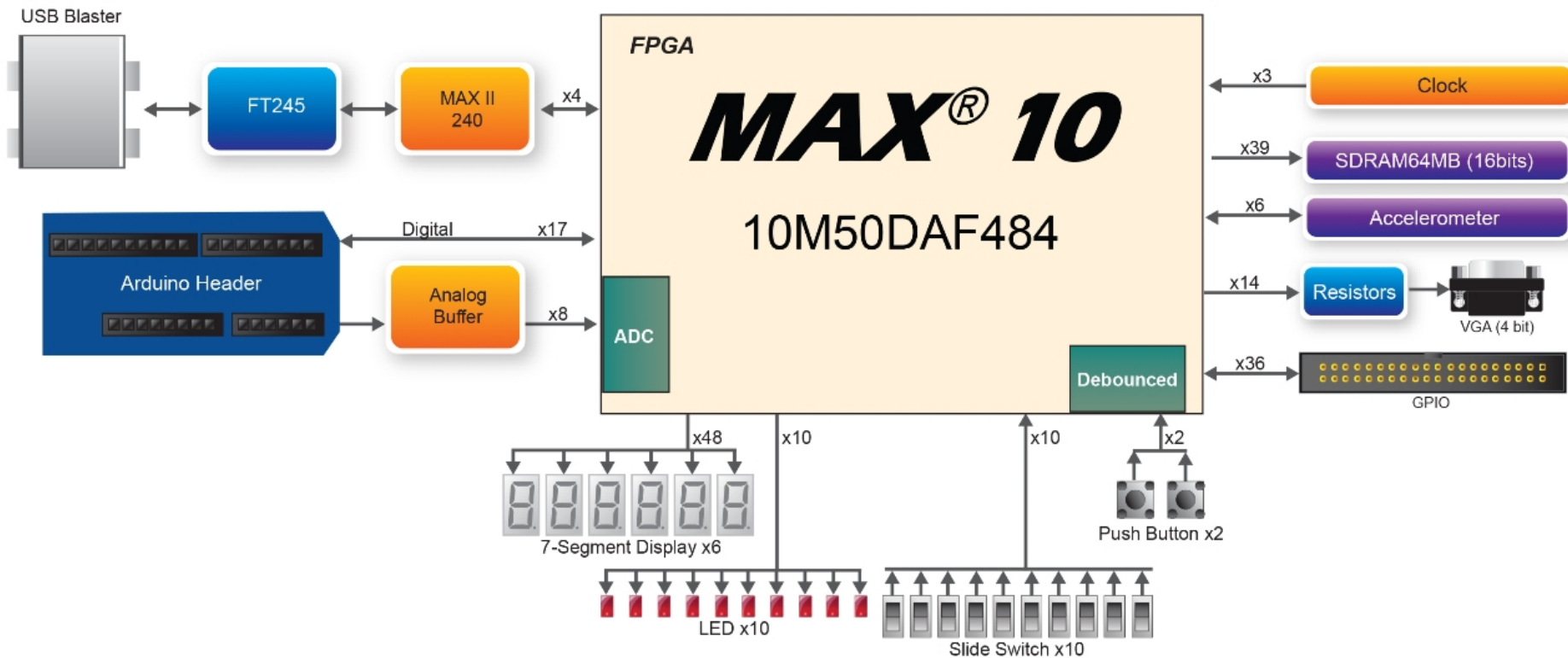


ALTERA MAX10 Development & Education Board (DE10-Lite)

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15	VGA and Accelerometer		
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17	Power - 1.8V, 2.5V, 3.3V		
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MAX10 Bank 3 & 4

GPIO 0

7,13 GPIO [35..0]

Arduino Digital Interface

13 Arduino IO[15..0]

Digital Accelerometer

15 GSENSOR_SDI

15 GSENSOR_SCLK

15 GSENSOR_INT1

15 GSENSOR_INT2

15 GSENSOR_CS_n

15 GSENSOR_SDO

VGA

15 VGA_R[3..0]

U5B

MAX 10 BOTTOM BANKS

BANK-3VCCIO = 3.3V

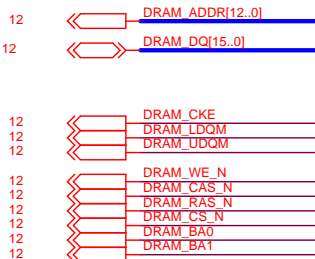
BANK-4VCCIO = 3.3V

GPIO 25	Y7	DIFFIO_RX_B10N	W11	GPIO_19	
GPIO 23	Y8	DIFFIO_RX_B10P	Y11	GPIO_17	
GPIO 34	AB2	DIFFIO_RX_B12N	AB10	GPIO_20	
GPIO 32	AB3	DIFFIO_RX_B12P	AB11	GPIO_18	
GPIO 33	Y3	DIFFIO_RX_B14N	AB12	GPIO_16	
GPIO 31	Y4	DIFFIO_RX_B14P	AB13	GPIO_15	
GPIO 30	AA5	DIFFIO_RX_B17N	W12	GPIO_14	
Arduino_IO0	AB5	DIFFIO_RX_B17P	W13	GPIO_13	
Arduino_IO1	AB6	DIFFIO_RX_B19N	AA14	GPIO_12	
Arduino_IO2	AB7	DIFFIO_RX_B19P	AB15	GSSENSOR_SCLK	
GPIO 24	AA8	DIFFIO_RX_B21N	AA15	GPIO_11	
Arduino_IO3	AB8	DIFFIO_RX_B21P	Y16		
GPIO 22	AA9	DIFFIO_RX_B23N	AB16	GSSENSOR_CS_n	
Arduino_IO4	AB9	DIFFIO_RX_B23P	AA16		
GPIO 9	V4	DIFFIO_RX_B2N	DIFFIO_RX_B42P	AB19	Arduino_IO10
VGA_R3	Y1	DIFFIO_RX_B2P	DIFFIO_RX_B44N	AB20	Arduino_IO13
VGA_R2	Y2	DIFFIO_RX_B4N	DIFFIO_RX_B44P	AA19	Arduino_IO11
VGA_R0	AA1	DIFFIO_RX_B4P	DIFFIO_RX_B46N	Y18	
GPIO 35	AA2	DIFFIO_RX_B6N	DIFFIO_RX_B46P	AB21	Arduino_IO14
GPIO 29	Y5	DIFFIO_RX_B8N	DIFFIO_RX_B50N	AA20	Arduino_IO15
GPIO 27	Y6	DIFFIO_RX_B8P	DIFFIO_RX_B50P	AB17	Arduino_IO8
GPIO 3	W9	DIFFIO_TX_RX_B11N	DIFFIO_RX_B58N	AB18	
GPIO 1	W10	DIFFIO_TX_RX_B11P	DIFFIO_RX_B58P	V11	GSSENSOR_SDI
GPIO 7	W7	DIFFIO_TX_RX_B13N	DIFFIO_TX_RX_B24N	V12	GSSENSOR_SDO
GPIO 5	W8	DIFFIO_TX_RX_B13P	DIFFIO_TX_RX_B24P	R12	
	R10	DIFFIO_TX_RX_B15N	DIFFIO_TX_RX_B26N	P12	
	P10	DIFFIO_TX_RX_B15P	DIFFIO_TX_RX_B26P	AA11	Arduino_IO6
GPIO 28	AA6	DIFFIO_TX_RX_B16N	DIFFIO_TX_RX_B28N	AA12	Arduino_IO7
GPIO 26	AA7	DIFFIO_TX_RX_B16P	DIFFIO_TX_RX_B28P	V13	
GPIO 10	W5	DIFFIO_TX_RX_B18N	DIFFIO_TX_RX_B34N	W14	
GPIO 8	W6	DIFFIO_TX_RX_B18P	DIFFIO_TX_RX_B34P	R13	
Arduino_IO5	Y10	DIFFIO_TX_RX_B22N	DIFFIO_TX_RX_B36N	P13	
GPIO 21	AA10	DIFFIO_TX_RX_B22P	DIFFIO_TX_RX_B36P	Y13	GSSENSOR_INT2
	U6	DIFFIO_TX_RX_B3N	DIFFIO_TX_RX_B37N	Y14	GSSENSOR_INT1
	U7	DIFFIO_TX_RX_B3P	DIFFIO_TX_RX_B37P	V14	
	W4	DIFFIO_TX_RX_B5N	DIFFIO_TX_RX_B39N	W15	
	W3	DIFFIO_TX_RX_B5P	DIFFIO_TX_RX_B39P	U15	
GPIO 6	V7	DIFFIO_TX_RX_B7N	DIFFIO_TX_RX_B41N	V16	
GPIO 4	V8	DIFFIO_TX_RX_B7P	DIFFIO_TX_RX_B41P	AA17	Arduino_IO9
	R9	DIFFIO_TX_RX_B9N	DIFFIO_TX_RX_B43N	Y17	
	P9	DIFFIO_TX_RX_B9P	DIFFIO_TX_RX_B43P	V15	
	AA3	DIFFIO_TX_RX_B9N	DIFFIO_TX_RX_B45N	W16	
	AB4	VREFB3N0	DIFFIO_TX_RX_B45P	Y19	Arduino_IO12
		IO_BANK3	DIFFIO_TX_RX_B49N	W18	
			DIFFIO_TX_RX_B49P	AA13	
			VREFB4N0	AB14	
			IO_BANK4		

10M50DAF484

MAX10 Bank 5 & 6

SDRAM



SWITCH



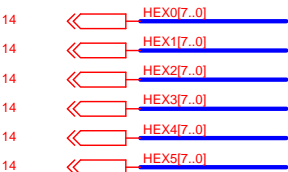
KEY



LED



7-segment Display



U5C

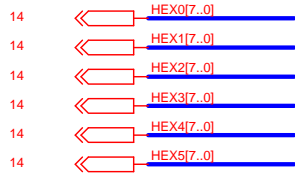
MAX 10 RIGHT BANKS



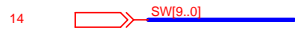
10M50DAF484

MAX10 Bank 7 & 8

7-segment Display



SWITCH



KEY



LED



Arduino Digital Interface



U5D

MAX 10 TOP BANKS

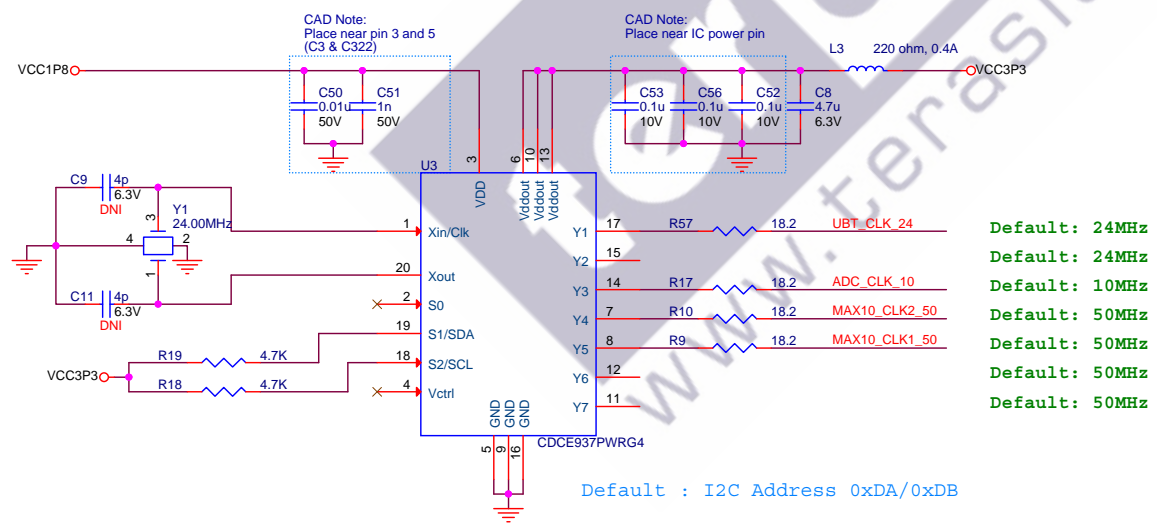
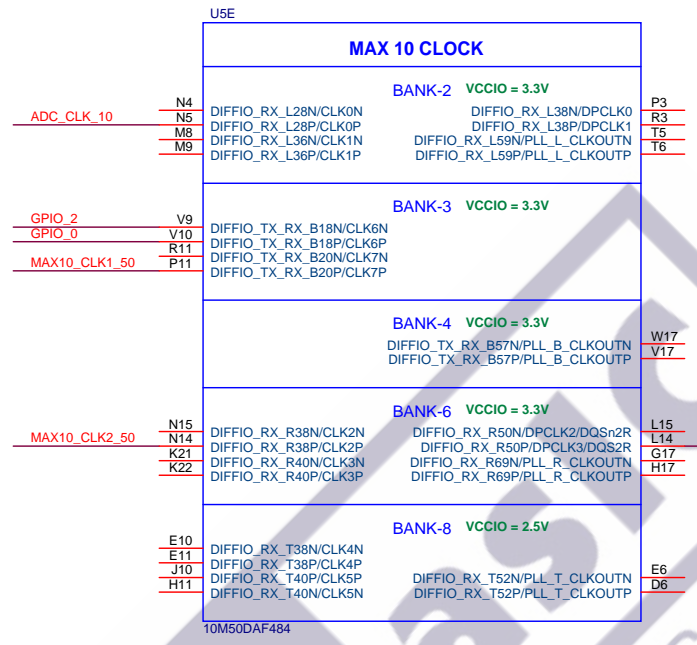
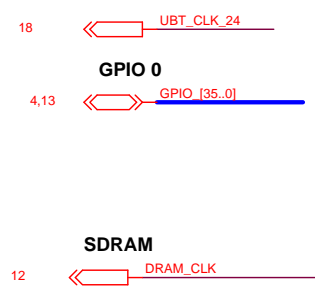
BANK-7VCCIO = 3.3V

BANK-8VCCIO = 2.5V

HEX14	A17	DIFFIO_RX_T10N	DIFFIO_RX_T39N	C7
HEX15	A18	DIFFIO_RX_T10P	DIFFIO_RX_T39P	C8
HEX02	C15	DIFFIO_RX_T15N	DIFFIO_RX_T41N	A6
HEX03	C16	DIFFIO_RX_T15P	DIFFIO_RX_T41P	B7
HEX17	A16	DIFFIO_RX_T16N	DIFFIO_RX_T42P	D8
HEX13	B16	DIFFIO_RX_T16P	DIFFIO_RX_T42P	A4
	J13	DIFFIO_RX_T17N	DIFFIO_RX_T43N	A5
	H14	DIFFIO_RX_T17P	DIFFIO_RX_T43P	E9
LEDR5	C13	DIFFIO_RX_T18N	DIFFIO_RX_T44N	A2
HEX00	C14	DIFFIO_RX_T18P	DIFFIO_RX_T45P	A3
SW8	B14	DIFFIO_RX_T19N	DIFFIO_RX_T45N	B3
SW7	A14	DIFFIO_RX_T19P	DIFFIO_RX_T46P	B4
HEX01	E15	DIFFIO_RX_T19P	DIFFIO_RX_T46N	B5
HEX04	E16	DIFFIO_RX_T1N	DIFFIO_RX_T47P	C4
	E13	DIFFIO_RX_T1P	DIFFIO_RX_T47N	E8
LEDR7	D14	DIFFIO_RX_T20N	DIFFIO_RX_T48P	D5
	E12	DIFFIO_RX_T20P	DIFFIO_RX_T48P	C5
LEDR4	D13	DIFFIO_RX_T21P	DIFFIO_RX_T49P	B1
	J12	DIFFIO_RX_T21N	DIFFIO_RX_T51N	B2
	H13	DIFFIO_RX_T22N	DIFFIO_RX_T51P	C2
	A12	DIFFIO_RX_T22P	DIFFIO_RX_T53N	C3
SW4	A12	DIFFIO_RX_T23N	DIFFIO_RX_T53P	D7
SW6	A13	DIFFIO_RX_T23P	VREFB8N0	D7
SW2	D12	DIFFIO_RX_T24N	IO_BANK8	C6
SW3	C12	DIFFIO_RX_T24P		
LEDR2	A10	DIFFIO_RX_T25N		
LEDR8	A11	DIFFIO_RX_T25P		
SW0	C10	DIFFIO_RX_T26N		
SW1	C11	DIFFIO_RX_T26N		
LEDR9	B11	DIFFIO_RX_T26P		
SW5	B12	DIFFIO_RX_T27N		
	J11	DIFFIO_RX_T27P		
	H12	DIFFIO_RX_T28N		
	B8	DIFFIO_RX_T28P		
KEY0	A9	DIFFIO_RX_T31N		
LEDR1	A9	DIFFIO_RX_T31P		
HEX06	C17	DIFFIO_RX_T2N		
HEX05	D17	DIFFIO_RX_T2P		
	C9	DIFFIO_RX_T30N		
LEDR3	B10	DIFFIO_RX_T30N		
KEY1	A7	DIFFIO_RX_T30P		
LEDR0	A8	DIFFIO_RX_T29P		
SW9	F15	DIFFIO_RX_T29N		
Arduino_Reset_n	F16	DIFFIO_RX_T5N		
HEX22	B19	DIFFIO_RX_T5P		
HEX33	C19	DIFFIO_RX_T6N		
HEX16	B17	DIFFIO_RX_T6P		
HEX10	C18	DIFFIO_RX_T7N		
HEX27	A19	DIFFIO_RX_T7P		
HEX21	A20	DIFFIO_RX_T8N		
LEDR6	E14	DIFFIO_RX_T8P		
	D15	DIFFIO_RX_T9N		
HEX07	D15	DIFFIO_RX_T9P		
	B15	VREFB7N0		
	A15	IO_BANK7		

10M50DAF484

MAX10 Clock

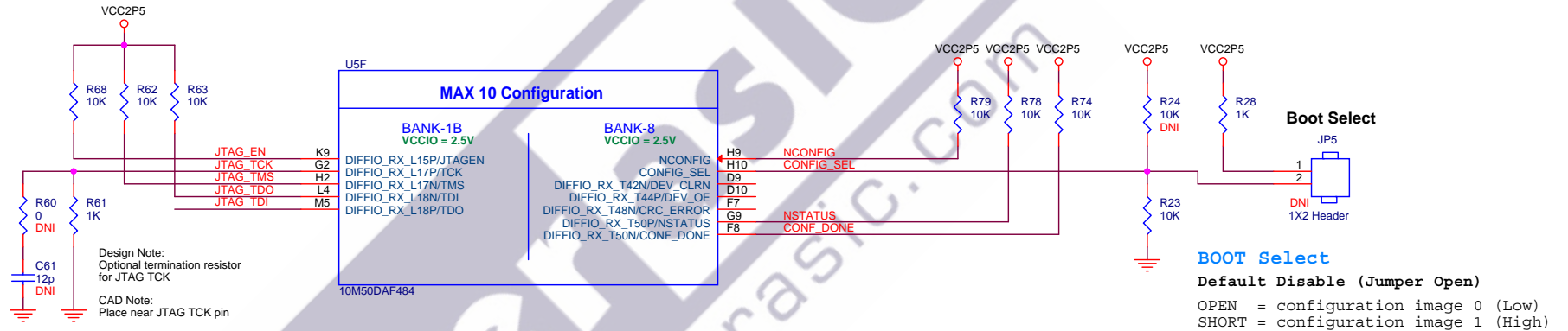
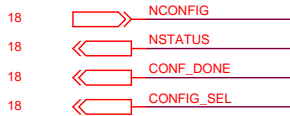


MAX10 Configuration

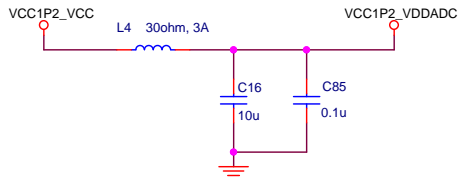
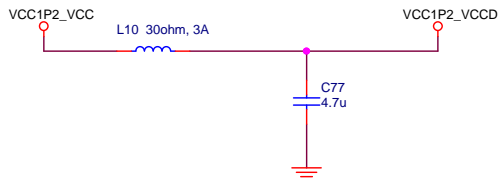
JTAG Interface



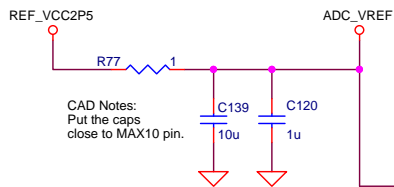
FPGA CONFIG



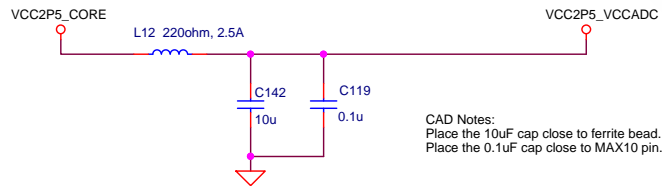
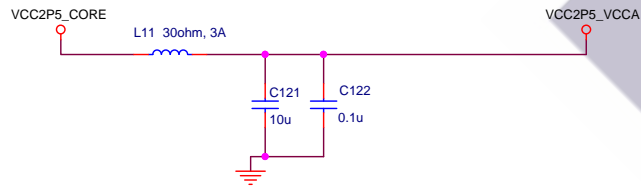
MAX10 Power



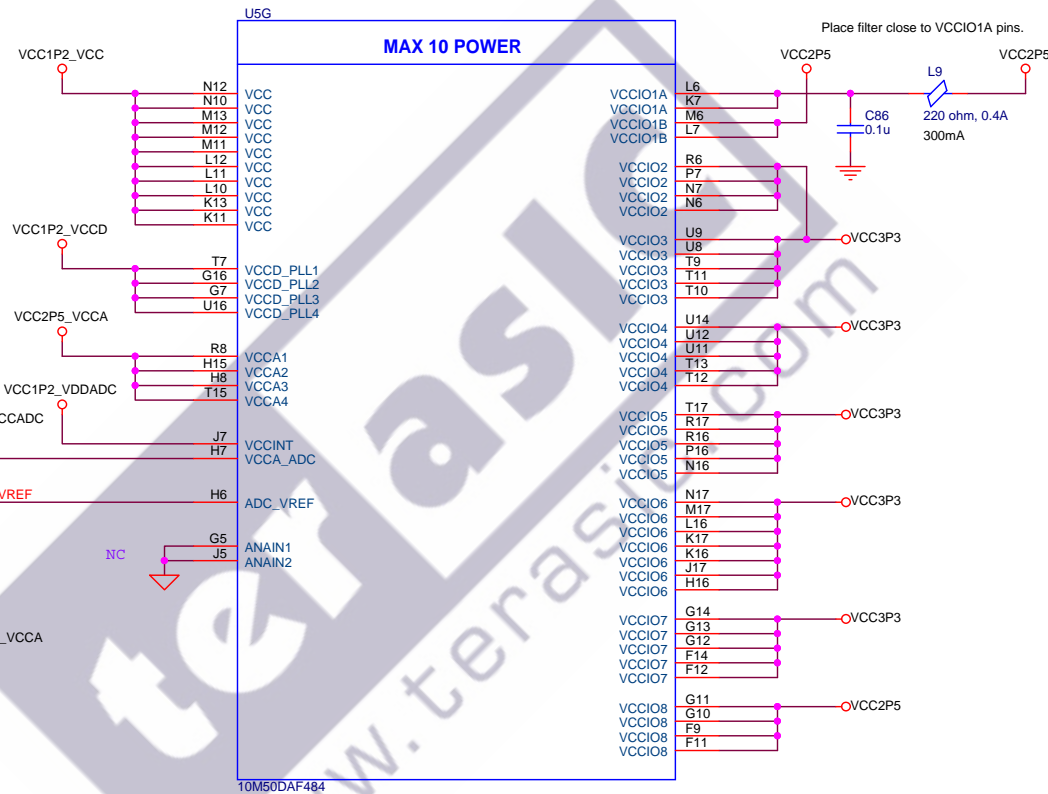
CAD Notes:
Place the 10uF cap close to ferrite bead.
Place the 0.1uF cap close to MAX10 pin.



CAD Notes:
Put the caps
close to MAX10 pin.

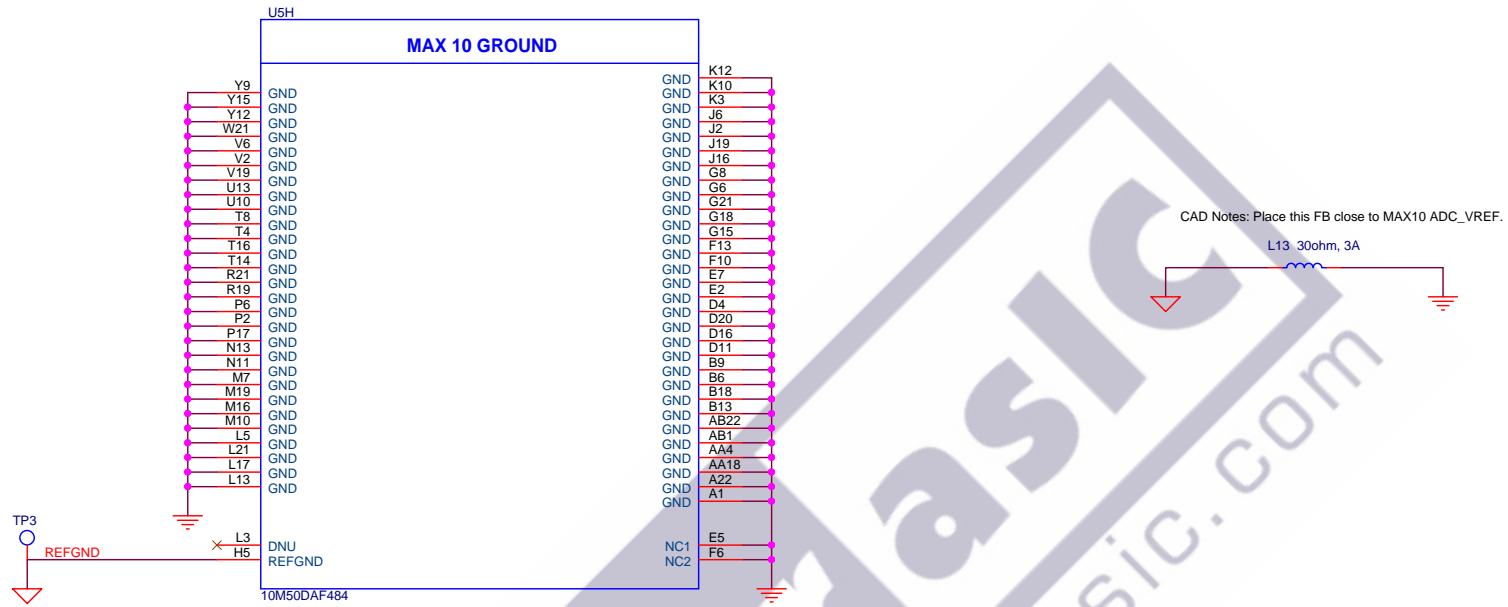


CAD Notes:
Place the 10uF cap close to ferrite bead.
Place the 0.1uF cap close to MAX10 pin.



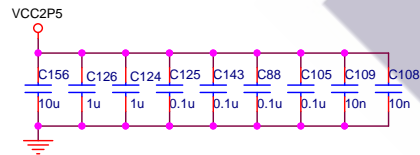
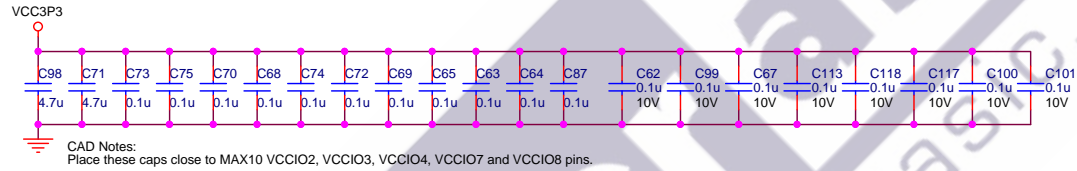
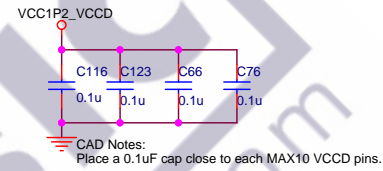
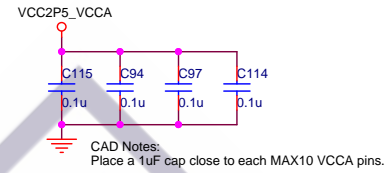
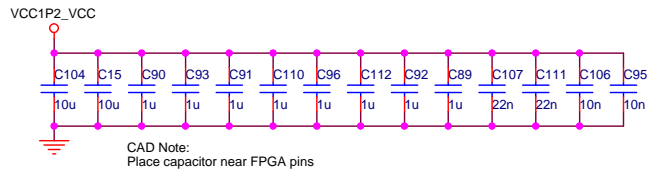
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Title DE10-Lite	
Size B	Document Number MAX10 Power
Date: Friday, January 20, 2017	Sheet 9 of 18
Rev B1	

MAX10 Ground

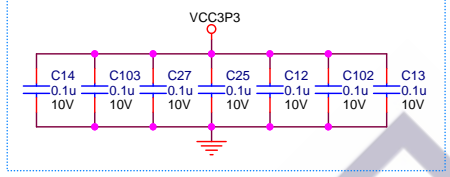


1. Use REFVDD as ground reference.
2. Route analog input signal adjacent to AVSSREF as possible.

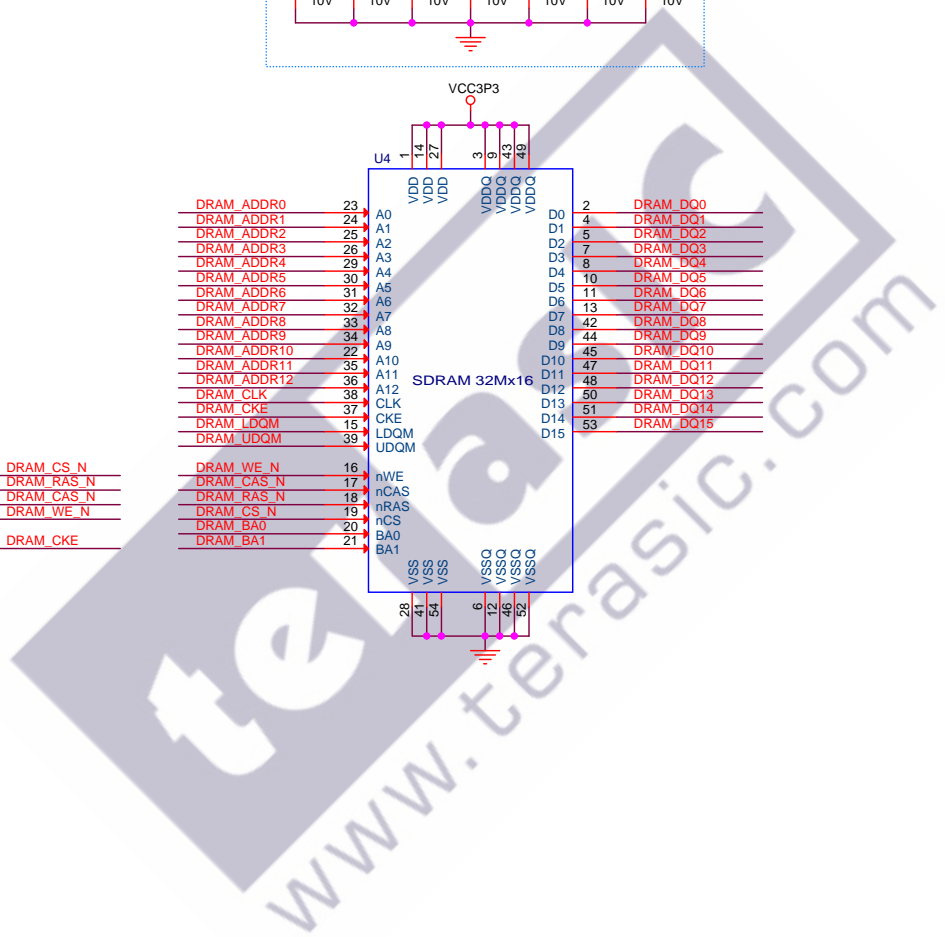
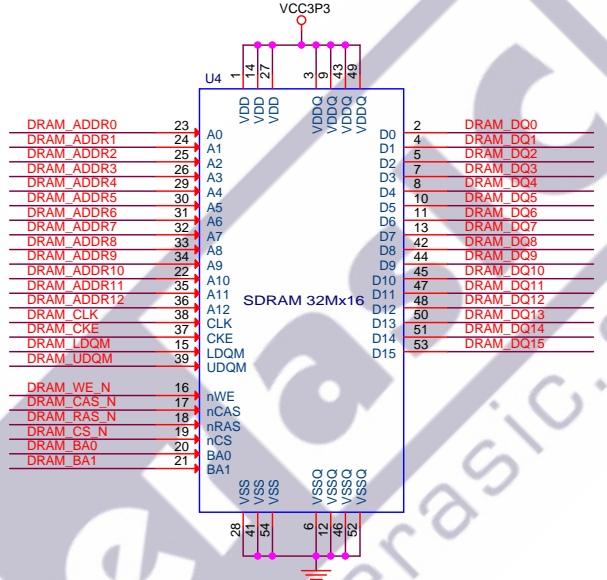
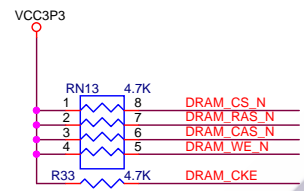
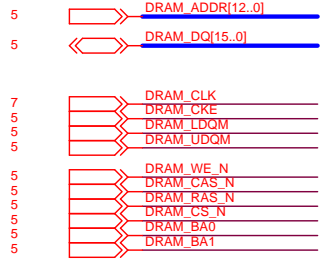
MAX10 Decoupling



CAD Note:
Place near IC power pin



SDRAM



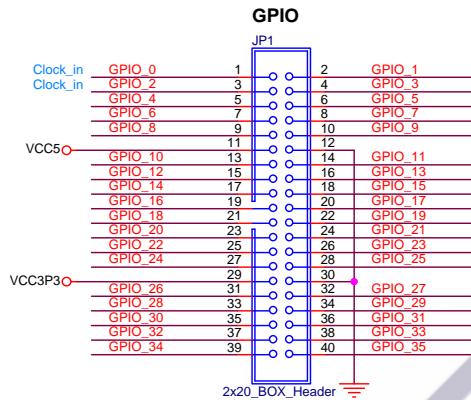
GPIO



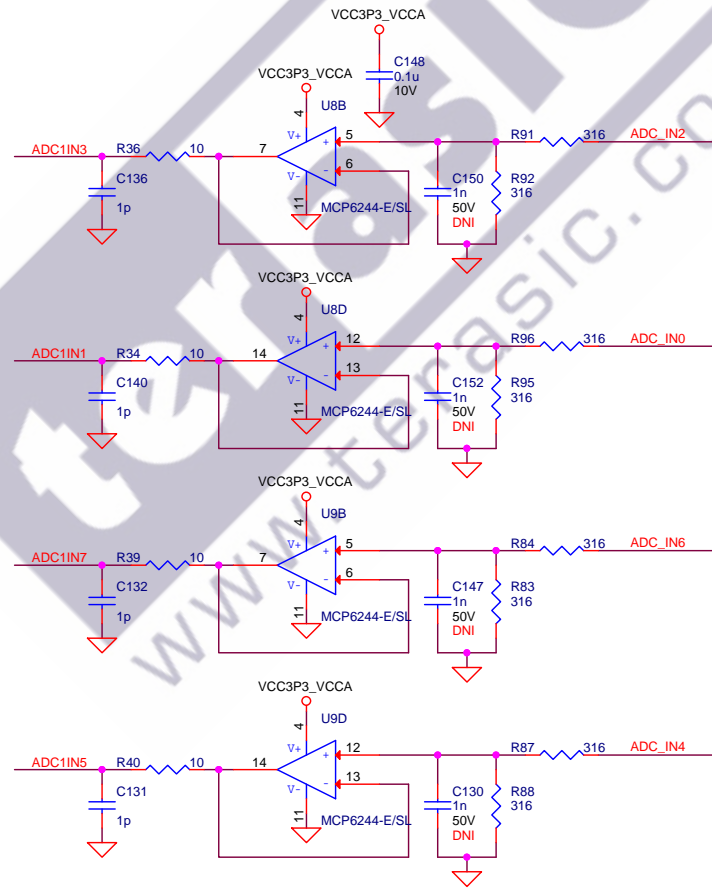
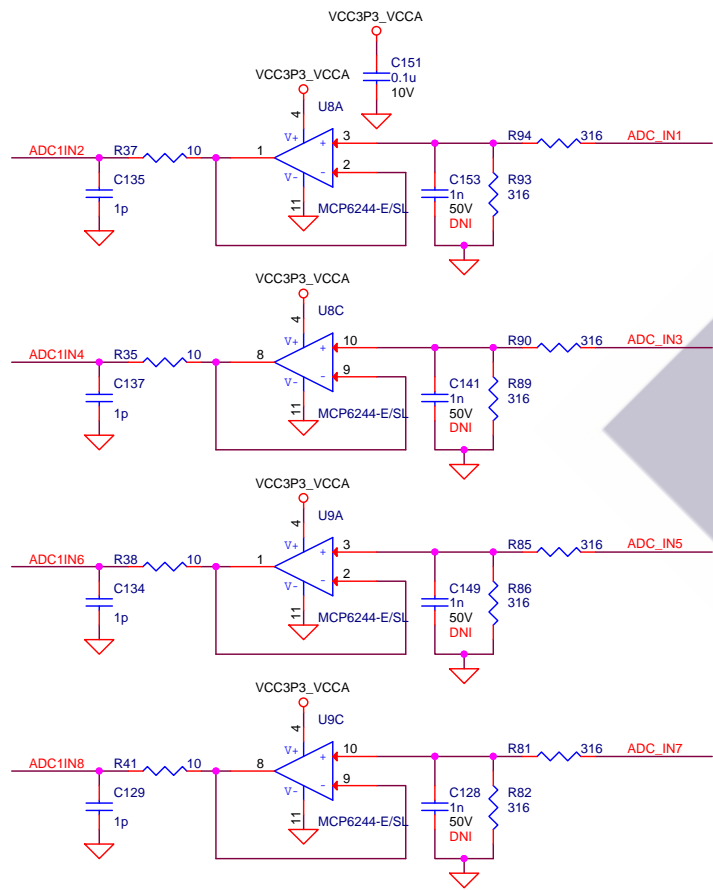
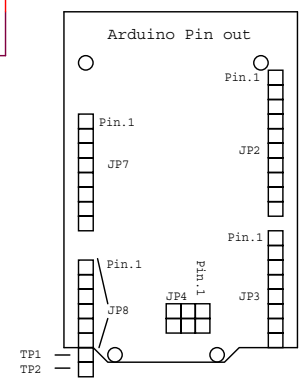
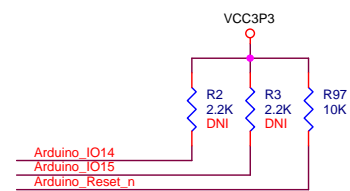
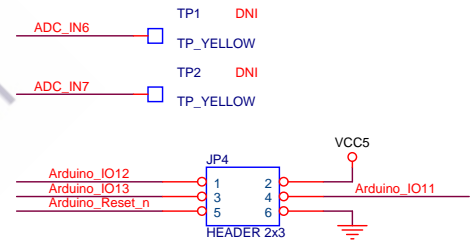
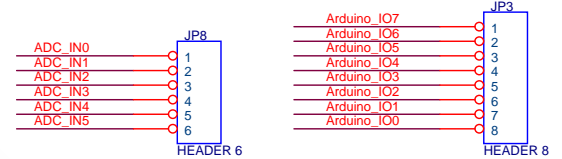
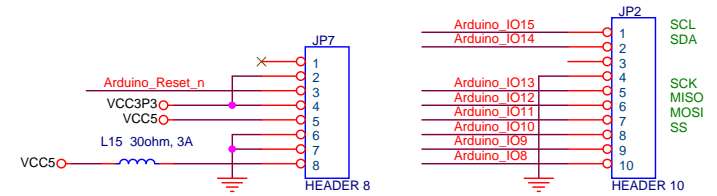
Arduino Digital Interface



Analog input interface

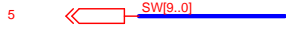


Arduino UNO Rev3



User IO, 7-Seg, LED

SWITCH



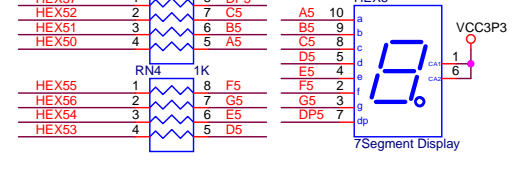
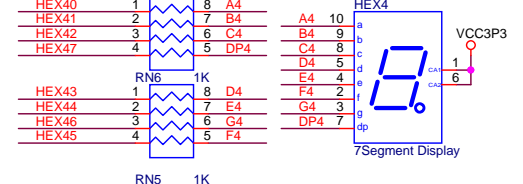
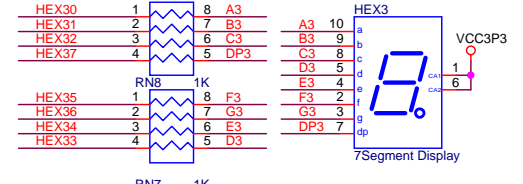
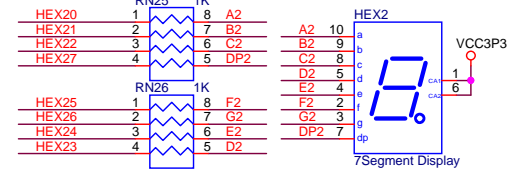
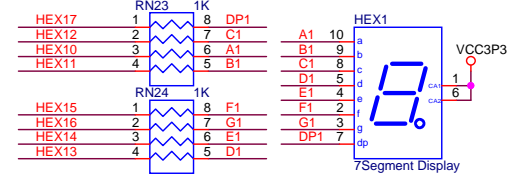
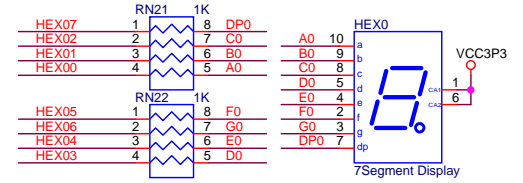
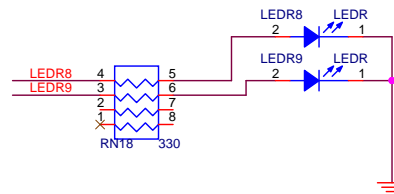
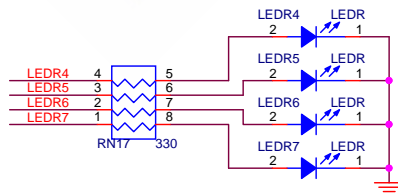
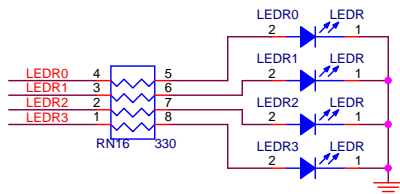
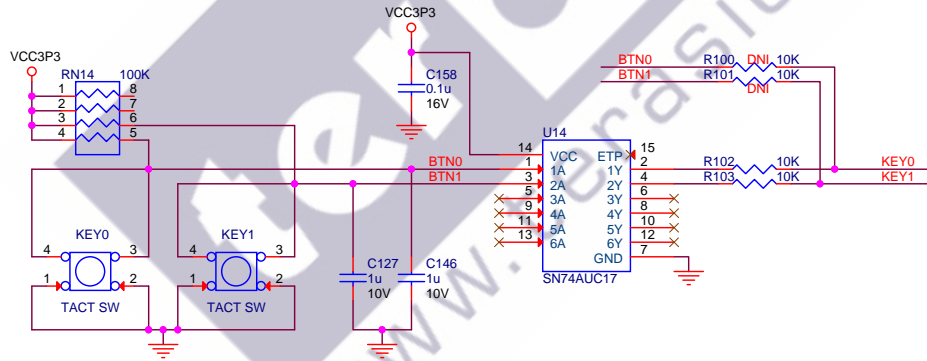
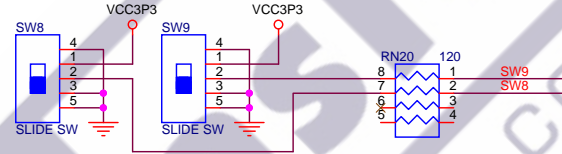
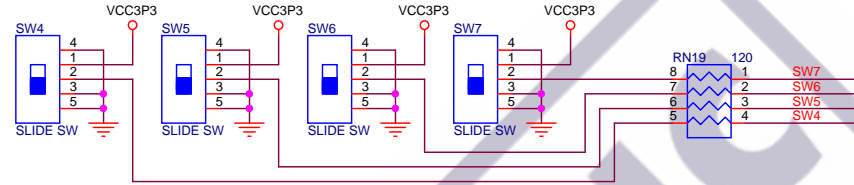
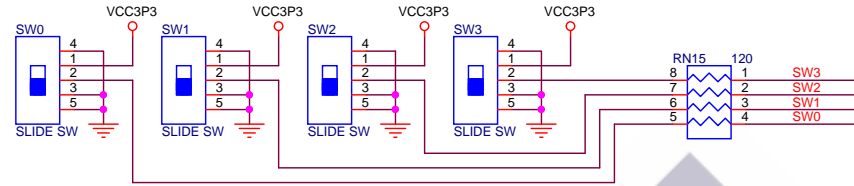
KEY



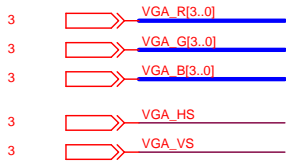
LED



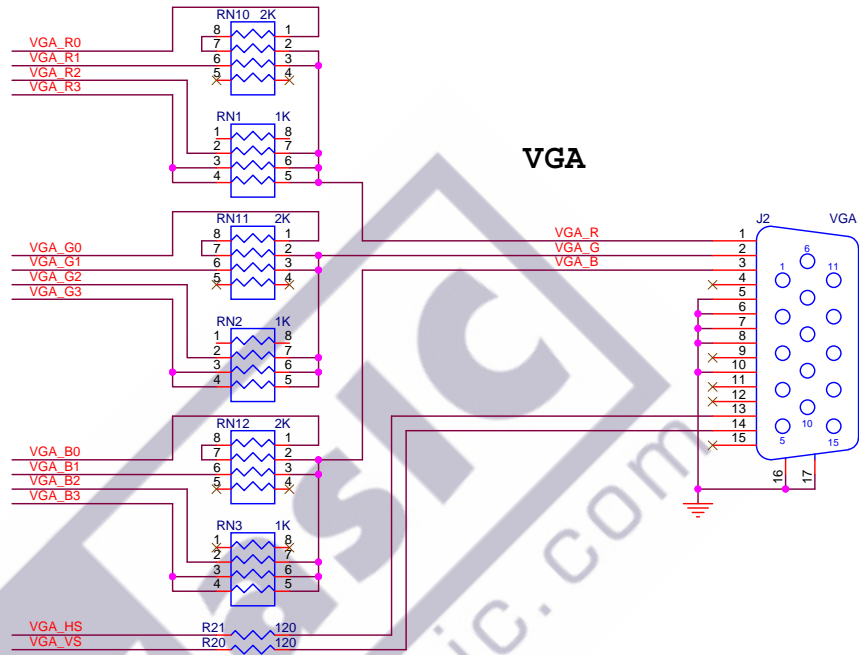
7-segment Display



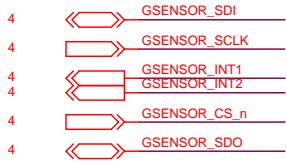
VGA



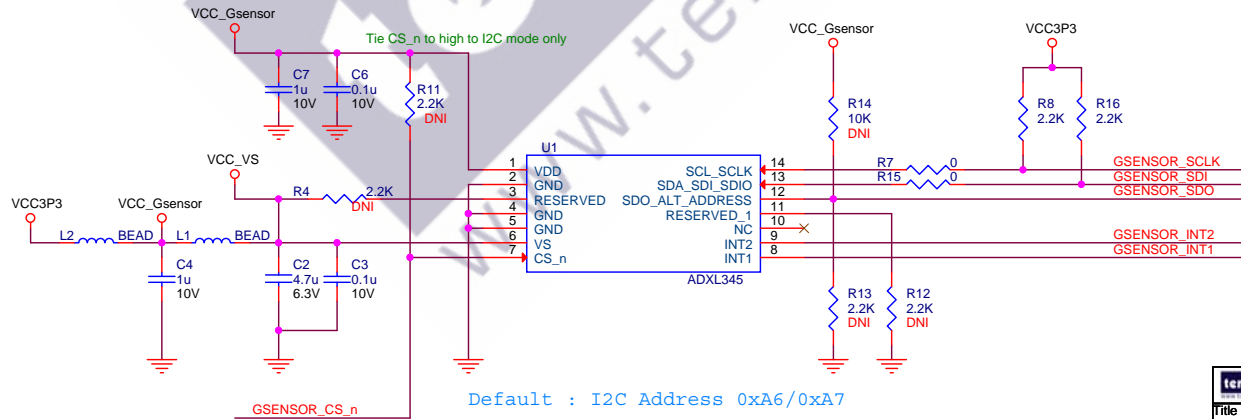
VGA and Accelerometer



Digital Accelerometer



Digital Accelerometer



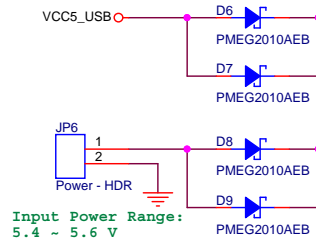
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Title		
DE10-Lite		
Size	Document Number	Rev
B	VGA and Accelerometer	B1
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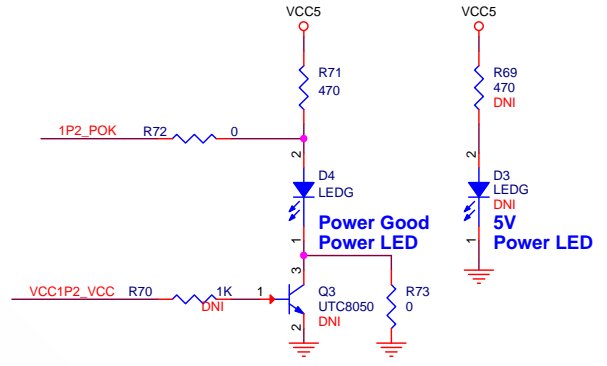
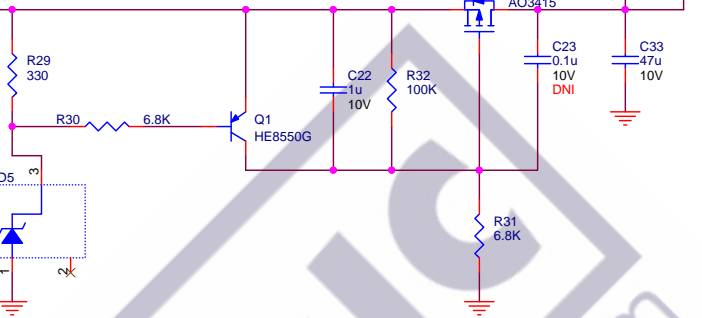
Power - 5V_DCIN / 1.2V

Power up Sequence:
 VCC5 --->
 VCC2P5, VCC3P3 --->
 VCC1P2_VCC

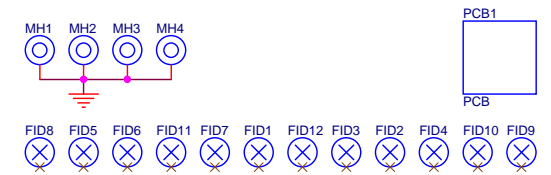
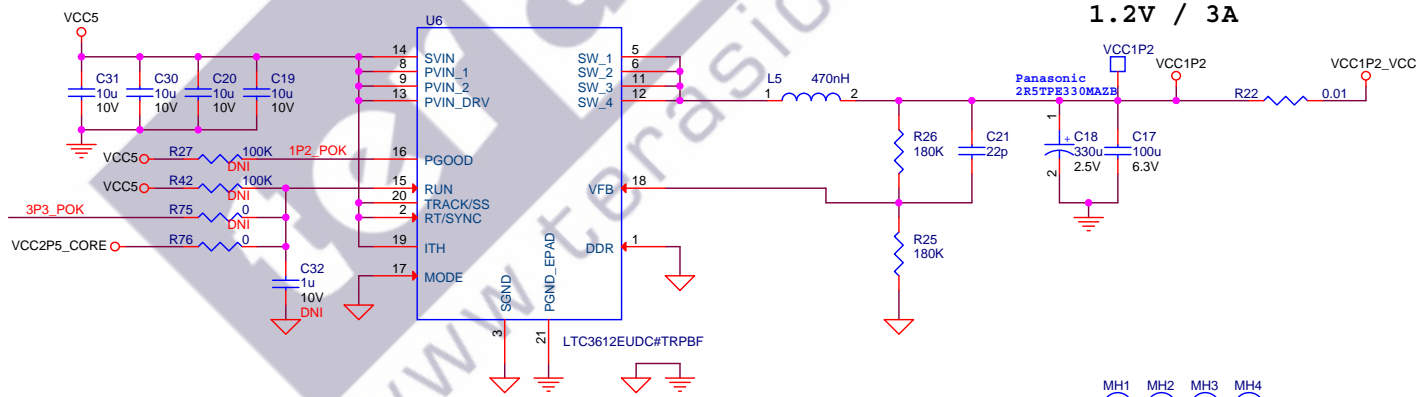
5V Power from USB Port



Overvoltage Protection
 Threshold Voltage : 5.4 ~ 5.6V



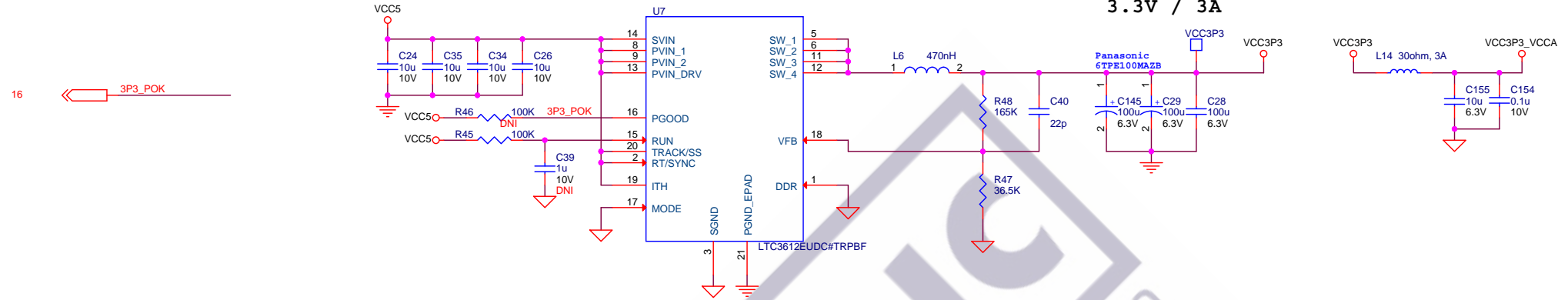
Ramp Time
 Tsoft-start = 1 msec
 Switching Frequency : 2.25MHz
 1.2V / 3A



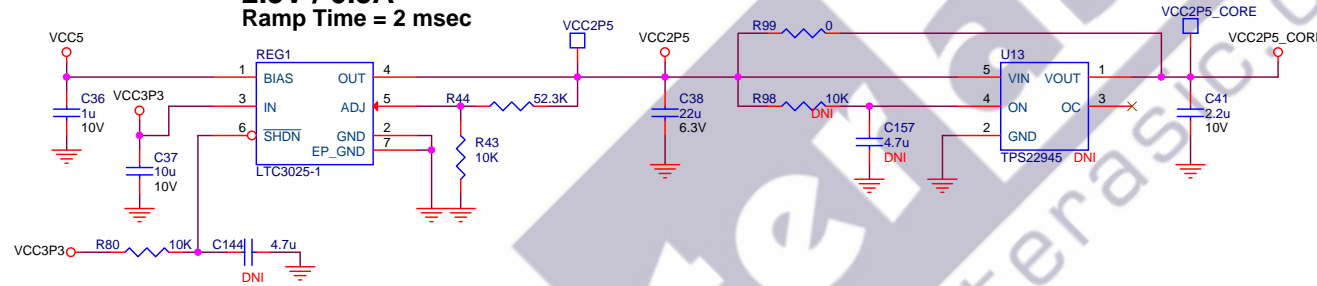
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Power - 3.3V / 2.5V

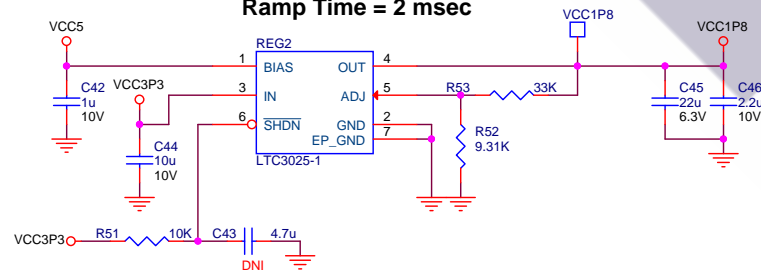
Ramp Time
Tsoft-start = 1 msec
Switching Frequency : 2.25MHz
3.3V / 3A



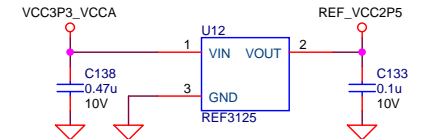
2.5V / 0.5A Ramp Time = 2 msec

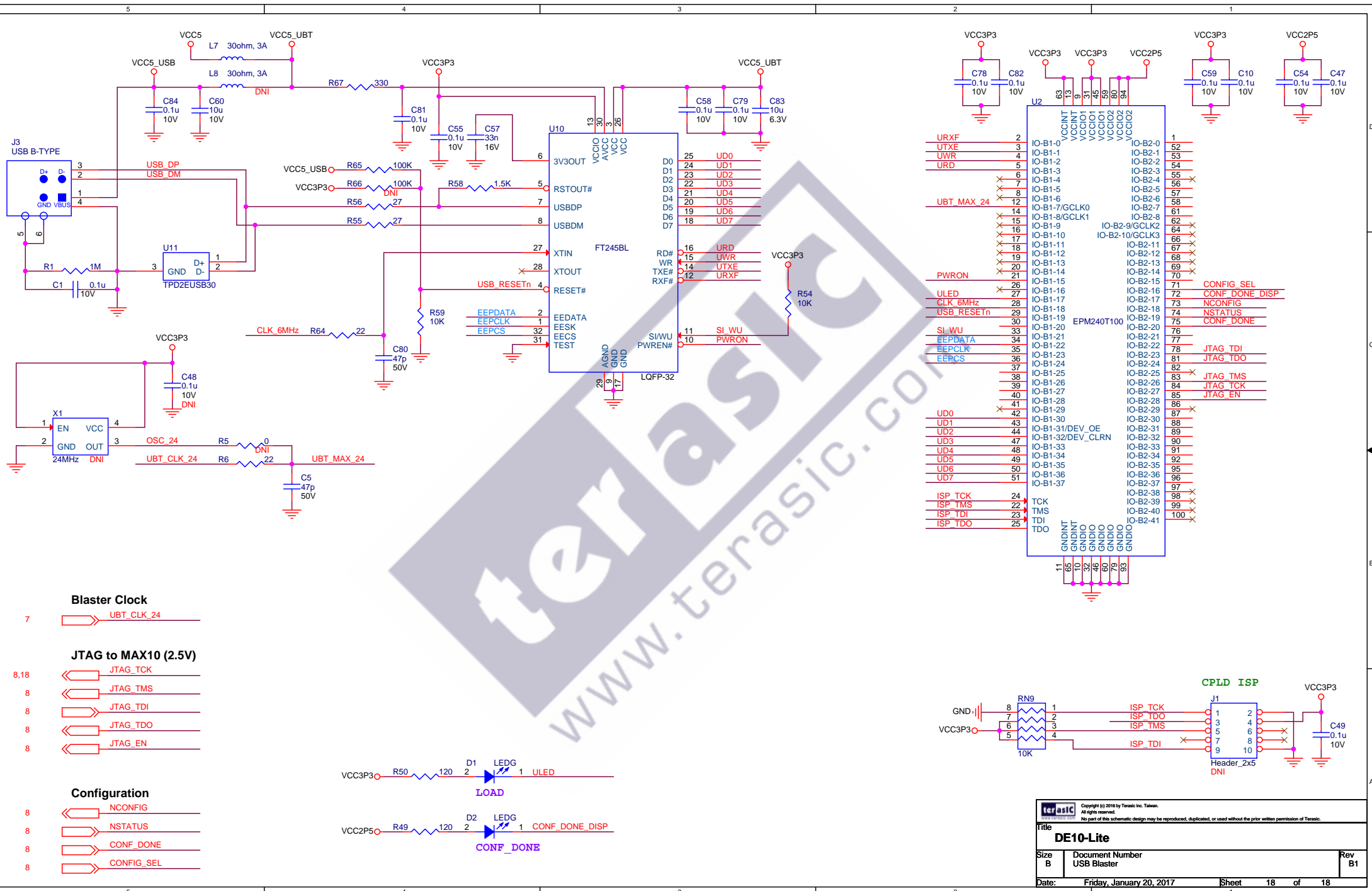


1.8V / 0.5A Ramp Time = 2 msec



Voltage Reference





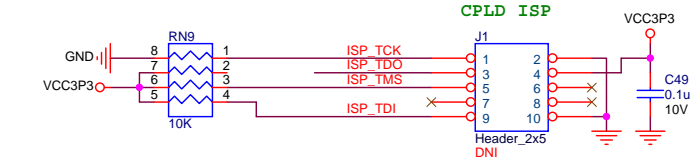
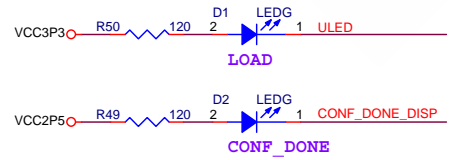
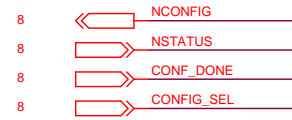
Blaster Clock



JTAG to MAX10 (2.5V)



Configuration



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Title			
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B	USB Blaster	B1	
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