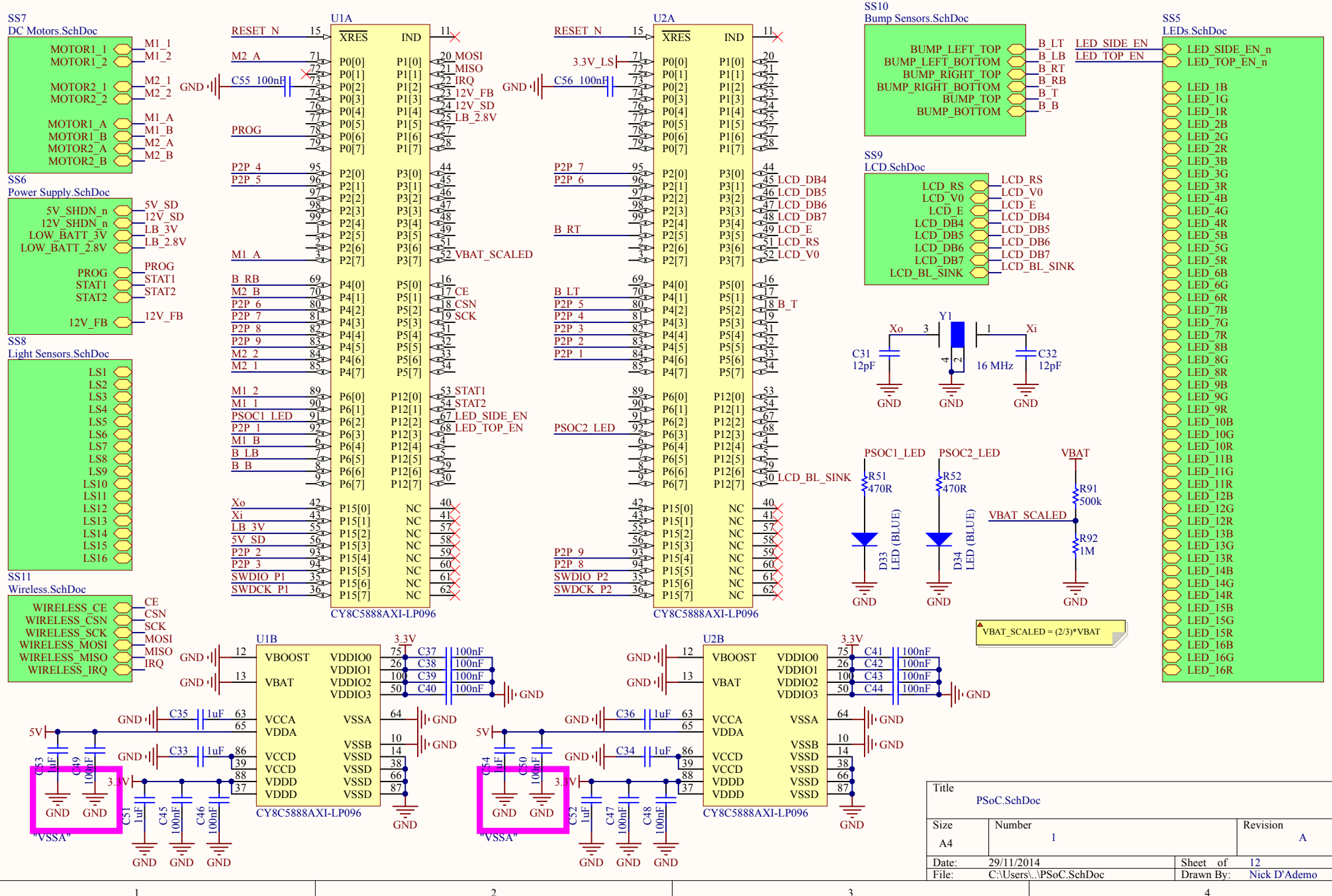

SS7
DC Motors.SchDoc
MOTOR1_1
MOTOR1_2
MOTOR2_1
MOTOR2_2
MOTOR1_A
MOTOR1_B
MOTOR2_A
MOTOR2_B
M1_1
M1_2
M2_1
M2_2
M1_A
M1_B
M2_A
M2_B
SS6
Power Supply.SchDoc
5V_SHDN_n
12V_SHDN_n
LOW_BATT_3V
LOW_BATT_2.8V
PROG
STAT1
STAT2
12V_FB
5V_SD
12V_SD
LB_3V
LB_2.8V
SS8
Light Sensors.SchDoc
LS1
LS2
LS3
LS4
LS5
LS6
LS7
LS8
LS9
LS10
LS11
LS12
LS13
LS14
LS15
LS16
SS11
Wireless.SchDoc
WIRELESS_CE
WIRELESS_CSN
WIRELESS_SCK
WIRELESS_MOSI
WIRELESS_MISO
WIRELESS_IRQ
CE
CSN
SCK
MOSI
MISO
IRQ
U1A
RESET_N
M2_A
C55 100nF
PROG
P2P_4
P2P_5
M1_A
B_RB
M2_B
P2P_6
P2P_7
P2P_8
P2P_9
M2_2
M2_1
M1_2
M1_1
PSOC1_LED
P2P_1
M1_B
B_LB
B_B
Xo
Xi
LB_3V
5V_SD
P2P_2
P2P_3
SWDIO_P1
SWDCK_P1
XRES
IND
P0[0]
P0[1]
P0[2]
P0[3]
P0[4]
P0[5]
P0[6]
P0[7]
P1[0]
P1[1]
P1[2]
P1[3]
P1[4]
P1[5]
P1[6]
P1[7]
P2[0]
P2[1]
P2[2]
P2[3]
P2[4]
P2[5]
P2[6]
P2[7]
P3[0]
P3[1]
P3[2]
P3[3]
P3[4]
P3[5]
P3[6]
P3[7]
P4[0]
P4[1]
P4[2]
P4[3]
P4[4]
P4[5]
P4[6]
P4[7]
P5[0]
P5[1]
P5[2]
P5[3]
P5[4]
P5[5]
P5[6]
P5[7]
P6[0]
P6[1]
P6[2]
P6[3]
P6[4]
P6[5]
P6[6]
P6[7]
P12[0]
P12[1]
P12[2]
P12[3]
P12[4]
P12[5]
P12[6]
P12[7]
P15[0]
P15[1]
P15[2]
P15[3]
P15[4]
P15[5]
P15[6]
P15[7]
MOSI
MISO
IRQ
12V_FB
12V_SD
LB_2.8V
VBAT_SCALED
CE
CSN
SCK
STAT1
STAT2
LED_SIDE_EN
LED_TOP_EN
NC
CY8C5888AXI-LP096
U2A
RESET_N
3.3V_LS
C56 100nF
B_RT
B_LT
P2P_7
P2P_6
P2P_5
P2P_4
P2P_3
P2P_2
P2P_1
PSOC2_LED
P2P_9
P2P_8
SWDIO_P2
SWDCK_P2
LCD_DB4
LCD_DB5
LCD_DB6
LCD_DB7
LCD_E
LCD_RS
LCD_V0
LCD_BL_SINK
CY8C5888AXI-LP096
SS10
Bump Sensors.SchDoc
BUMP_LEFT_TOP
BUMP_LEFT_BOTTOM
BUMP_RIGHT_TOP
BUMP_RIGHT_BOTTOM
BUMP_TOP
BUMP_BOTTOM
B_LT
B_LB
B_RT
B_RB
B_T
B_B
SS9
LCD.SchDoc
LCD_RS
LCD_V0
LCD_E
LCD_DB4
LCD_DB5
LCD_DB6
LCD_DB7
LCD_BL_SINK
Y1
Xo
Xi
C31 12pF
C32 12pF
16 MHz
PSOC1_LED
PSOC2_LED
VBAT
R51 470R
R52 470R
R91 500k
R92 1M
VBAT_SCALED
D33 LED (BLUE)
D34 LED (BLUE)
VBAT_SCALED = (2/3)*VBAT
SS5
LEDs.SchDoc
LED_SIDE_EN
LED_TOP_EN
LED_SIDE_EN_n
LED_TOP_EN_n
LED_1B
LED_1G
LED_1R
LED_2B
LED_2G
LED_2R
LED_3B
LED_3G
LED_3R
LED_4B
LED_4G
LED_4R
LED_5B
LED_5G
LED_5R
LED_6B
LED_6G
LED_6R
LED_7B
LED_7G
LED_7R
LED_8B
LED_8G
LED_8R
LED_9B
LED_9G
LED_9R
LED_10B
LED_10G
LED_10R
LED_11B
LED_11G
LED_11R
LED_12B
LED_12G
LED_12R
LED_13B
LED_13G
LED_13R
LED_14B
LED_14G
LED_14R
LED_15B
LED_15G
LED_15R
LED_16B
LED_16G
LED_16R
U1B
U2B
VBOOST
VBAT
VCCA
VDDA
VCCD
VDDD
VDDIO0
VDDIO1
VDDIO2
VDDIO3
VSSA
VSSB
VSSD
3.3V
5V
GND
C35 1uF
C33 1uF
C36 1uF
C34 1uF
C37 100nF
C38 100nF
C39 100nF
C40 100nF
C41 100nF
C42 100nF
C43 100nF
C44 100nF
C53 1uF
C49 100nF
C54 1uF
C50 100nF
C51 1uF
C45 100nF
C46 100nF
C52 1uF
C47 100nF
C48 100nF
"VSSA"
Title
PSoC.SchDoc
Size
A4
Number
1
Revision
A
Date:
29/11/2014
File:
C:\Users\..\PSoC.SchDoc
Sheet of
12
Drawn By:
Nick D'Ademo

All LEDs have been set to 20mA forward current for 5V via:

RED: R=150R
GREEN: R=91R
BLUE: R=91R

SIDE LED:

Vf @ If=20mA (Min->Typ->Max):

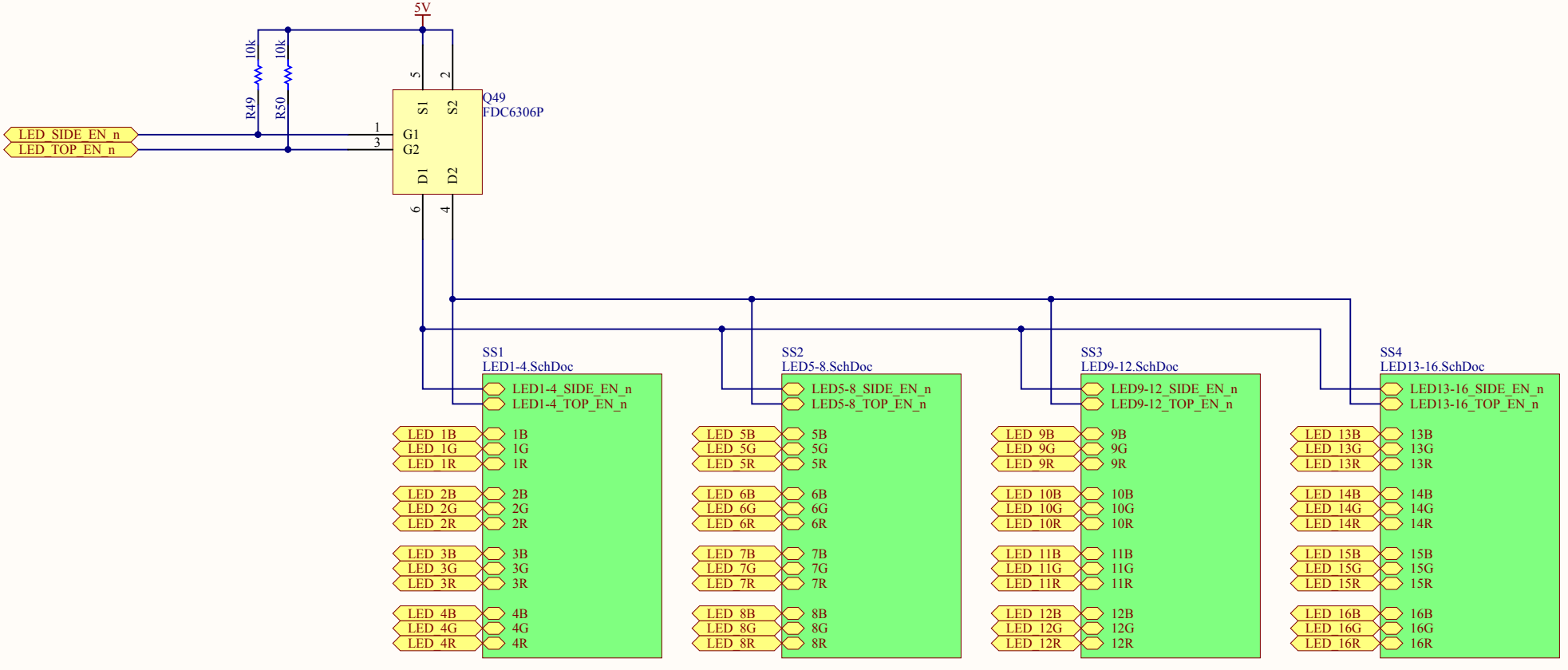
RED: 1.8->2.0->2.4V
GREEN: 3.0->3.3->3.6V
BLUE: 3.0->3.3->3.6V

TOP LED:

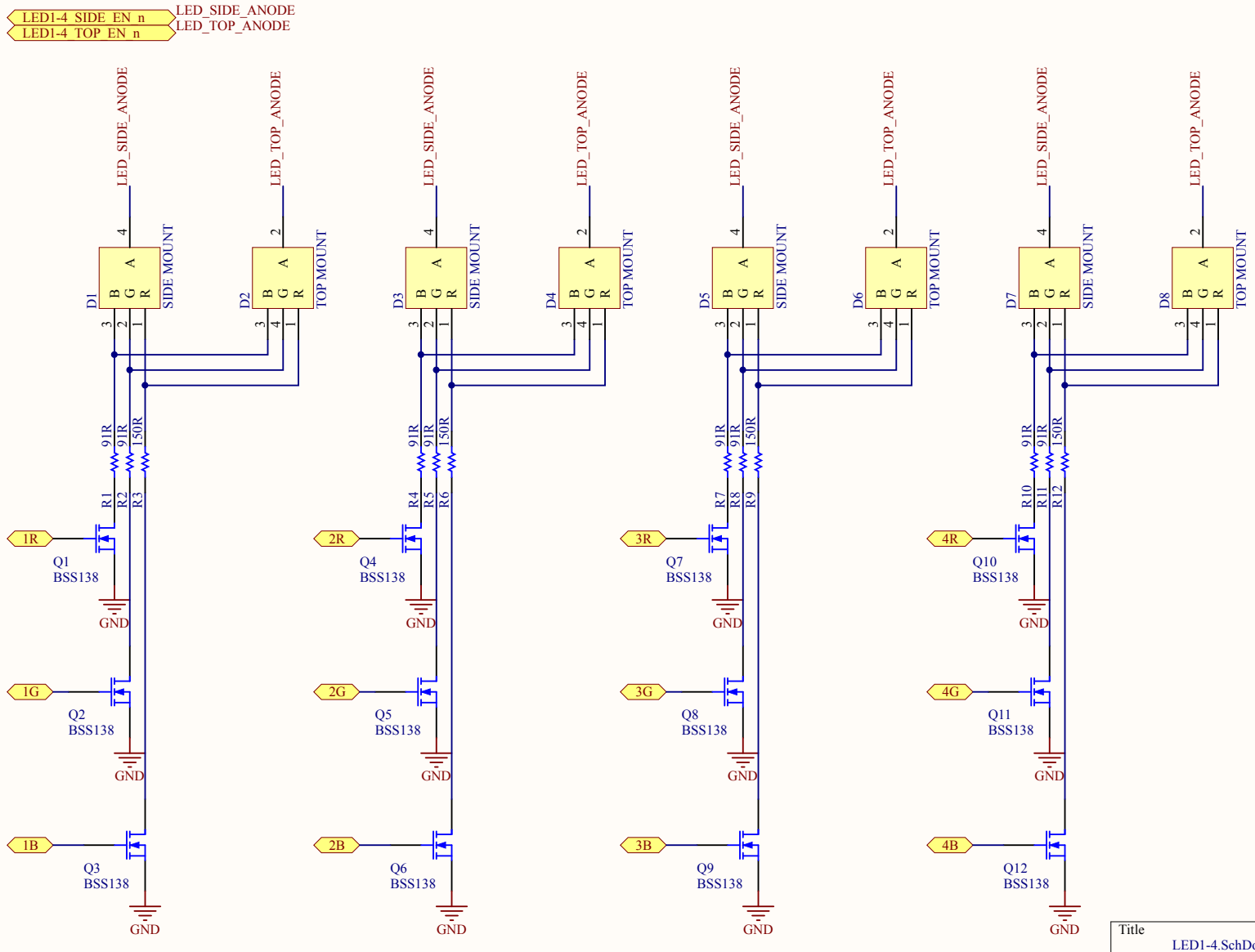
Vf @ If=20mA (Avg->Max):

RED: 2.0->2.6V
GREEN: 3.2->4.0V
BLUE: 3.2->4.0V

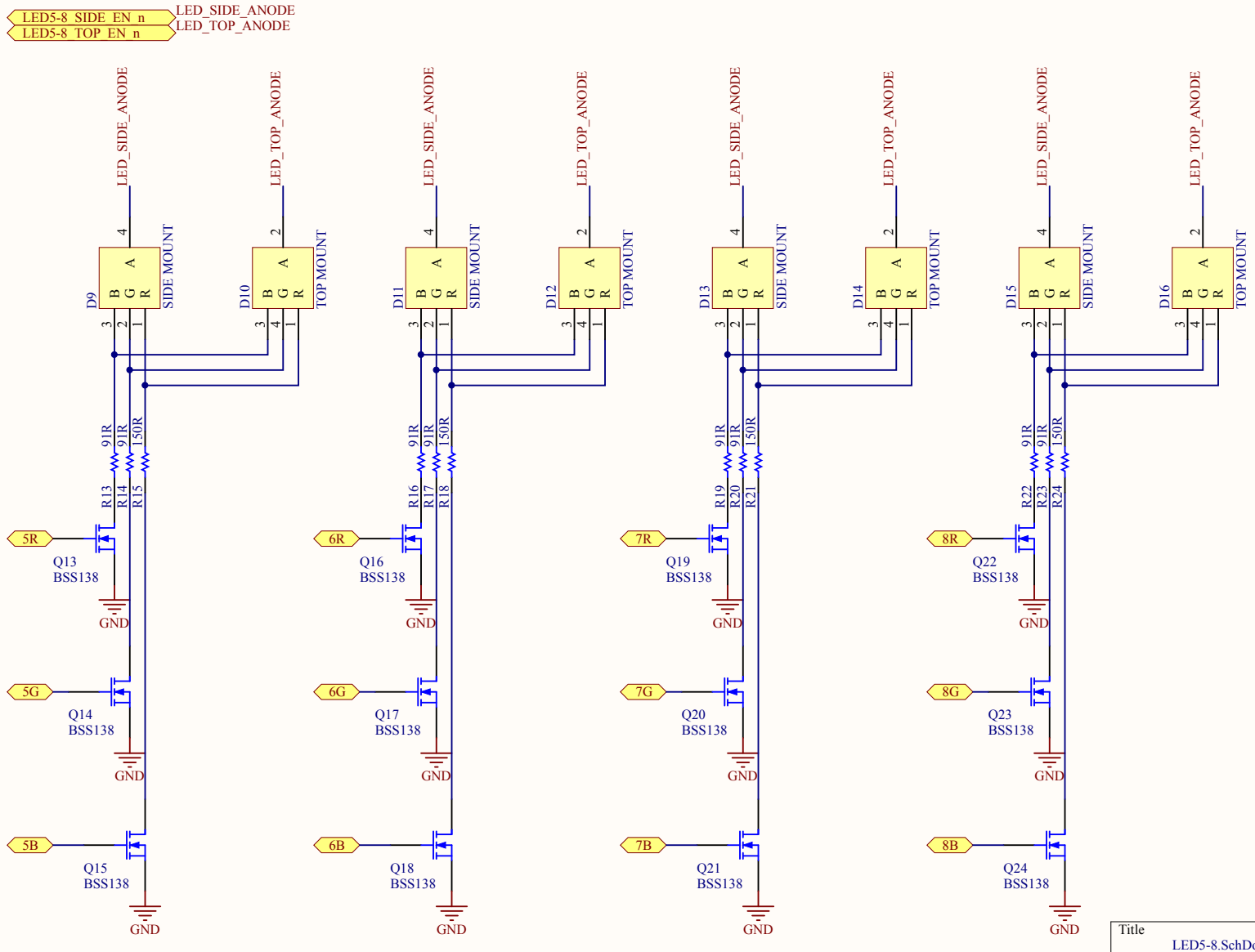
CLV1A-FKB-CJ1M1F1BB7R4S3: 675mcd Red, 1055mcd Green, 337mcd Blue
CLV1A-FKB-CK1N1G1BB7R4S3: 730mcd Red, 1150mcd Green, 365mcd Blue



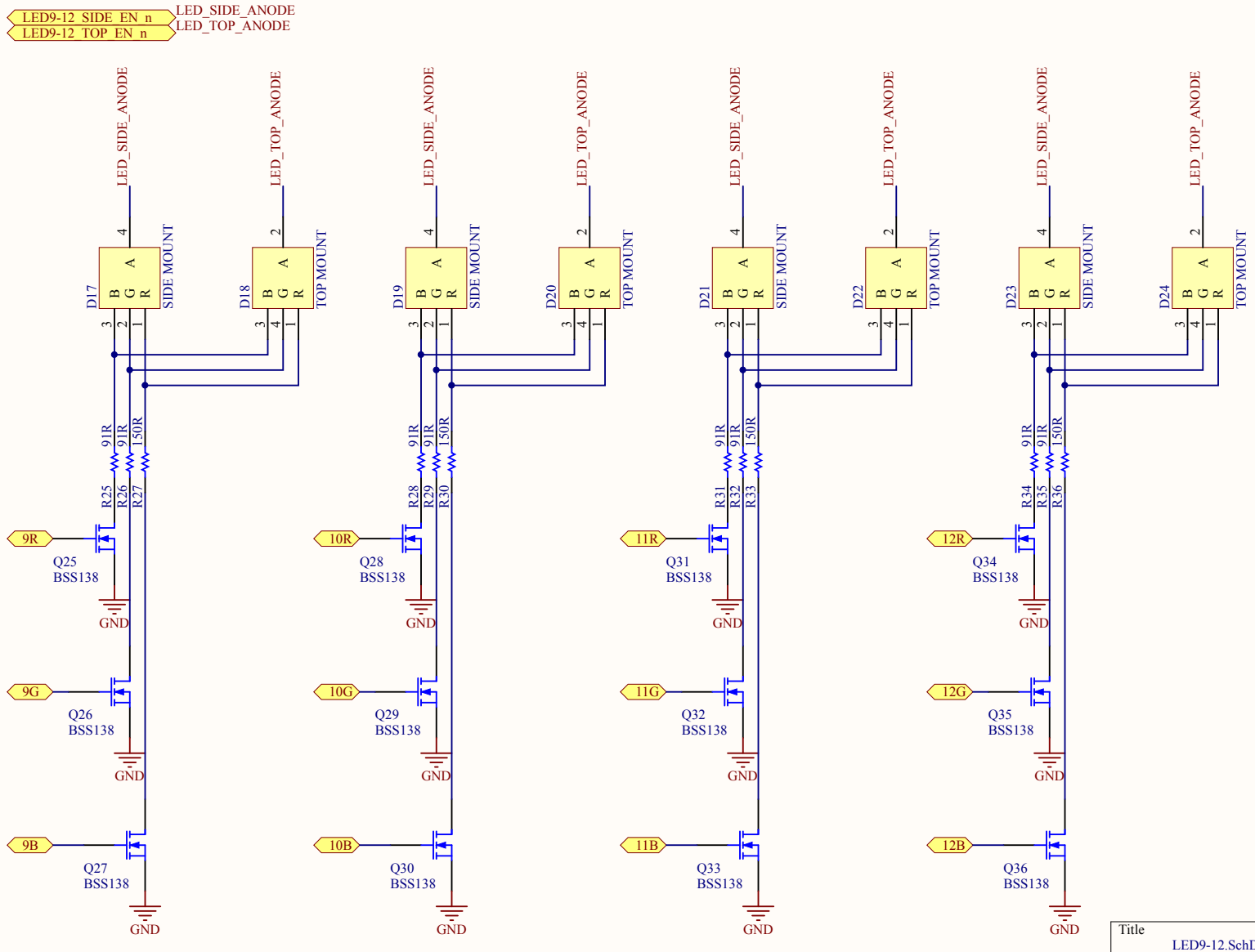
Title: LEDs.SchDoc		
Size: A4	Number: 2	Revision: A
Date: 29/11/2014		Sheet of 12
File: C:\Users\..\LEDs.SchDoc		Drawn By: Nick D'Ademo



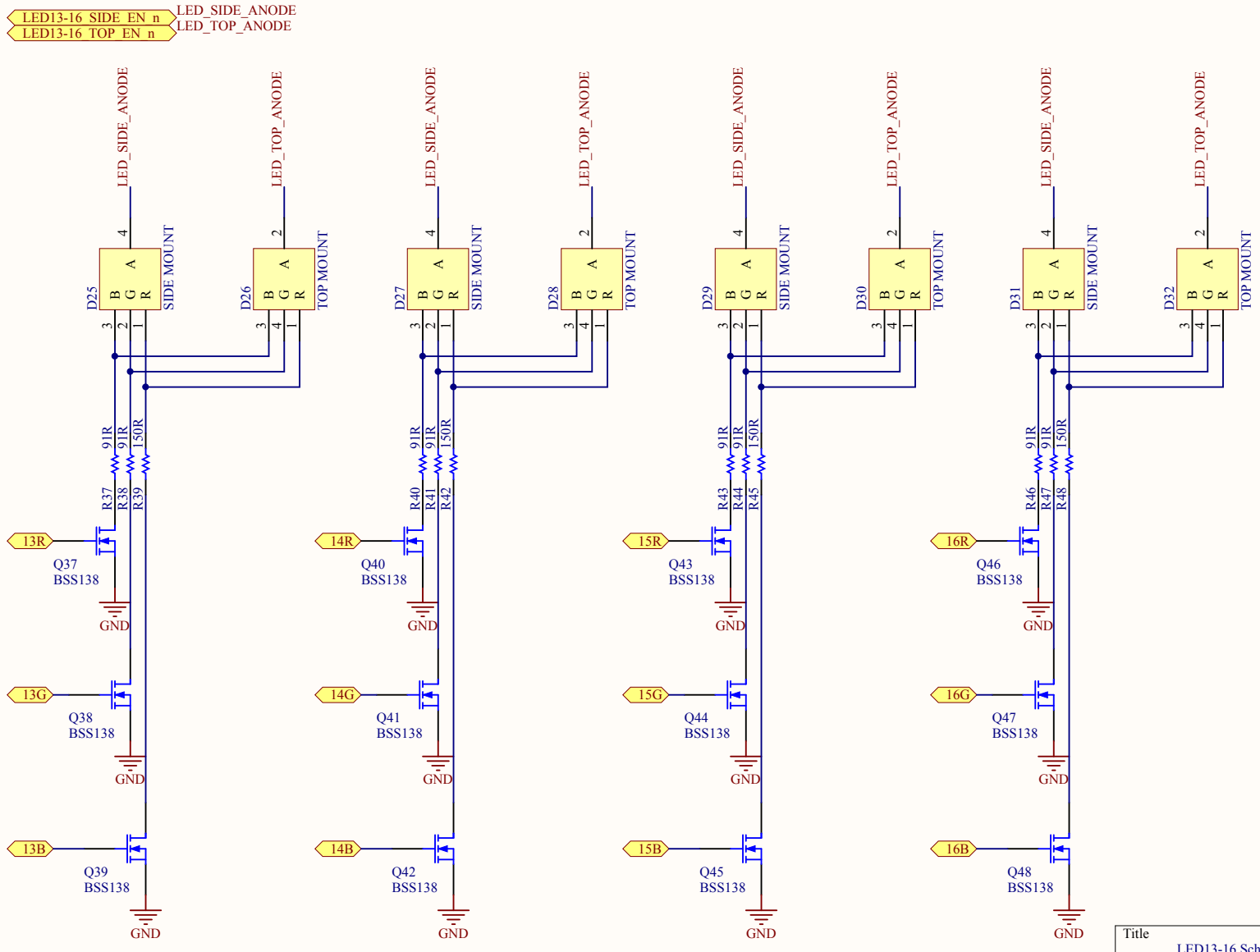
Title	LED1-4.SchDoc		
Size: A4	Number: 3		Revision: A
Date: 29/11/2014		Sheet of 12	
File: C:\Users\..\LED1-4.SchDoc		Drawn By: Nick D'Ademo	



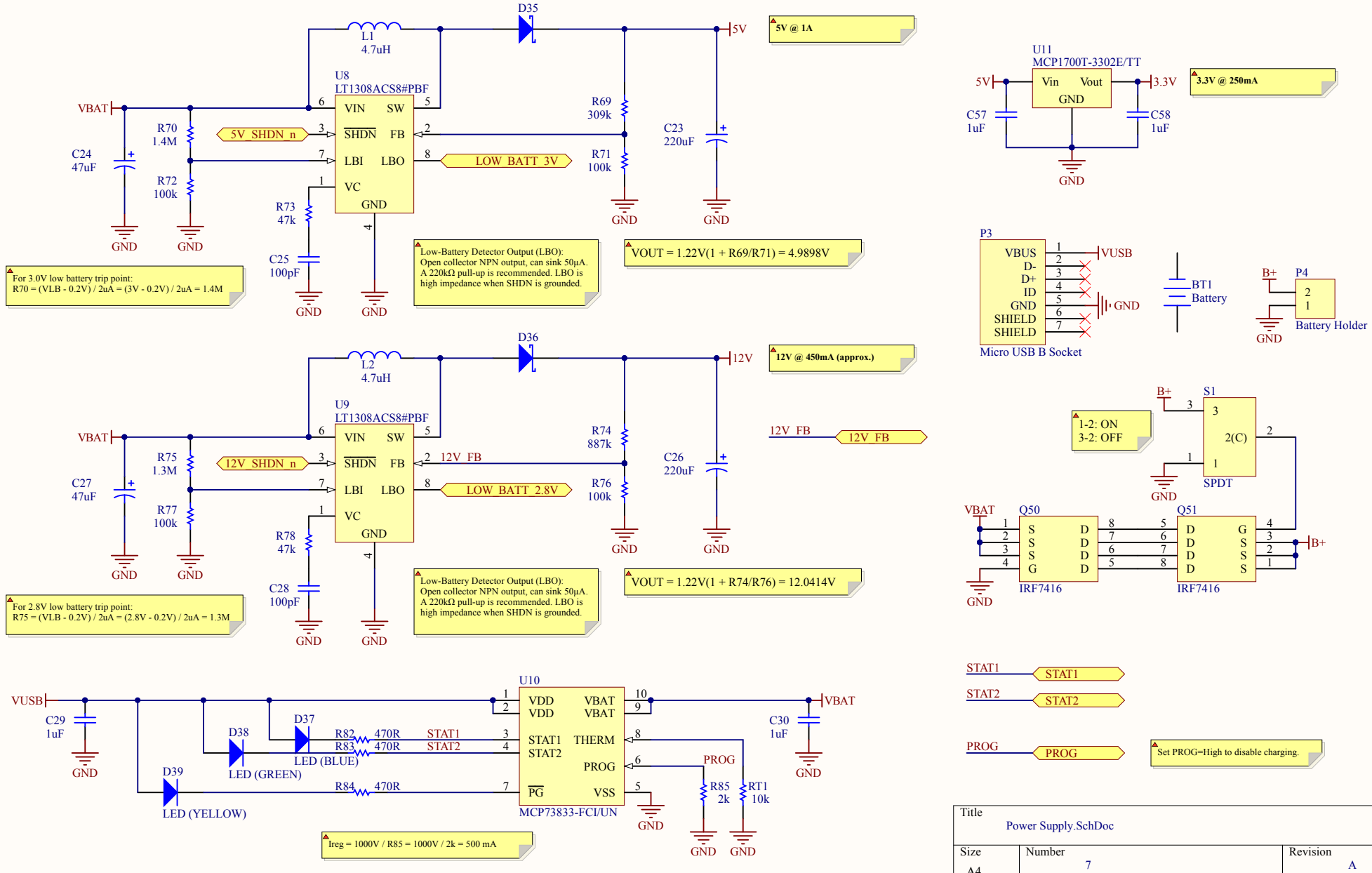
Title	LED5-8.SchDoc		
Size: A4	Number: 4		Revision: A
Date: 29/11/2014		Sheet of 12	
File: C:\Users\..\LED5-8.SchDoc		Drawn By: Nick D'Ademo	



Title	LED9-12.SchDoc	
Size: A4	Number: 5	Revision: A
Date: 29/11/2014	Sheet of 12	
File: C:\Users\..\LED9-12.SchDoc	Drawn By: Nick D'Ademo	



Title	LED13-16.SchDoc		
Size: A4	Number: 6	Revision: A	
Date: 29/11/2014		Sheet of 12	
File: C:\Users\..\LED13-16.SchDoc		Drawn By: Nick D'Ademo	



Title: Power Supply.SchDoc		
Size: A4	Number: 7	Revision: A
Date: 29/11/2014		Sheet of 12
File: C:\Users\..\Power Supply.SchDoc		Drawn By: Nick D'Ademo

AMS light sensors (www.ams.com) have the following pin-outs:
GND - 1
VDD - 2
OUT - 3

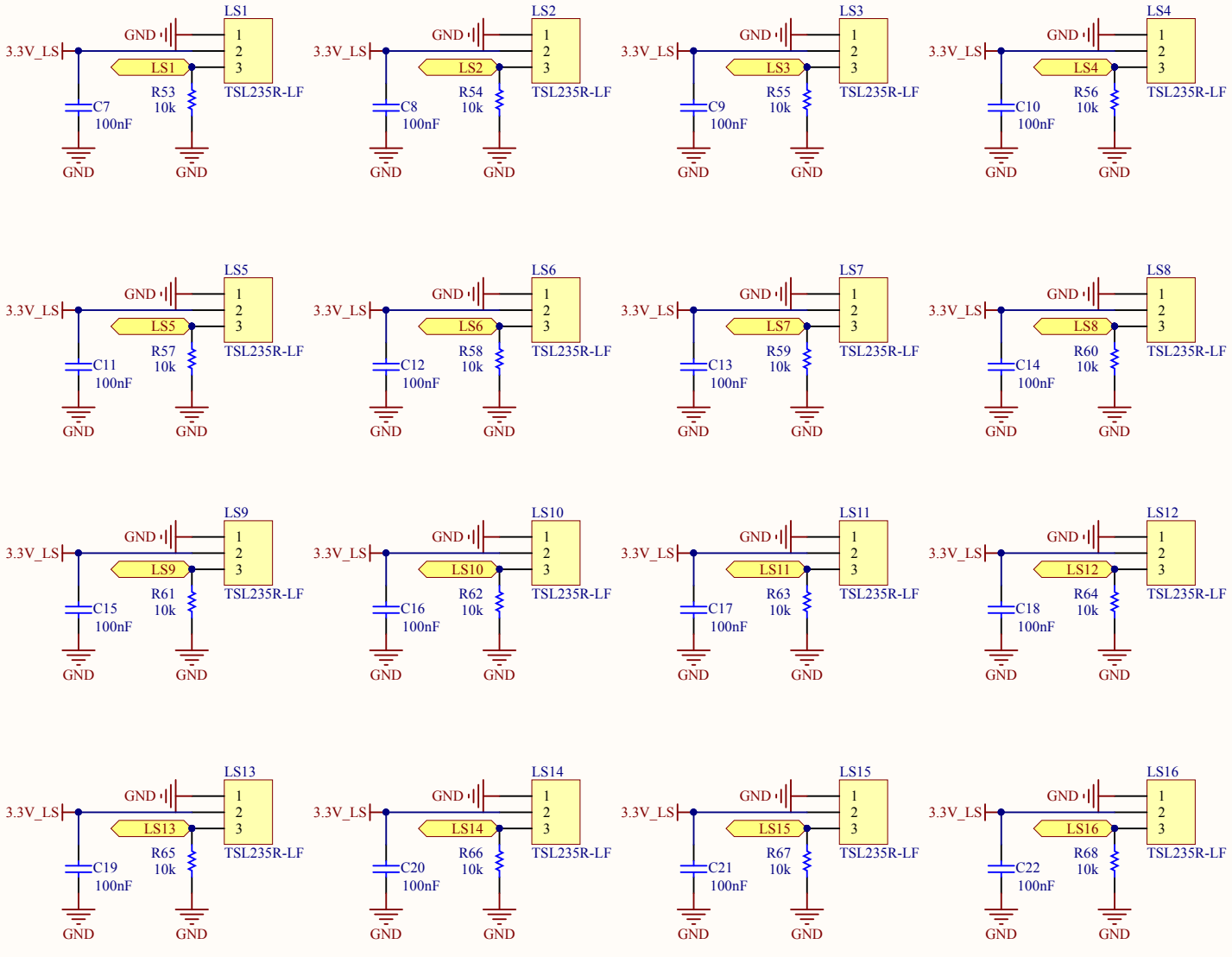
Light-to-Frequency parts:

TSL235
TSL237
TSL245 (IR light)

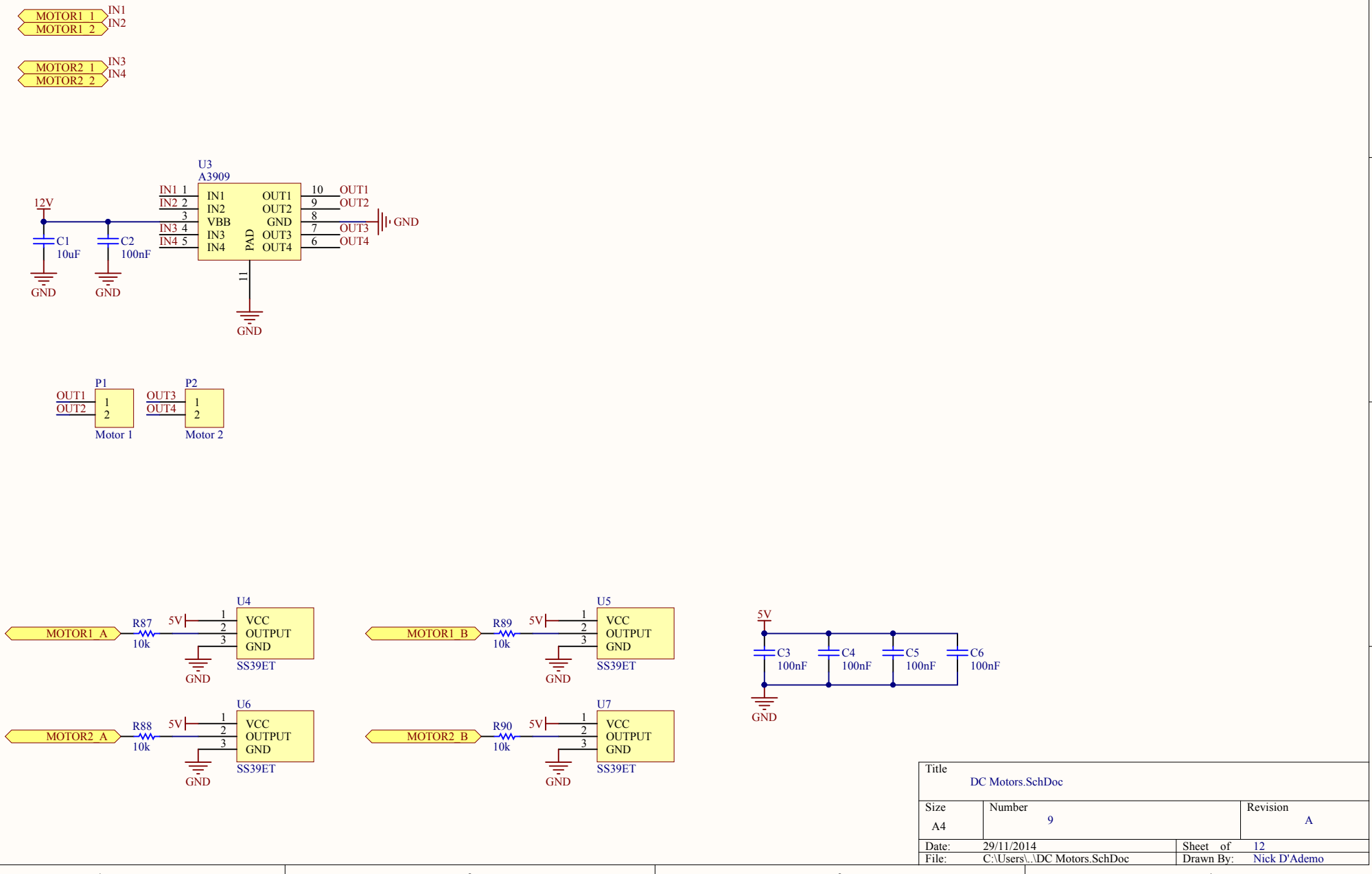
Light-to-Voltage parts:

TSL12S
TSL13S
TSL14S
TSL250R
TSL251R
TSL252R
TSL253R
TSL254R
TSL257
TSL260R (IR light)
TSL261R (IR light)
TSL262R (IR light)
TSL267 (IR light)

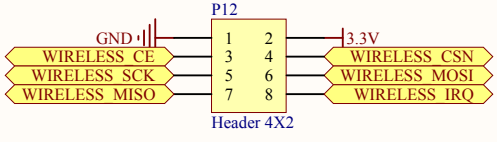
Only install R53 to R68 if Light-to-Voltage parts are used.

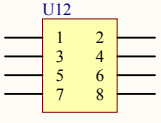


Title	Light Sensors.SchDoc		
Size A4	Number 8		Revision A
Date:	29/11/2014	Sheet of	12
File:	C:\Users\..\Light Sensors.SchDoc	Drawn By:	Nick D'Ademo



Title	DC Motors.SchDoc
Size	A4
Number	9
Revision	A
Date:	29/11/2014
Sheet of	12
File:	C:\Users\..\DC Motors.SchDoc
Drawn By:	Nick D'Ademo

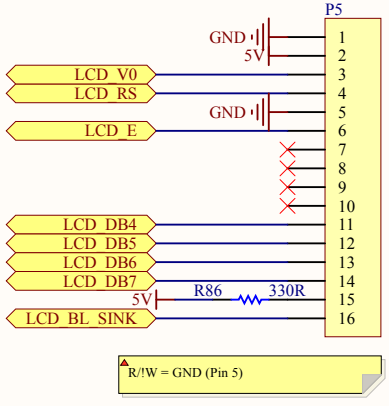


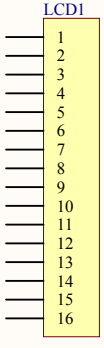


U12 available at ElecFreaks.com:

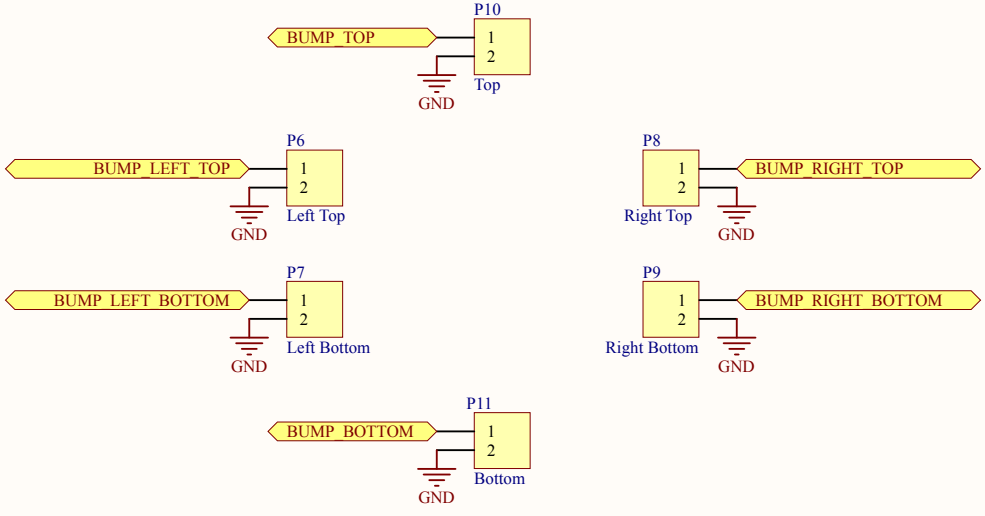
EF03065 (PCB antenna): http://www.elecfreaks.com/store/24g-wireless-nrf24l01p-p-118.html
EF03064 (external antenna): http://www.elecfreaks.com/store/nrf24l01p-pa-lna-v20-p-142.html

Title	Wireless.SchDoc		
Size: A4	Number: 10		Revision: A
Date:	29/11/2014	Sheet of	12
File:	C:\Users\..\Wireless.SchDoc	Drawn By:	Nick D'Ademo

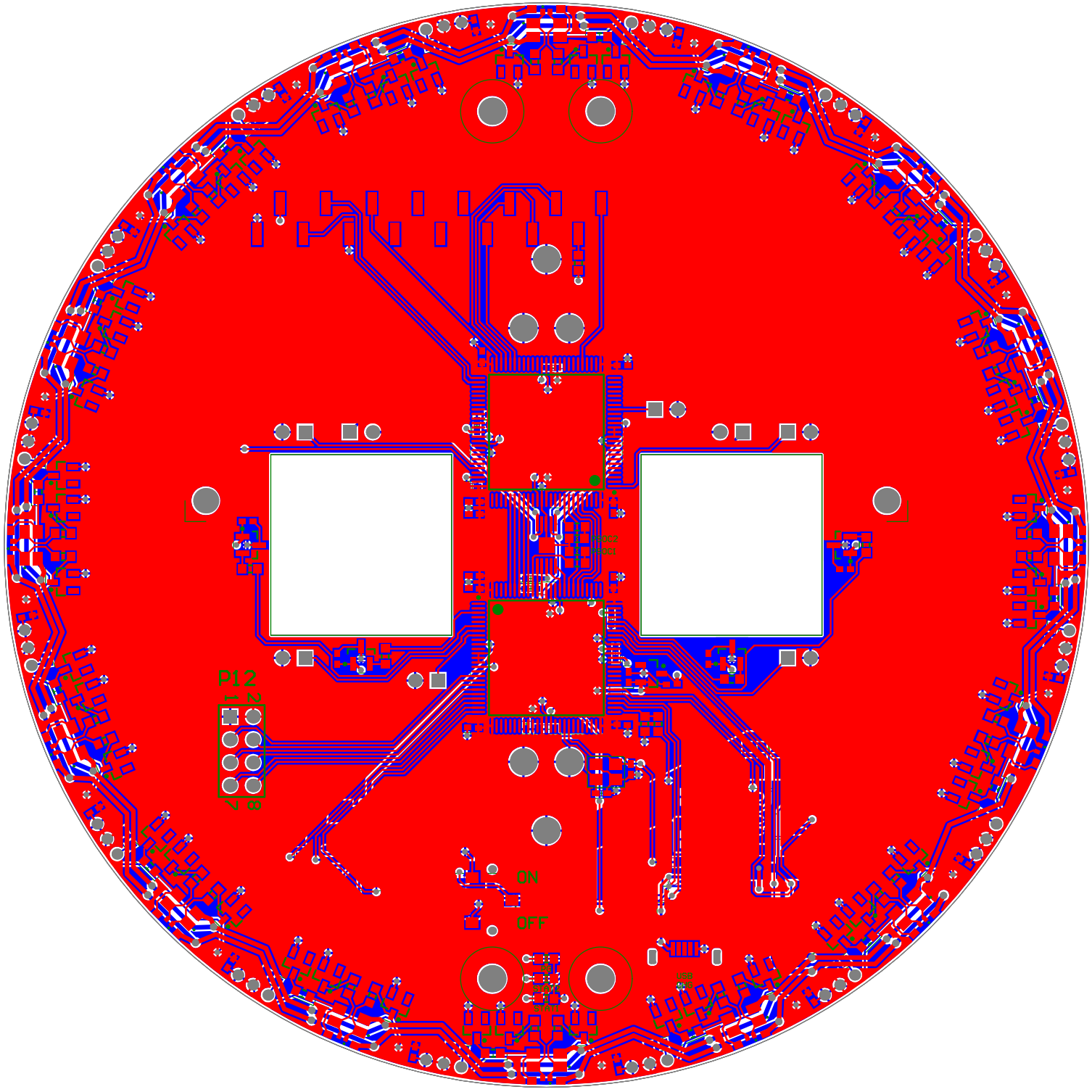




Title	LCD.SchDoc		
Size: A4	Number: 11		Revision: A
Date: 29/11/2014		Sheet of 12	
File: C:\Users\..\LCD.SchDoc		Drawn By: Nick D'Ademo	



Title	Bump Sensors.SchDoc		
Size: A4	Number: 12		Revision: A
Date: 29/11/2014		Sheet of 12	
File: C:\Users\..\Bump Sensors.SchDoc		Drawn By: Nick D'Ademo	


P12
ON
OFF

Description	Designator	Footprint	Quantity	Value
18650 1-Cell Lithium Ion Battery	BT1		1	
TAIYO YUDEN - EMK107BBJ106MA-T - CAP CER 10UF 16V 20% X5R 0603	C1	CAPC1005N	1	10uF
Capacitor, X5R, ±10%, 16V, 0402	C2, C3, C4, C5, C6	CAPC1005N	5	100nF
Capacitor, X7R, ±10%, 6.3V, 0402	C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C55, C56	CAPC1005N	32	100nF
KEMET - T491D227K016AT - CAP TANT 220UF 16V 10% 2917	C23, C26	TC7343-2917	2	220uF
KEMET - T491B476K010AT - CAP TANT 47UF 10V 10% 1411	C24, C27	TC3528-1411	2	47uF
Capacitor, NP0, ±10%, 6.3V, 0402	C25, C28	CAPC1005N	2	100pF
Capacitor, X5R, ±10%, 6.3V, 0402	C29, C30	CAPC1005N	2	1uF
Capacitor, NP0, ±2%, 25V, 0402	C31, C32	CAPC1005N	2	12pF
Capacitor, X5R, ±10%, 10V, 0402	C33, C34, C35, C36, C51, C52, C53, C54, C57, C58	CAPC1005N	10	1uF
OPTEK - OVSRRGBCC3 - LED RED/GRN/BLUE 1204 SMD	D1, D3, D5, D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31	OVSRRGBCC3_SIDE	16	
CREE - CLV1A-FKB-CK1N1G1BB7R4S3 - LED RGB 3-IN-1 3.2X2.8MM 4PLCC	D2, D4, D6, D8, D10, D12, D14, D16, D18, D20, D22, D24, D26, D28, D30, D32	PLCC4	16	
ROHM - SMLE12BC7TT86Q - LED, 0603, LO-CUR. BLU	D33, D34, D37	LED_0603	3	
VISHAY SEMICONDUCTOR - VS-MBRS130TRPBF - DIODE SCHOTTKY 30V 1A DO214AA	D35, D36	SMB_DIODE	2	
KINGBRIGHT - KP-1608MGC - LED, 0603, GREEN, 70MCD, 568NM	D38	LED_0603	1	
KINGBRIGHT - KP-1608SYC - LED, SMD, 0603, YELLOW	D39	LED_0603	1	
TAIYO YUDEN - NR6028T4R7M - INDUCTOR 4.7UH 2.7A 20% SMD	L1, L2	TY_NR	2	4.7uH
SHENZHEN EONE ELECTRONICS CO.,LTD - IM120424015 - EONE High 16x2 (1602) Characters LCD	LCD1		1	
AMS - TSL235R-LF - IC LIGHT TO FREQUENCY CONV 3PIN	LS1, LS2, LS3, LS4, LS5, LS6, LS7, LS8, LS9, LS10, LS11, LS12, LS13, LS14, LS15, LS16	AMS_S_3PIN	16	
MOLEX INC - 0022272021 - CONN HEADER 2POS .100 VERT TIN	P1, P2, P6, P7, P8, P9, P10, P11	HDR1X2	8	
GLOBAL CONNECTOR TECHNOLOGY - USB3140-30-0170-1-C - CONNECTOR, USB 2.0 MICRO B, RCPT, 5POS, SMT	P3	USB3140-30-0170-1-C	1	
KEYSTONE ELECTRONICS - 54 - BATTERY CLIP 18MM 18650 CELL	P4	54	1	
SAMTEC - SSW-116-22-F-S-VS - Conn Socket Strip SKT 16 POS 2.54mm Solder ST SMD Tube	P5	Samtec-SSW-116-22-F-S-VS	1	
Header, 4-Pin, Dual row	P12	HDR2X4	1	
FAIRCHILD SEMICONDUCTOR - BSS138 - MOSFET N-CH 50V 220MA SOT-23	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45, Q46, Q47, Q48	SOT95P230-3N	48	
FAIRCHILD SEMICONDUCTOR - FDC6306P - MOSFET 2P-CH 20V 1.9A SSOT6	Q49	SOT-6	1	
INTERNATIONAL RECTIFIER - IRF7416TRPBF - MOSFET P-CH 30V 10A 8-SOIC	Q50, Q51	SOIC127P600-8AN	2	
Resistor, ±1%, 0.1W, 0603	R1, R2, R4, R5, R7, R8, R10, R11, R13, R14, R16, R17, R19, R20, R22, R23, R25, R26, R28, R29, R31, R32, R34, R35, R37, R38, R40, R41, R43, R44, R46, R47	RESC1608N	32	91R
Resistor, ±1%, 0.1W, 0603	R3, R6, R9, R12, R15, R18, R21, R24, R27, R30, R33, R36, R39, R42, R45, R48	RESC1608N	16	150R
Resistor, ±1%, 0.1W, 0603	R49, R50, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R87, R88, R89, R90	RESC1608N	22	10k
Resistor, ±1%, 0.1W, 0603	R51, R52, R82, R83, R84	RESC1608N	5	470R
Resistor, ±1%, 0.1W, 0603	R69	RESC1608N	1	309k
Resistor, ±1%, 0.1W, 0603	R70	RESC1608N	1	1.4M
Resistor, ±1%, 0.1W, 0603	R71, R72, R76, R77	RESC1608N	4	100k
Resistor, ±1%, 0.1W, 0603	R73, R78	RESC1608N	2	47k
Resistor, ±1%, 0.1W, 0603	R74	RESC1608N	1	887k
Resistor, ±1%, 0.1W, 0603	R75	RESC1608N	1	1.3M
Resistor, ±1%, 0.1W, 0603	R85	RESC1608N	1	2k
Resistor, ±1%, 0.1W, 0603	R86	RESC1608N	1	330R
Resistor, ±1%, 0.1W, 0603	R91	RESC1608N	1	500k
Resistor, ±1%, 0.1W, 0603	R92	RESC1608N	1	1M
MURATA - NCP18XH103J03RB - THERMISTOR, NTC, 10K, 5%, SMD	RT1	RESC1608N	1	10k
COPAL ELECTRONICS INC - CL-SB-12B-01T - SWITCH SLIDE SPDT 0.2A GULL 12V	S1	CL-SB-12B-01T	1	
PSoC Programmable System-on-Chip, 256 KB Flash, 62 GPIOs, 1.71 to 5.5 V, 100-Pin TQFP (AX100), Tray	U1, U2	CYP-AX100_L	2	
ALLEGRO - A3909GLYTR-T - IC MOTOR DRIVER PAR 10MSOP	U3	MSOP-10	1	
HONEYWELL S&C - SS39ET - SENSOR, HALL EFFECT, LINEAR, SOT23-3	U4, U5, U6, U7	SOT23-3N	4	
LINEAR TECHNOLOGY - LT1308ACS8#PBF - IC REG BOOST 5V 1A 8SOIC	U8, U9	LT-S8-8_N	2	
MICROCHIP - MCP73833-FCI/UN - IC LI-ION/LI-POLY CTRLR 10MSOP	U10	MSOP-UN10_N	1	
MICROCHIP - MCP1700T-3302E/TT - IC REG LDO 3.3V 0.25A SOT23-3	U11	SOT95P230-3N	1	
NORDIC SEMICONDUCTOR - nRF24L01+	U12	HDR2X4	1	
NDK - NX3225SA-16.000MHZ-STD-CSR-1 - CRYSTAL 16MHZ 8PF SMD	Y1	NX3225SA	1	