



▲ 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):

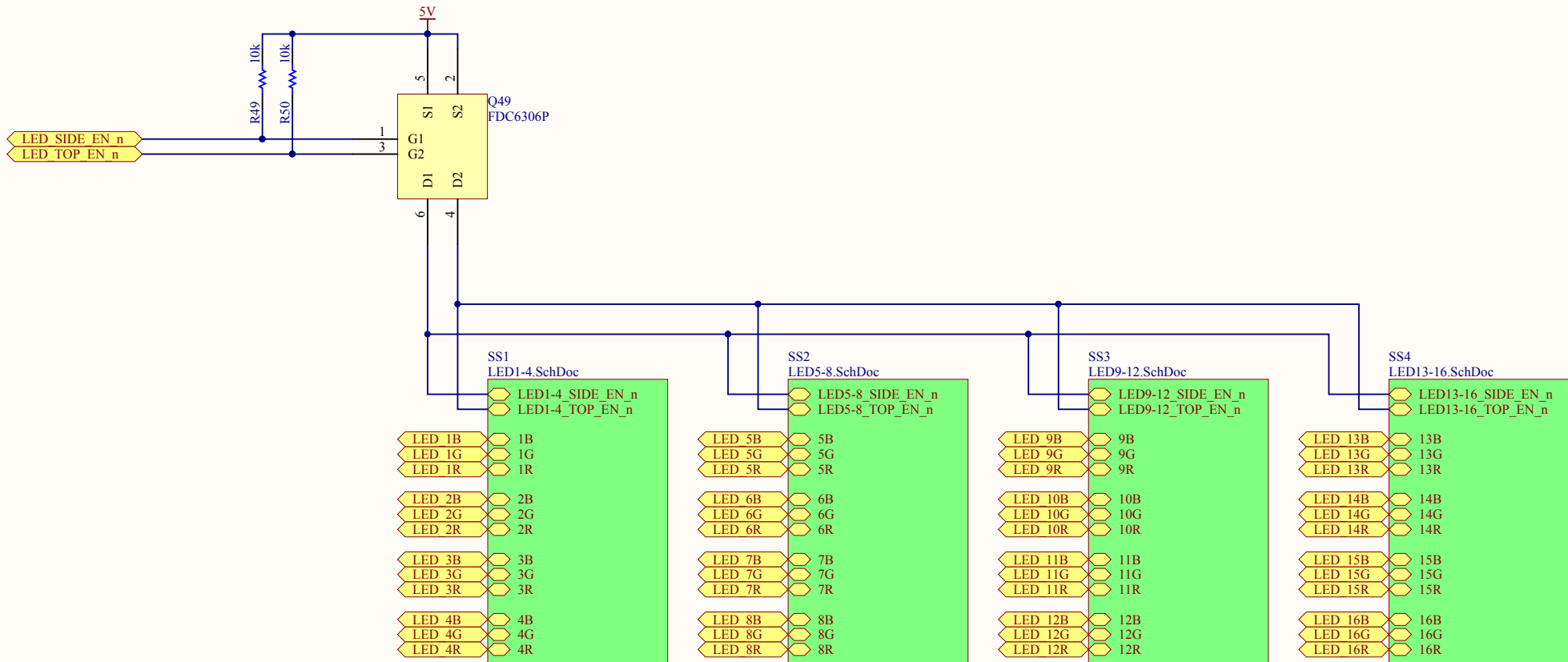
RED: 1.8->2.0->2.4V  
GREEN: 3.0->3.3->3.6V  
BLUE: 3.0->3.3->3.6V

▲ TOP LED:

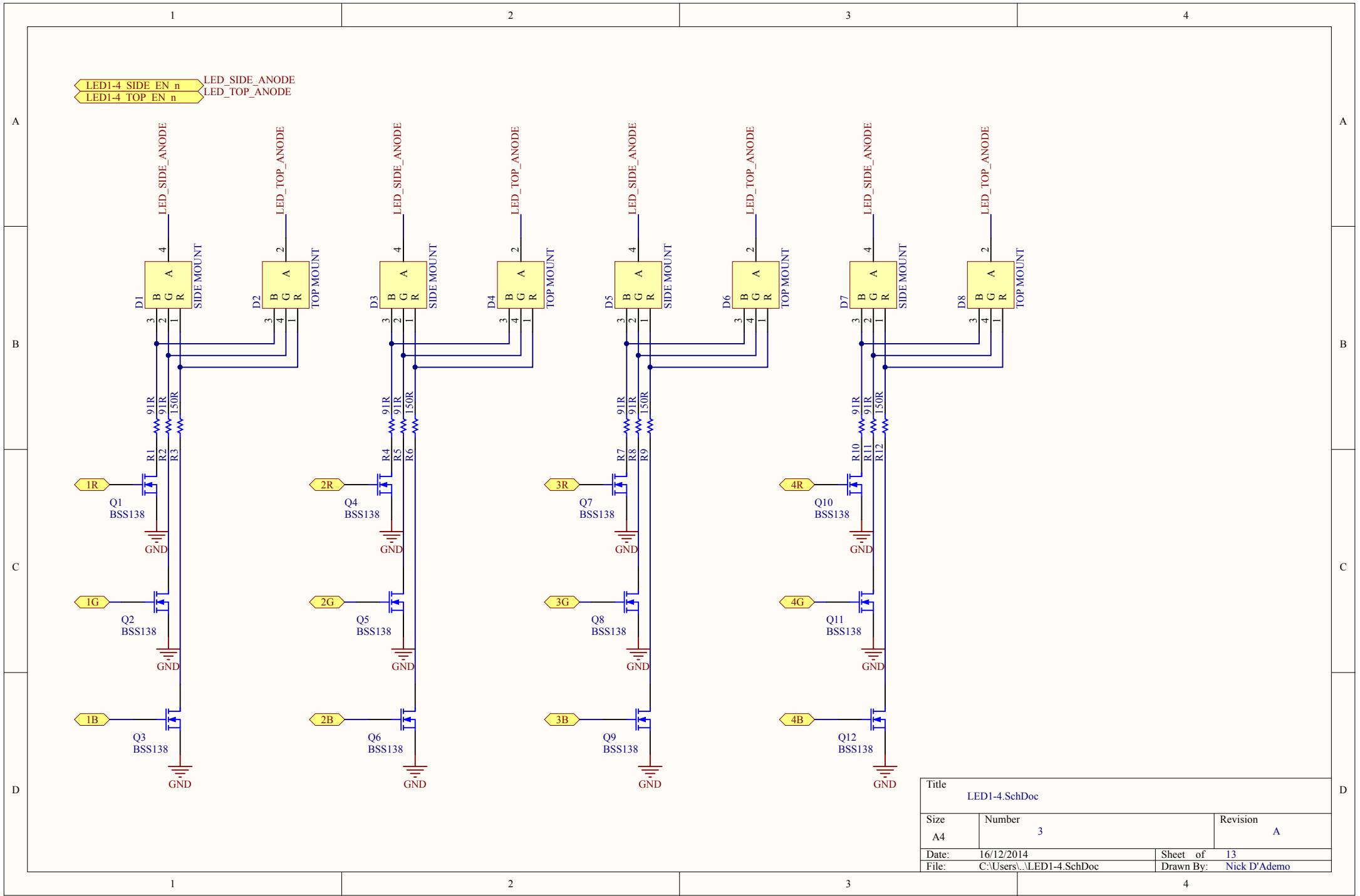
Vf @ If=20mA (Avg->Max):

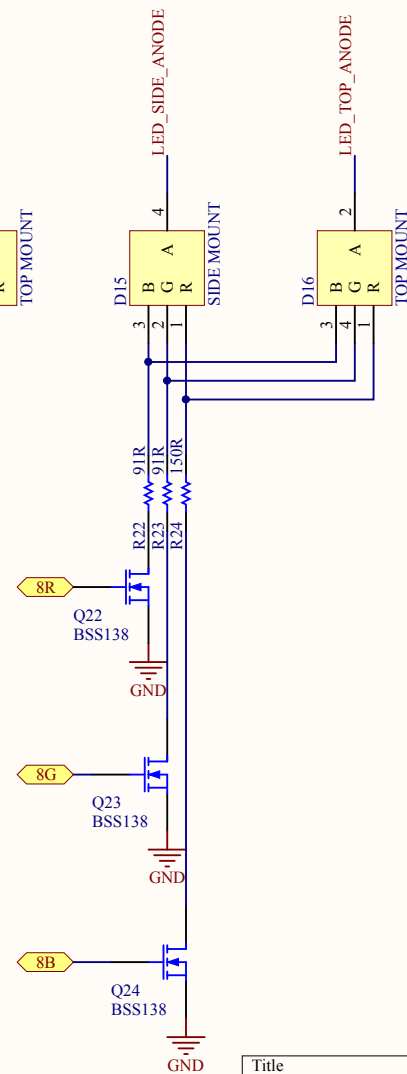
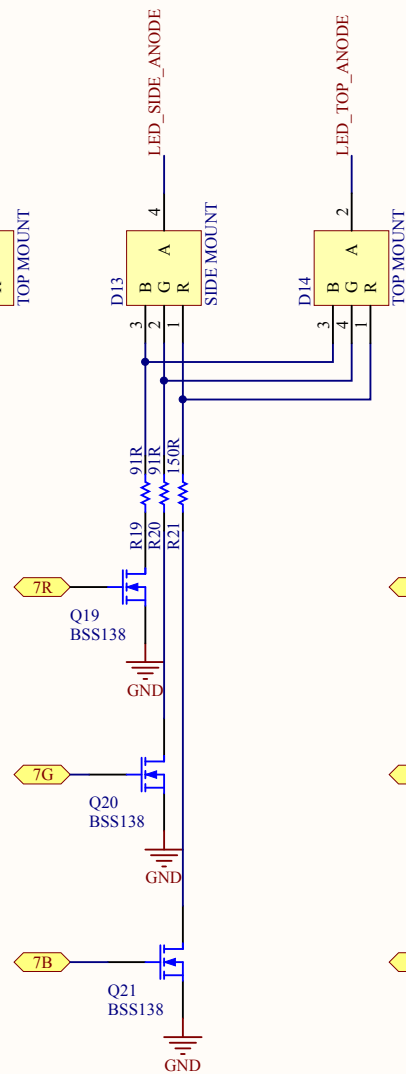
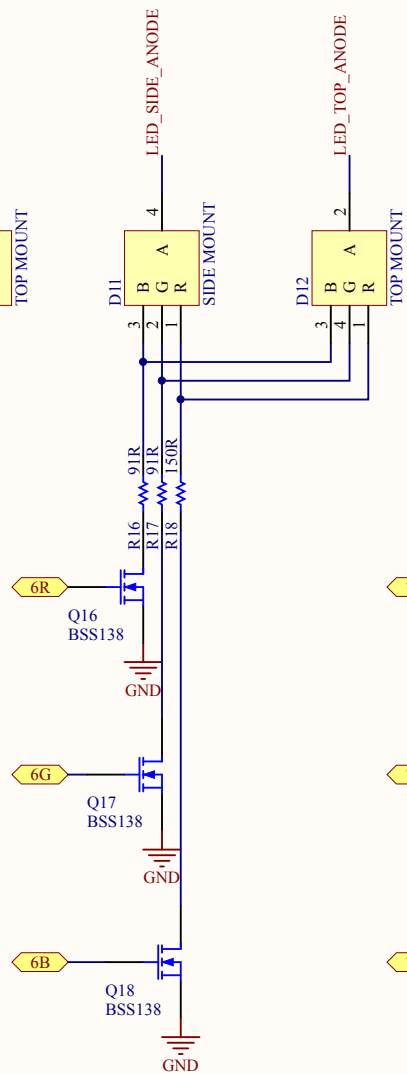
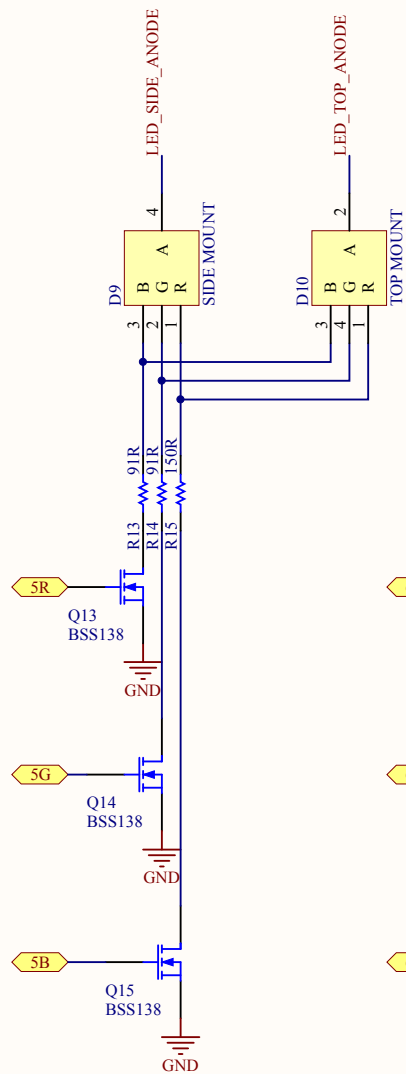
RED: 2.0->2.6V  
GREEN: 3.2->4.0V  
BLUE: 3.2->4.0V

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

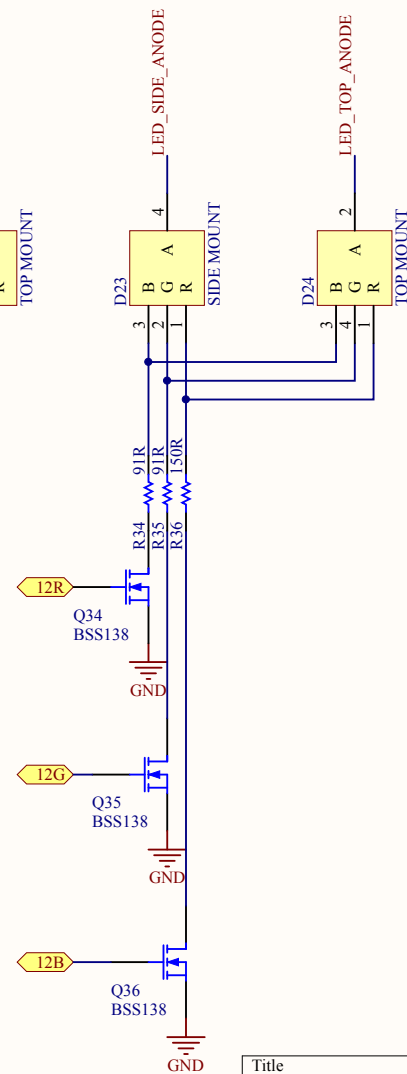
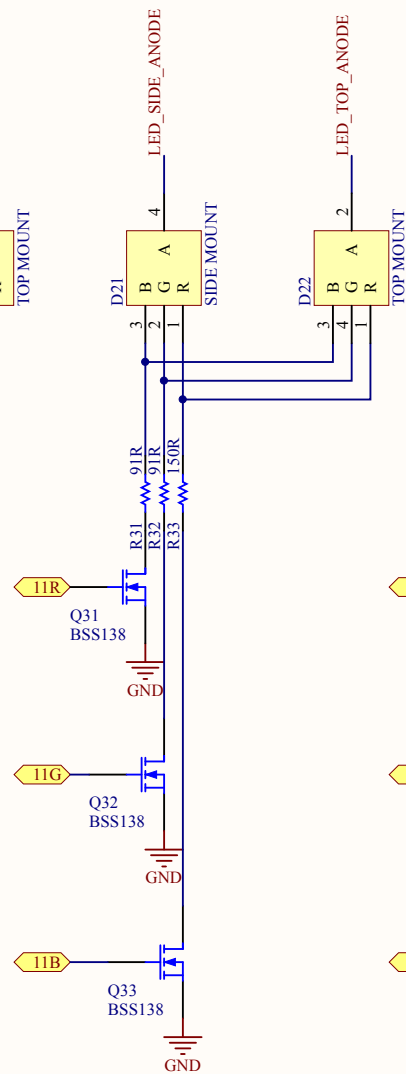
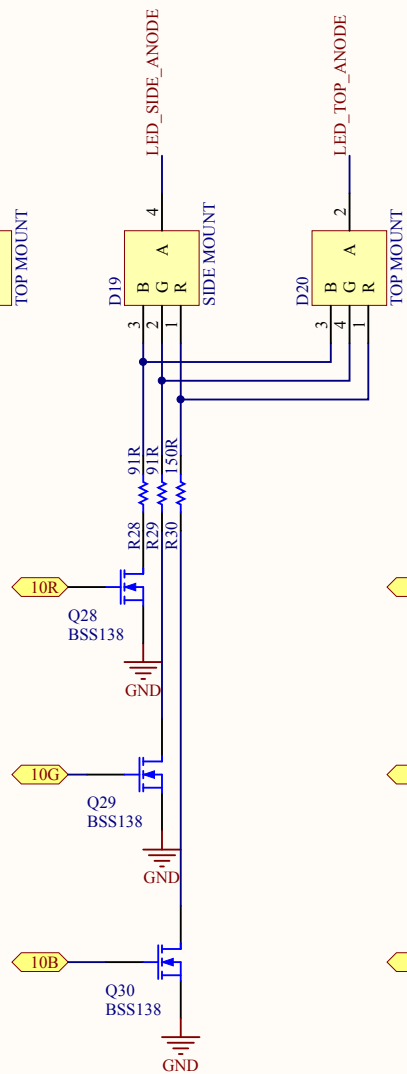
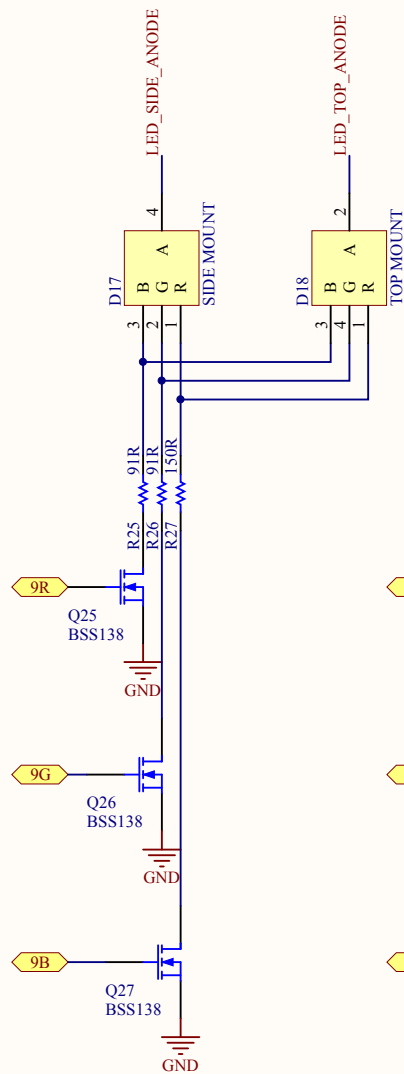


Title			
LEDs.SchDoc			
Size	Number	Revision	
A4	2	A	
Date:	16/12/2014	Sheet of	13
File:	C:\Users\...\LEDs.SchDoc	Drawn By:	Nick D'Ademo

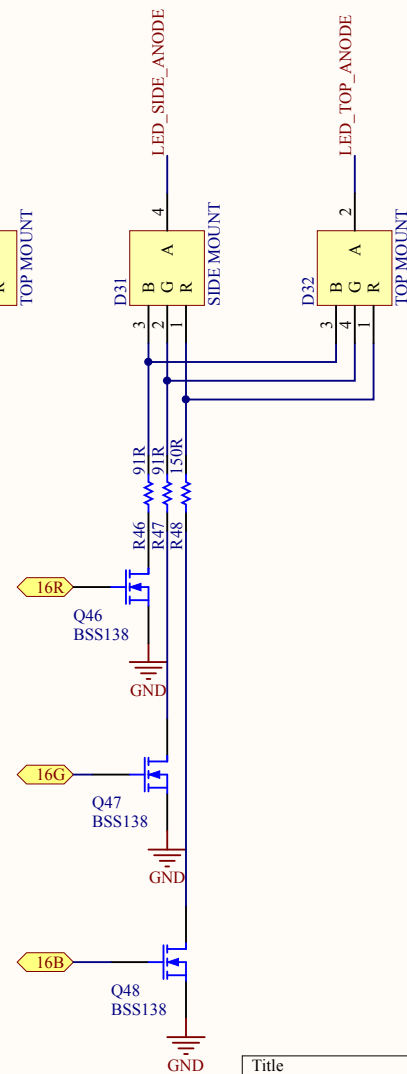
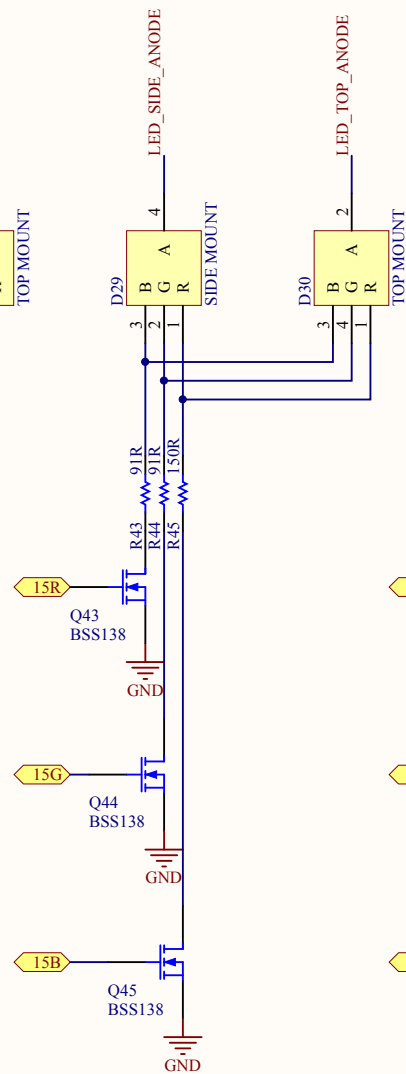
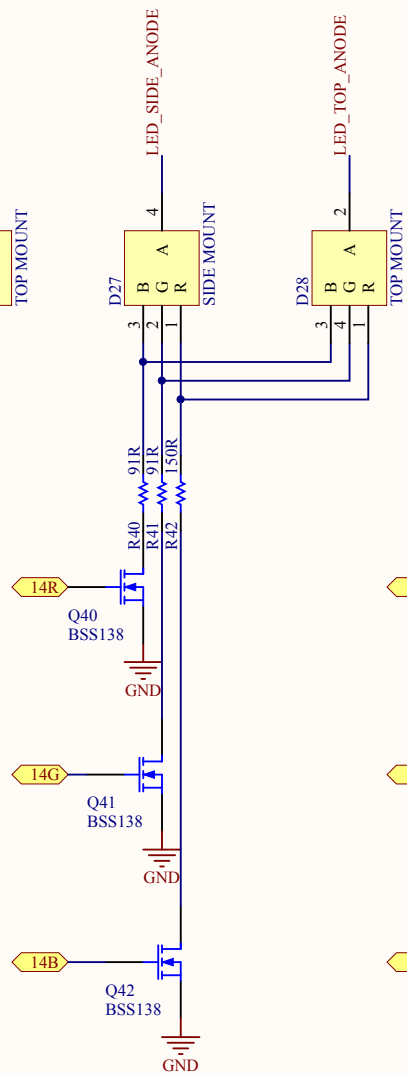
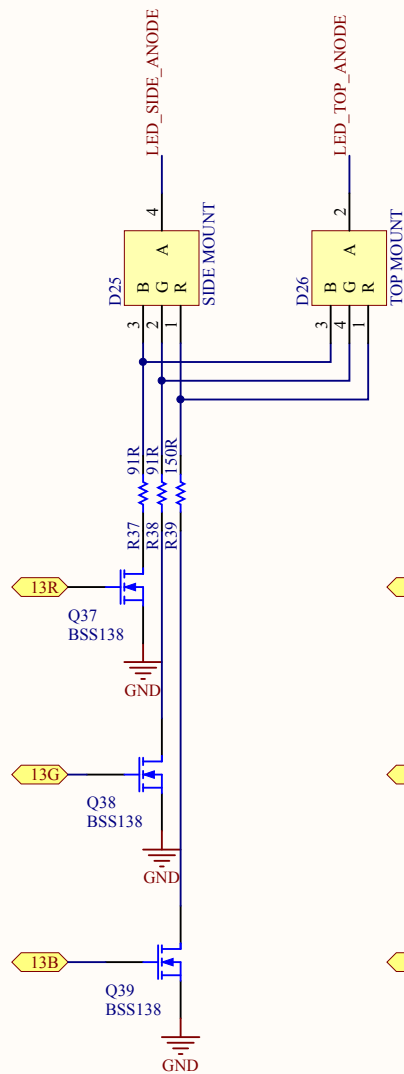




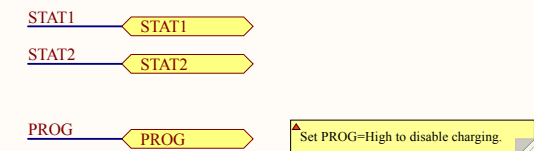
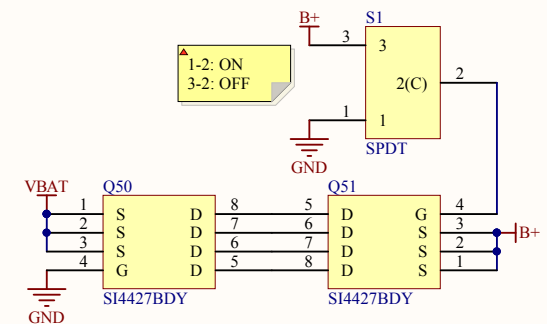
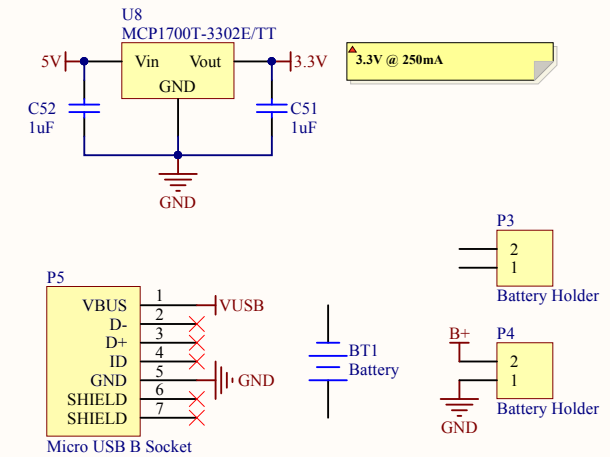
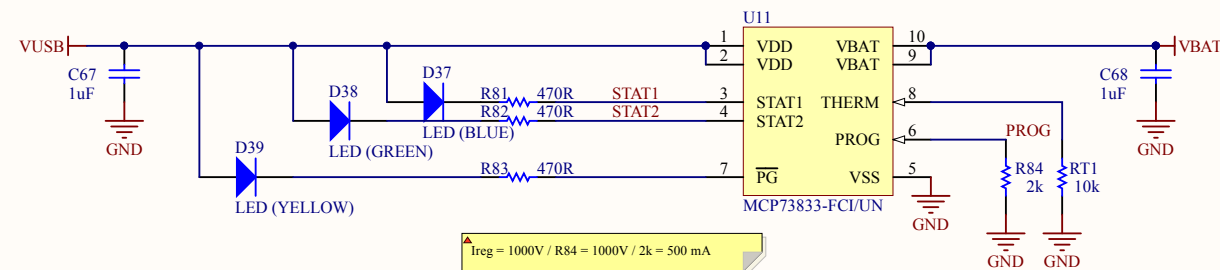
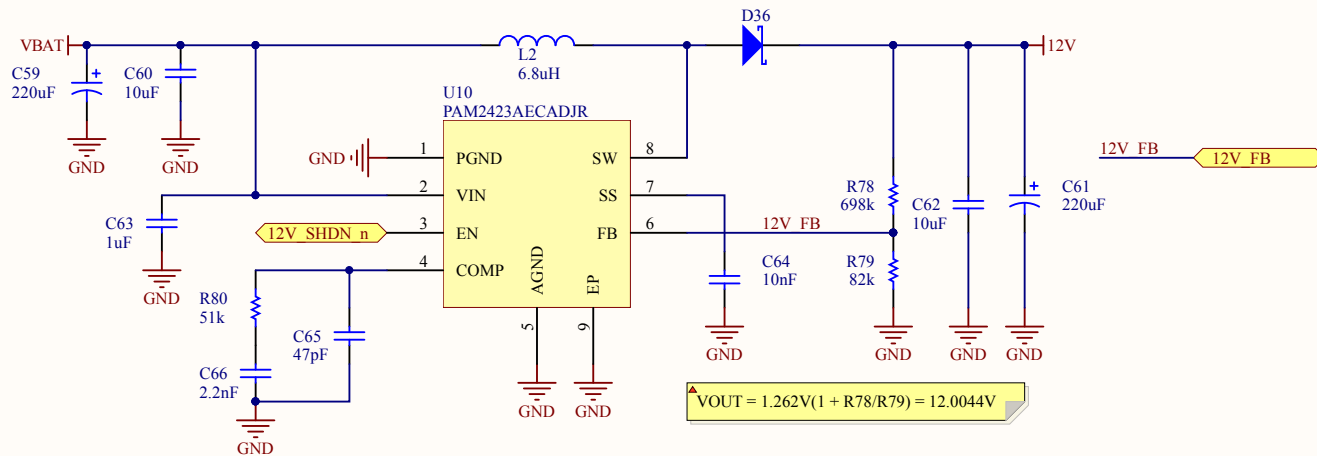
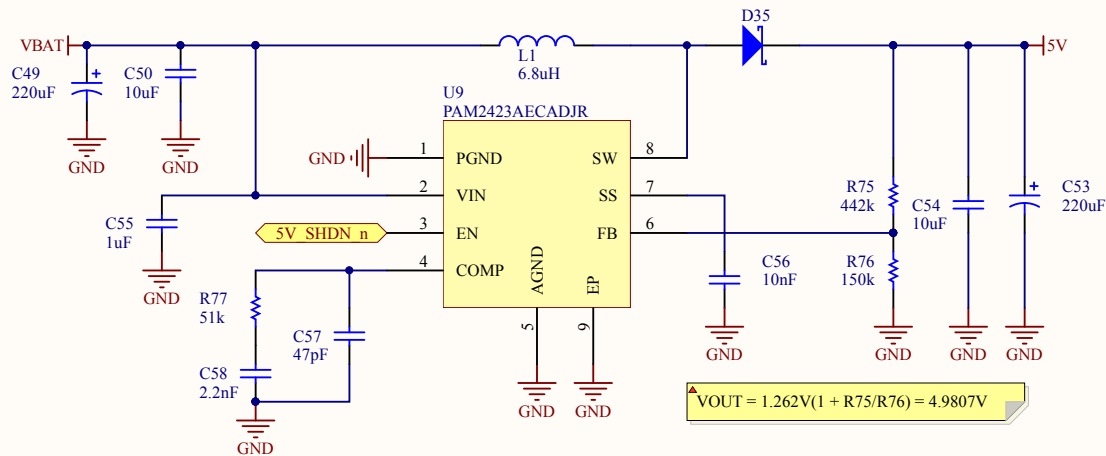
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Title LED9-12.SchDoc			
Size A4	Number 5		Revision A
Date: 16/12/2014	Sheet of 13		
File: C:\Users\...\\LED9-12.SchDoc	Drawn By: Nick D'Ademo		



Title LED13-16.SchDoc			
Size A4	Number 6		Revision A
Date:	16/12/2014	Sheet of	13
File:	C:\Users\...\LED13-16.SchDoc	Drawn By:	Nick D'Ademo



Title			Power Supply.SchDoc	
Size	Number	Revision		
A4	7	A		
Date:	16/12/2014	Sheet	of	13
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

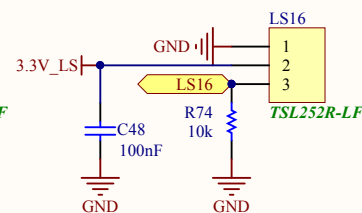
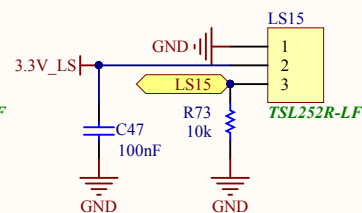
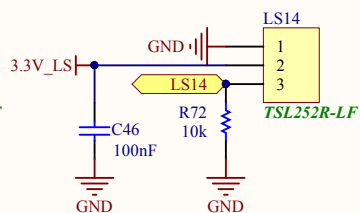
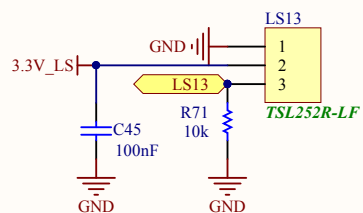
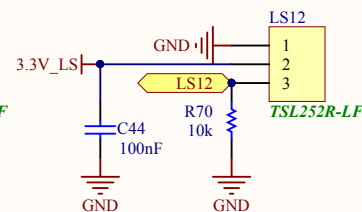
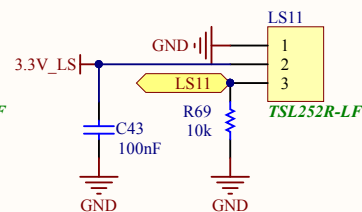
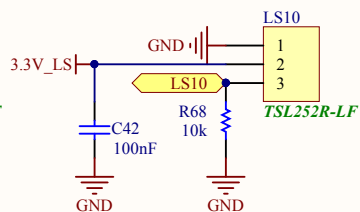
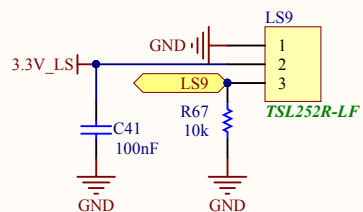
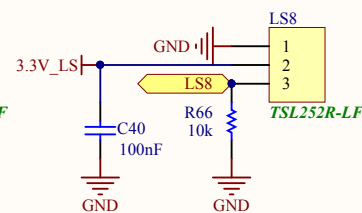
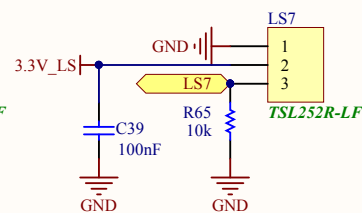
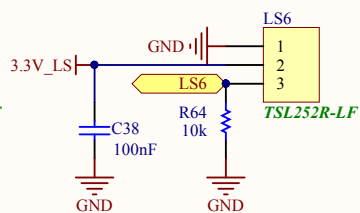
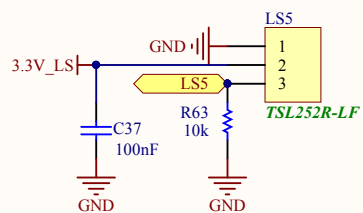
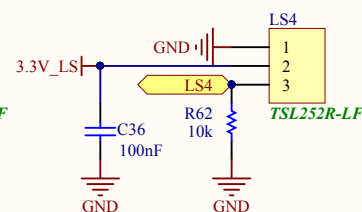
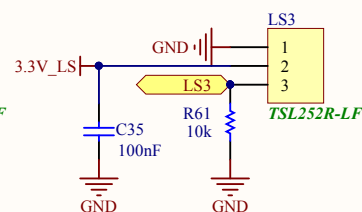
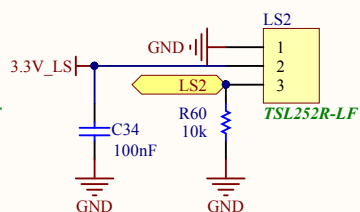
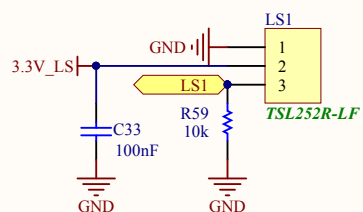
Light-to-Frequency parts:

TSL235  
TSL237  
TSL245 (IR light)

Light-to-Voltage parts:

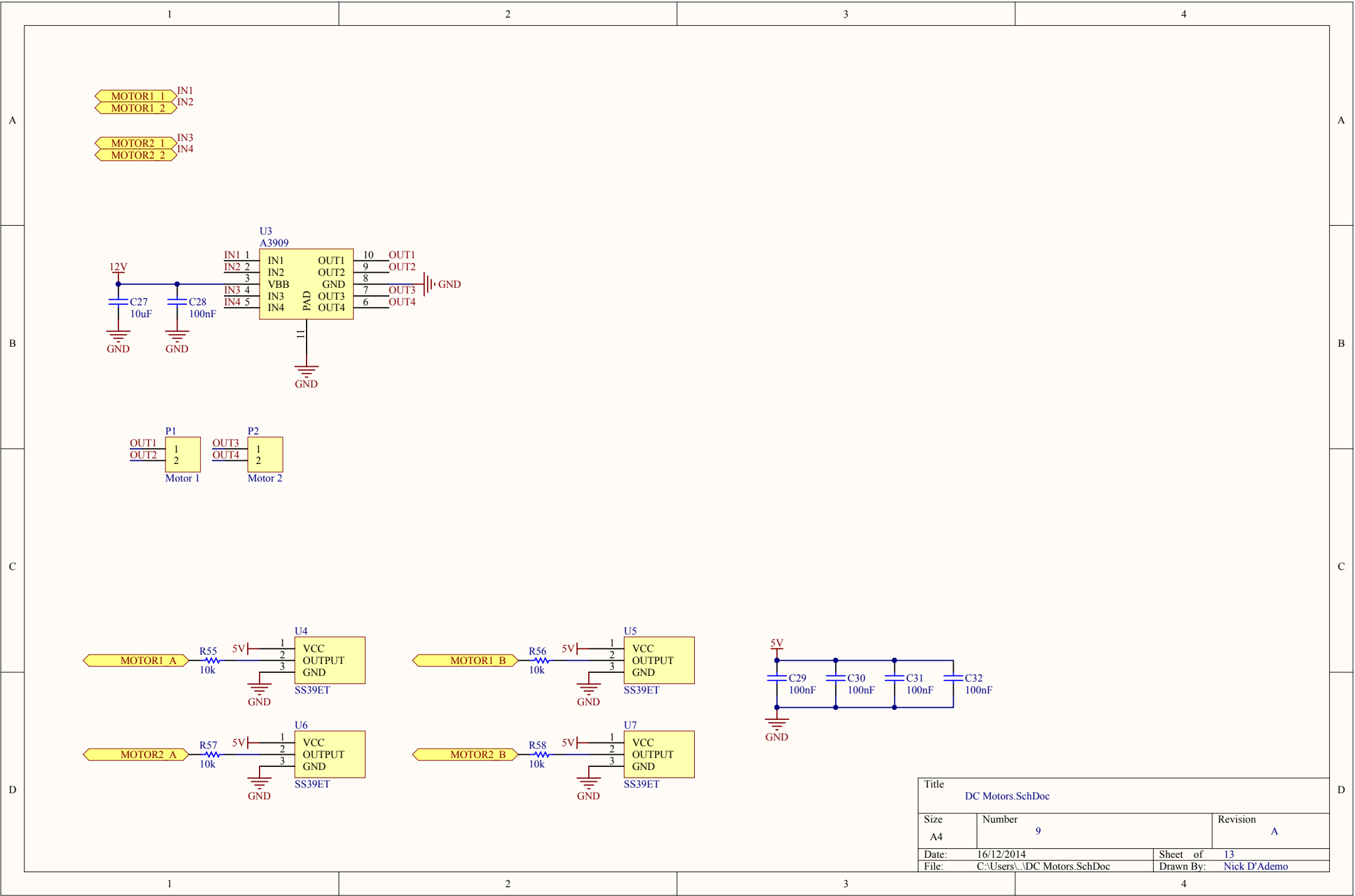
TSL125  
TSL135  
TSL145  
TSL250R  
TSL251R  
TSL252R  
TSL253R  
TSL254R  
TSL257  
TSL260R (IR light)  
TSL261R (IR light)  
TSL262R (IR light)  
TSL267 (IR light)

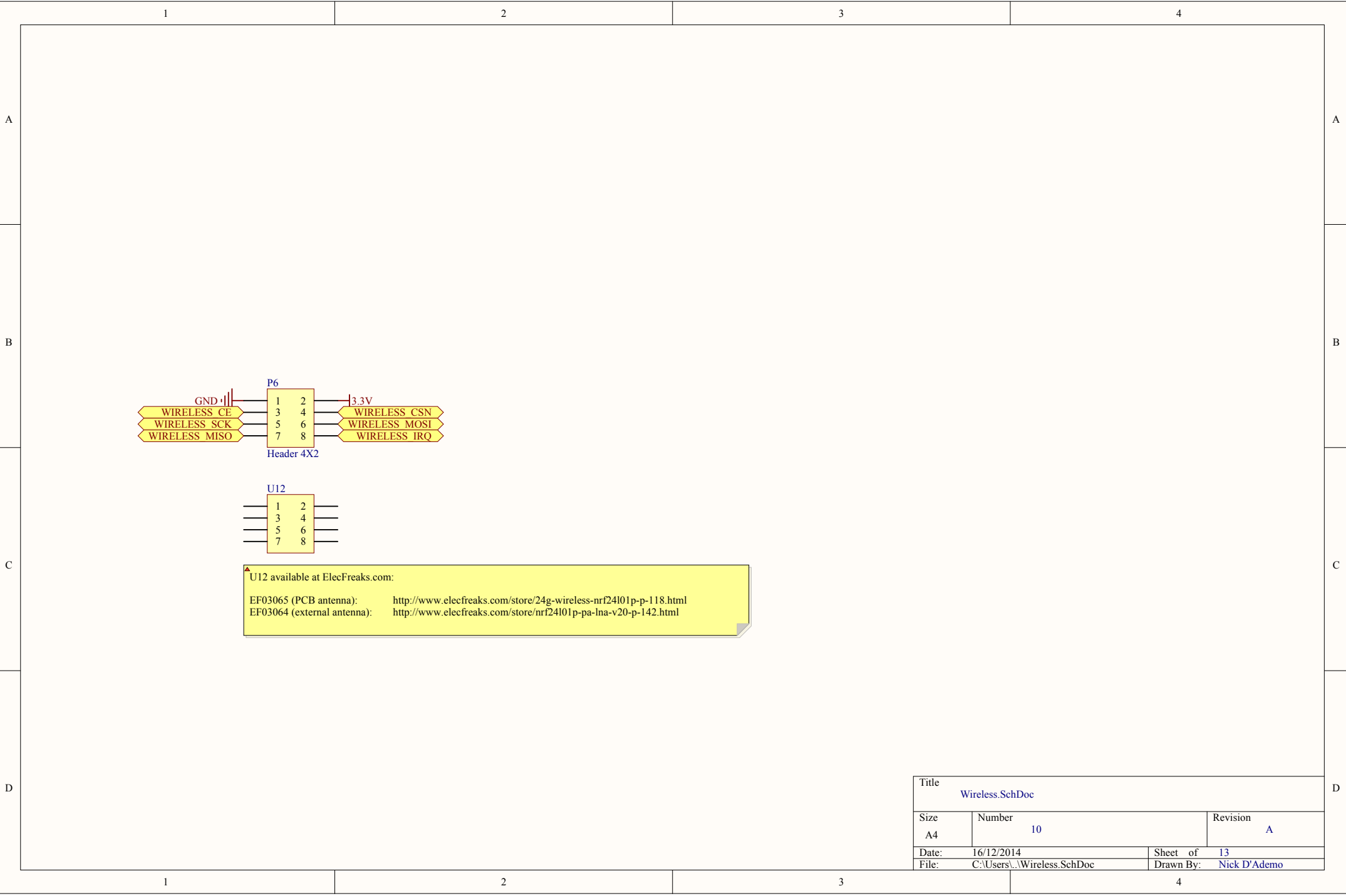
▲ Only install R59 to R74 if Light-to-Voltage parts are used.



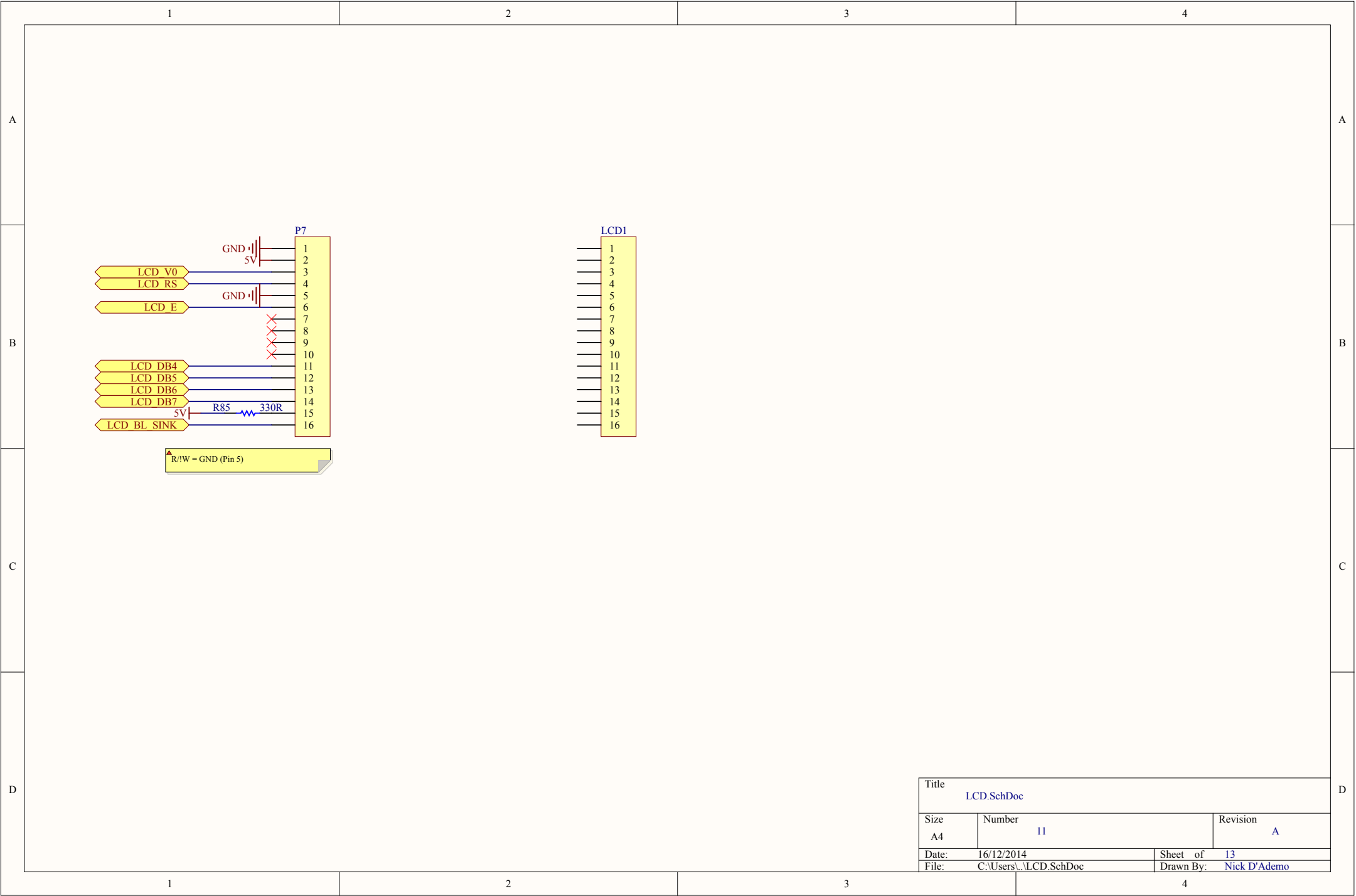
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Date: 16/12/2014	Sheet of 13	
File: C:\Users\...\Light Sensors.SchDoc	Drawn By: Nick D'Ademo	

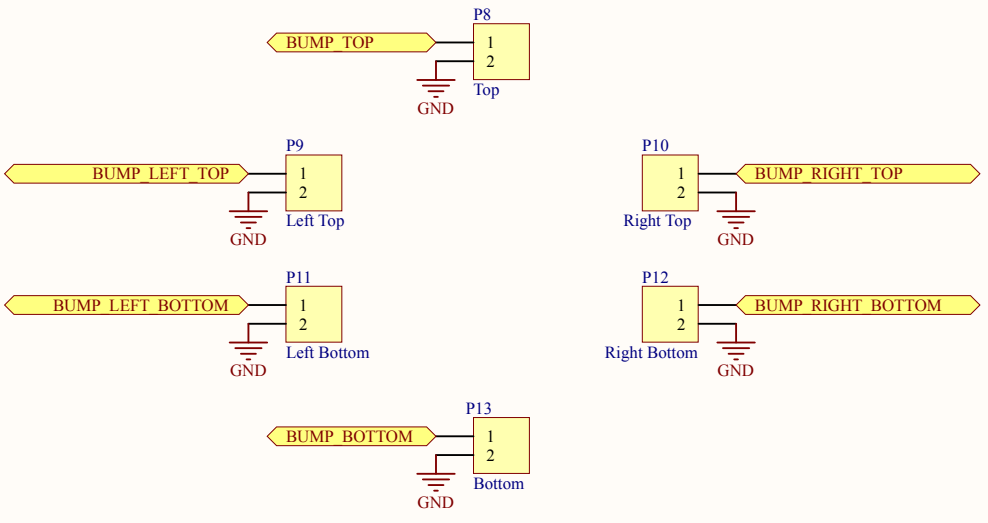




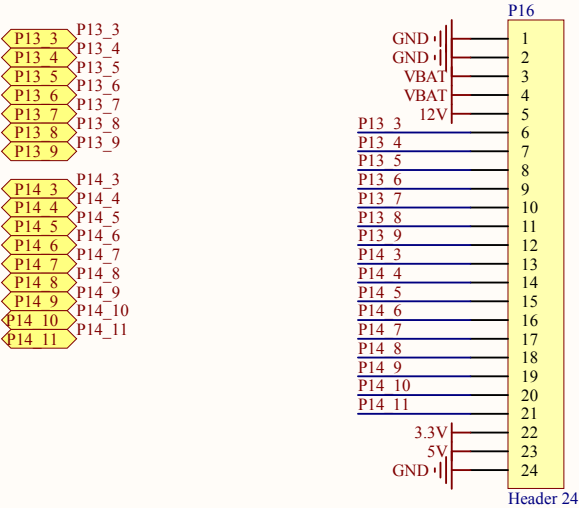
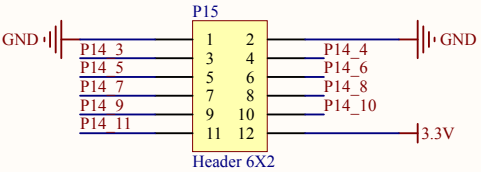
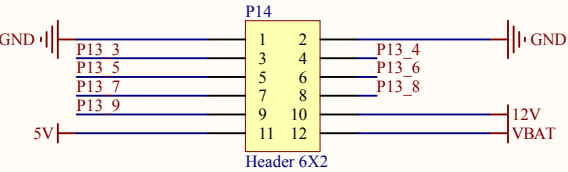


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Wireless.SchDoc			
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Date:	16/12/2014	Sheet of	13
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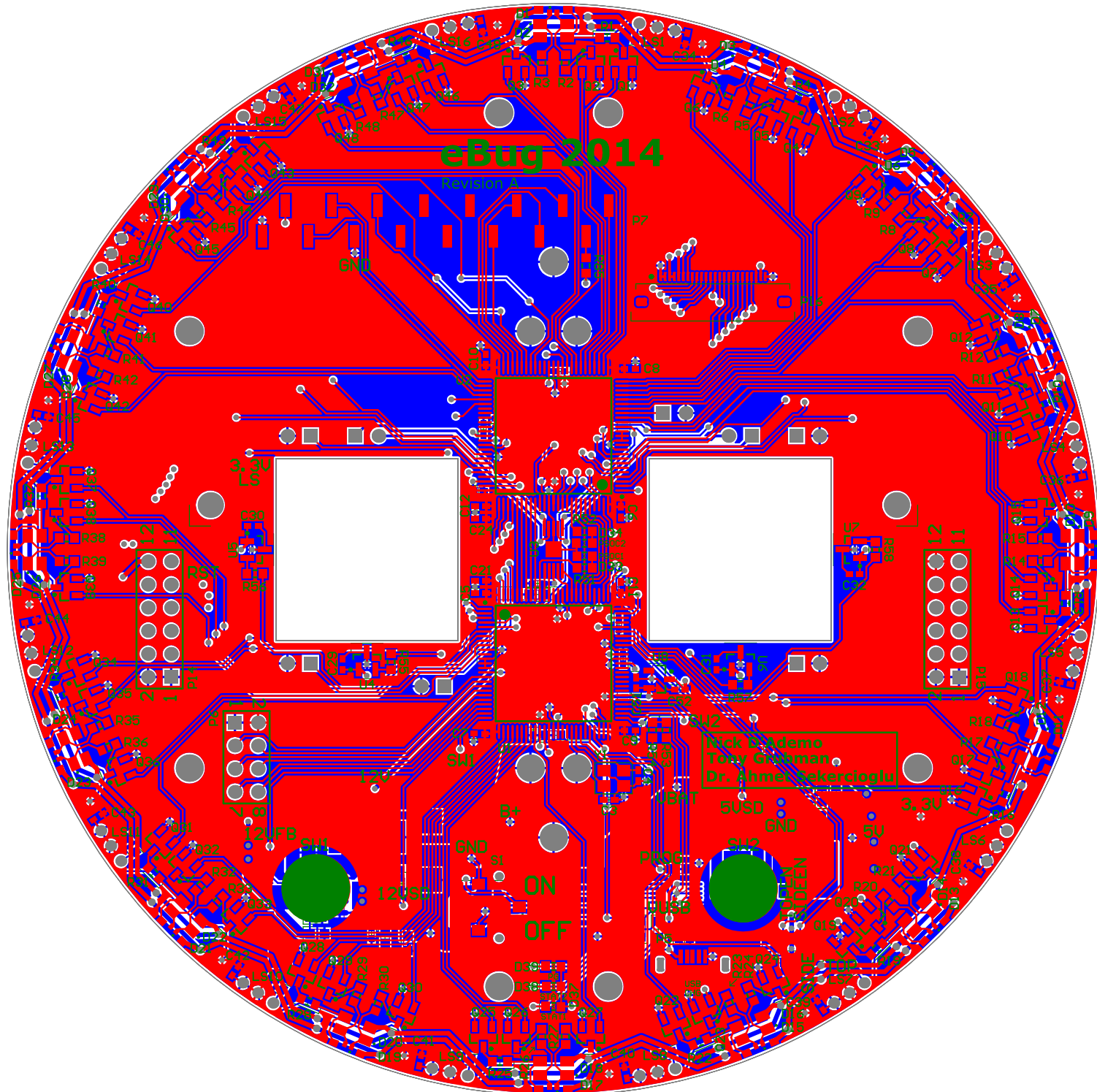




Title			Bump Sensors.SchDoc	
Size	Number	Revision		
A4	12	A		
Date:	16/12/2014	Sheet of	13	
File:	C:\Users\...\Bump Sensors.SchDoc	Drawn By:	Nick D'Ademo	



Title Expansion Header.SchDoc			
Size A4	Number 13	Revision A	
Date:	16/12/2014	Sheet of	13
File:	C:\Users\...\Expansion Header.SchDoc	Drawn By:	Nick D'Ademo



Description	Designator	Footprint	Quantity	Value
18650 1-Cell Lithium Ion Battery	B1		1	
Capacitor, X7R, ±10%, 16V, 0402	C1, C2, C5, C6, C7, C8, C9, C10, C11, C12, C16, C19, C22, C23, C25, C26, C28, C49, C30, C31, C32, C33, C34, C35, C36, C37, C48, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48		37	100nF
Capacitor, NP0, ±2%, 25V, 0402	C3, C4	CAPC1005N	2	12pF
Capacitor, X5R, ±10%, 10V, 0402	C13, C14, C15, C17, C18, C20, C21, C24, C51, C52, C55, C63, C67, C68	CAPC1005N	14	1uF
TAYO YUDEN - EMK1078B1J06MA-T - CAP CER 10UF 16V 20% X5R 0603	C47, C50, C54, C60, C62	CAPC1608N		5.10uF
KEMET - T491D227K016AT - CAP TANT 220UF 16V 10% 2917	C49, C53, C59, C61	TC7343-2917	4	220uF
Capacitor, X7R, ±10%, 16V, 0402	C56, C64	CAPC1005N	2	10nF
Capacitor, NP0, ±5%, 25V, 0402	C57, C65	CAPC1005N	2	47pF
Capacitor, X7R, ±10%, 16V, 0402	C58, C66	CAPC1005N	2	2.2nF
OPTIK - OV5SRGBCC3 - LED RED/GRN/BLUE 1204 SMD	D1, D3, D5, D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31	OV5SRGBCC3_51DE	16	
CREE - CLV1A-FXB-CK1N1G18B7R453 - 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 - SMLE128C7T86Q - LED, 0603, LO-CUR, BLU	D33, D34, D37	LED_0603	3	
VISHAY - SS34-E3/57T - DIODE SCHOTTKY 40V 3A DO214AB	D35, D36	DO-214AB	2	
KINGRIGHT - KP-1608MGC - LED, 0603, GREEN, 70MCD, 568NM	D38	LED_0603	1	
KINGRIGHT - KP-1608BYC - LED, SMD, 0603, YELLOW	D39	LED_0603	1	
BOURNS - SRP702BA-6R8M - FIXED IND 6.8UH 4.5A 60 MOHM SMD	L1, L2	SRP702BA	2	6.8uH
SHENZHEN EONE ELECTRONICS CO.,LTD - IM120424015 - EONE High 16x2 16020 Characters LCD	LCD1		1	
AMS - TSL252R-LF - IC LIGHT TO VOLTAGE SENSOR 3PIN	LS1, LS2, LS3, LS4, LS5, LS6, LS7, LS8, LS9, LS10, LS11, LS12, LS13, LS14, LS15, LS16	AMS_5_3PIN	16	
MOLEX INC - 0022772021 - CONN HEADER 2POS .100 VERT TIN	P1, P2, P8, P9, P10, P11, P12, P13	HDR1X2	8	
KEYSTONE ELECTRONICS - 54 - BATTERY CLIP 18MM 18650 CELL	P3, P4	54	2	
GLOBAL CONNECTOR TECHNOLOGY - USB3140-30-0170-1-C - CONNECTOR, USB 2.0 MICRO B, RCPT, SPOS, SMT	P5	USB3140-30-0170-1-C	1	
SAMTEC - SSW-116-22-F-S-V5 - Conn Socket Strip SKT 16 POS 2.54mm Solder SMD Tube	P7	Samtec-SSW-116-22-F-S-V5	1	
SAMTEC - SSW-106-01-T-D - SOCKET, 2.54MM, 2X6WAY	P14, P15	SSW-106-01-X-D	2	
GLOBAL CONNECTOR TECHNOLOGY - FFC2810-24-T - FFC/FFC CONNECTOR, RECEPTACLE, 24POS, 1ROW	P16	FFC2810	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		48	
FAIRCHILD SEMICONDUCTOR - FDC630P - MOSFET 2P-CH 20V 1.9A SSO76	Q49	SOT-6	1	
VISHAY SILICONX - SH4427BDV-T1-E3 - MOSFET P-CH 30V 9.7A 8-SOIC	Q50, Q51	SOIC12/P900-BAN	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	RES1608N	32	91R
Resistor, ±1%, 0.1W, 0603	R3, R6, R9, R12, R15, R18, R21, R24, R27, R30, R33, R36, R39, R42, R45, R48	RES1608N	16	150R
Resistor, ±1%, 0.1W, 0603	R49, R50, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74	RES1608N	22	10k
Resistor, ±1%, 0.1W, 0603	R51, R52, R81, R82, R83	RES1608N	5	470R
Resistor, ±1%, 0.1W, 0603	R53	RES1608N	1	500k
Resistor, ±1%, 0.1W, 0603	R54	RES1608N	1	1M
Resistor, ±1%, 0.1W, 0603	R75	RES1608N	1	442k
Resistor, ±1%, 0.1W, 0603	R76	RES1608N	1	150k
Resistor, ±1%, 0.1W, 0603	R77, R80	RES1608N	2	51k
Resistor, ±1%, 0.1W, 0603	R78	RES1608N	1	698k
Resistor, ±1%, 0.1W, 0603	R79	RES1608N	1	82k
Resistor, ±1%, 0.1W, 0603	R84	RES1608N	1	2k
Resistor, ±1%, 0.1W, 0603	R85	RES1608N	1	330R
MURATA - NCP18KH10J03R8 - THERMISTOR, NTC, 10K, 5%, SMD	RT1	RES1608N	1	10k
COPAL ELECTRONICS INC - CL-S8-128-01T - SWITCH SLIDE SPDT 0.2A GULL 12V	S1	CL-S8-128-01T	1	
PLSIC Programmable System-on-Chip, 256 KB Flash, 82 GPIOs, 1.71 to 5.5 V, 100 Pin TQFP (AX100), Tray	U1, U2	CVP-AX100_L	2	
ALLEGRO - A3909QLYR-T - IC MOTOR DRIVER PAR 10MSOP	U3	MSOP-10	1	
HONEYWELL SBC - SS39ET - SENSOR, HALL EFFECT, LINEAR, SOT23-3	U4, U5, U6, U7	SOT23-3N	4	
MICROCHIP - MCP1700T-3302E/TT - IC REG LDO 3.3V 0.25A SOT23-3	U8	SOT95P230-3N	1	
DIODES INCORPORATED - PAM2423AECADIR - IC REG BOOST ADJ 5.5A 8SOIC	U9, U10	SOIC12/P900-RON	2	
MICROCHIP - MCP73833-FCUJN - IC LI-ION/LI-POLY CTRLR 10MSOP	U11	MSOP-LIN10_N	1	
NORDIC SEMICONDUCTOR - nRF24L01+	U12	HDR2K4	1	
NDK - NX32255A-16.000MHZ-STD-CSR-1 - CRYSTAL 16MHZ 8PF SMD	Y1	NX32255A	1	