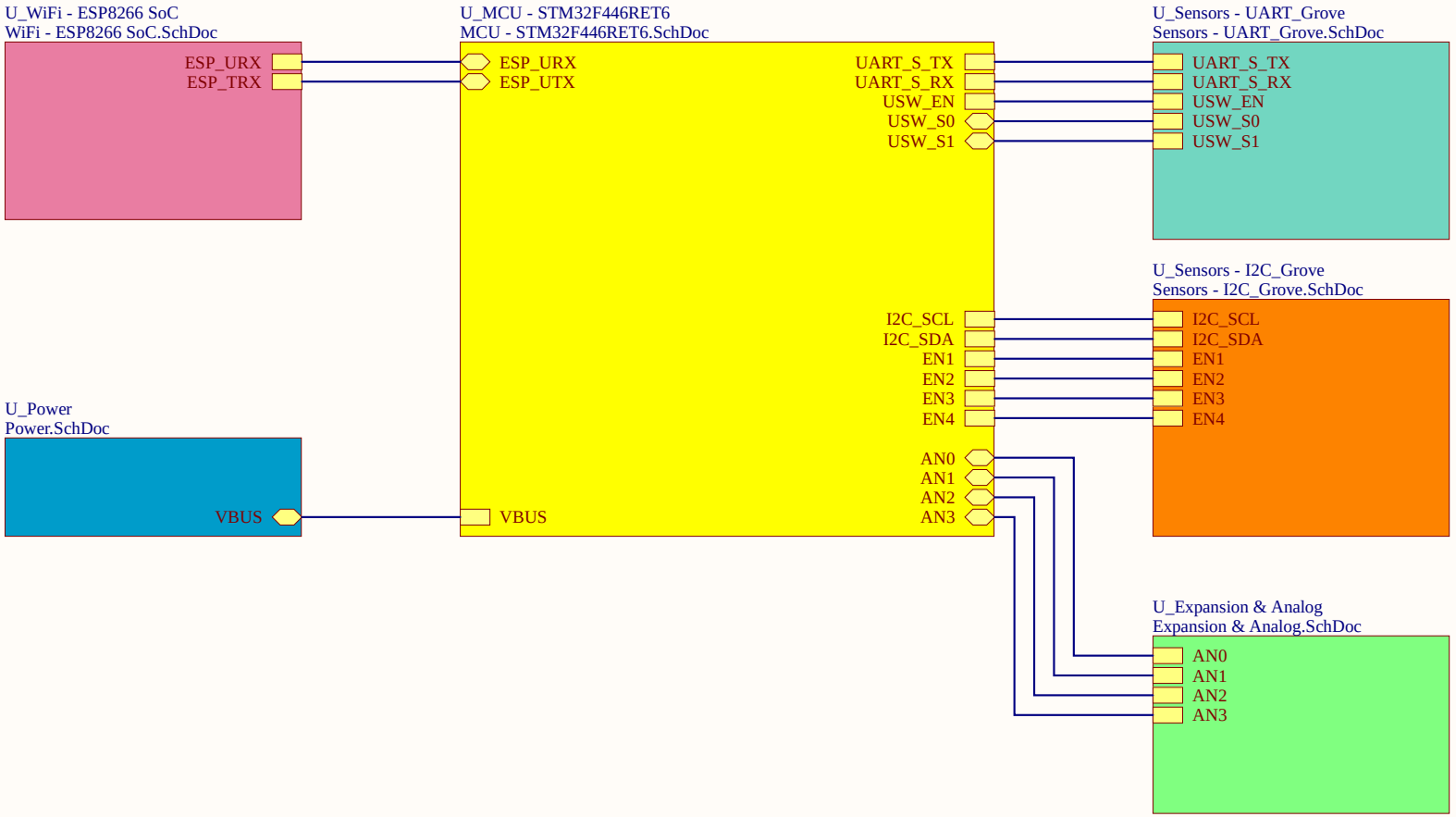
SunLeaf System Overview



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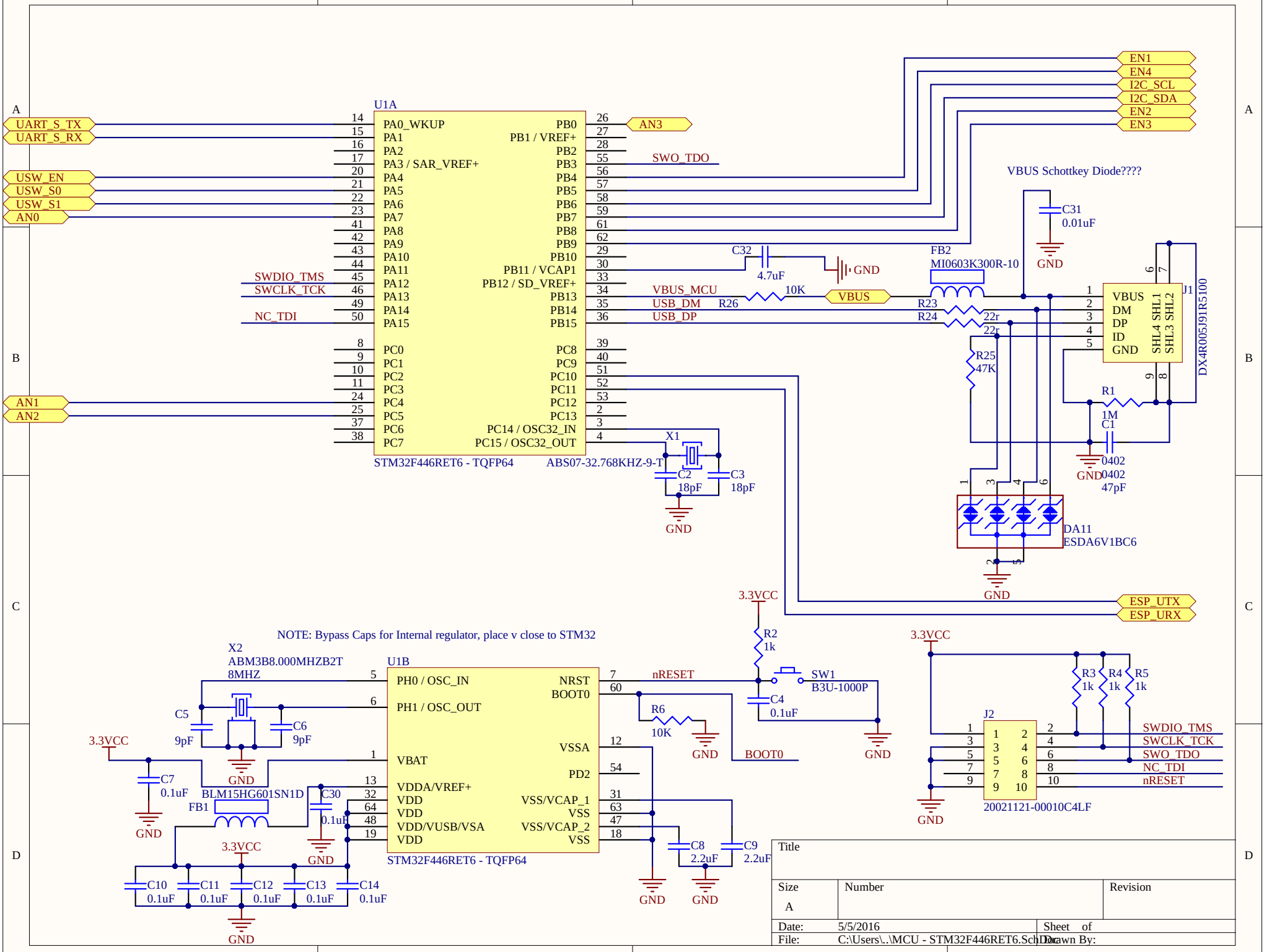
U1A
STM32F446RET6 - TQFP64
PA0_WKUP
PA1
PA2
PA3 / SAR_VREF+
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
PB0
PB1 / VREF+
PB2
PB3
PB4
PB5
PB6
PB7
PB8
PB9
PB10
PB11 / VCAP1
PB12 / SD_VREF+
PB13
PB14
PB15
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14 / OSC32_IN
PC15 / OSC32_OUT
UART_S_TX
UART_S_RX
USW_EN
USW_S0
USW_S1
AN0
AN1
AN2
AN3
SWDIO_TMS
SWCLK_TCK
NC_TDI
SWO_TDO
EN1
EN4
I2C_SCL
I2C_SDA
EN2
EN3
ESP_UTX
ESP_URX
VBUS_MCU
USB_DM
USB_DP
VBUS Schottkey Diode????
C31
0.01uF
C32
4.7uF
GND
FB2
MI0603K300R-10
R26
10K
VBUS
R23
R24
22r
22r
R25
47K
R1
1M
C1
0402
47pF
J1
VBUS
DM
DP
ID
GND
SHL4
SHL1
SHL3
SHL2
DX4R005J91R5100
DA11
ESDA6V1BC6
X1
ABS07-32.768KHZ-9-T
C2
18pF
C3
18pF
3.3VCC
R2
1k
SW1
B3U-1000P
C4
0.1uF
nRESET
BOOT0
R6
10K
NOTE: Bypass Caps for Internal regulator, place v close to STM32
X2
ABM3B8.000MHZB2T
8MHZ
C5
9pF
C6
9pF
U1B
STM32F446RET6 - TQFP64
PH0 / OSC_IN
PH1 / OSC_OUT
VBAT
VDDA/VREF+
VDD
VDD
VDD/VUSB/VSA
VDD
NRST
BOOT0
VSSA
PD2
VSS/VCAP_1
VSS
VSS/VCAP_2
VSS
C7
0.1uF
FB1
BLM15HG601SN1D
C30
0.1uF
C8
2.2uF
C9
2.2uF
C10
0.1uF
C11
0.1uF
C12
0.1uF
C13
0.1uF
C14
0.1uF
R3
1k
R4
1k
R5
1k
J2
20021121-00010C4LF
SWDIO_TMS
SWCLK_TCK
SWO_TDO
NC_TDI
nRESET
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Revision
Date:
5/5/2016
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C:\Users\..\MCU - STM32F446RET6.SchDoc
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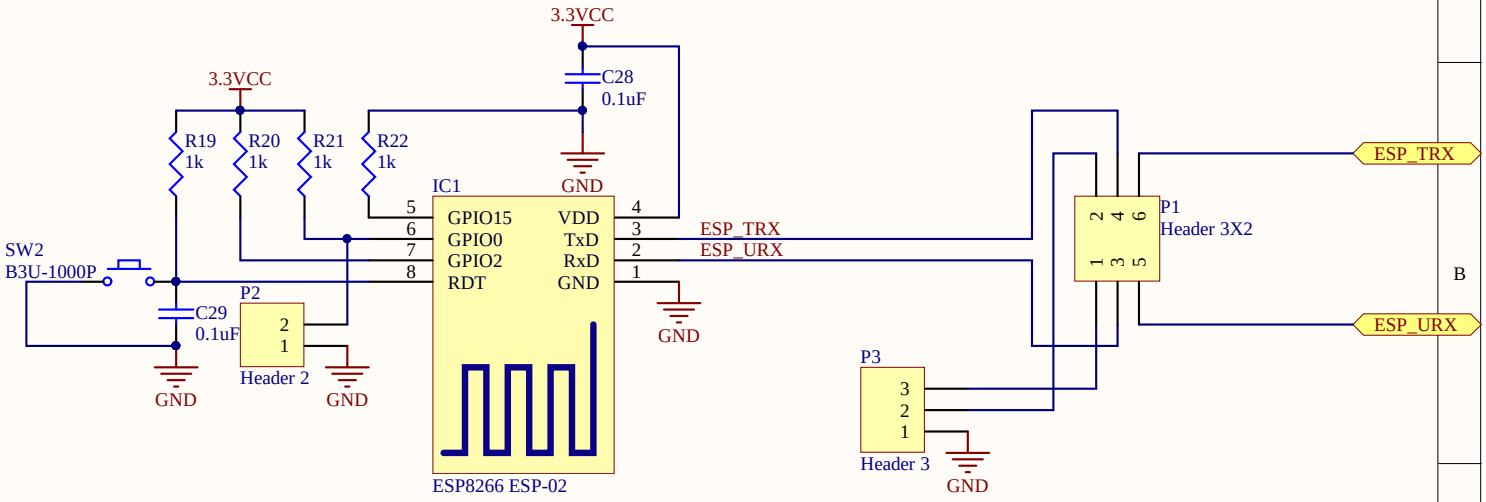

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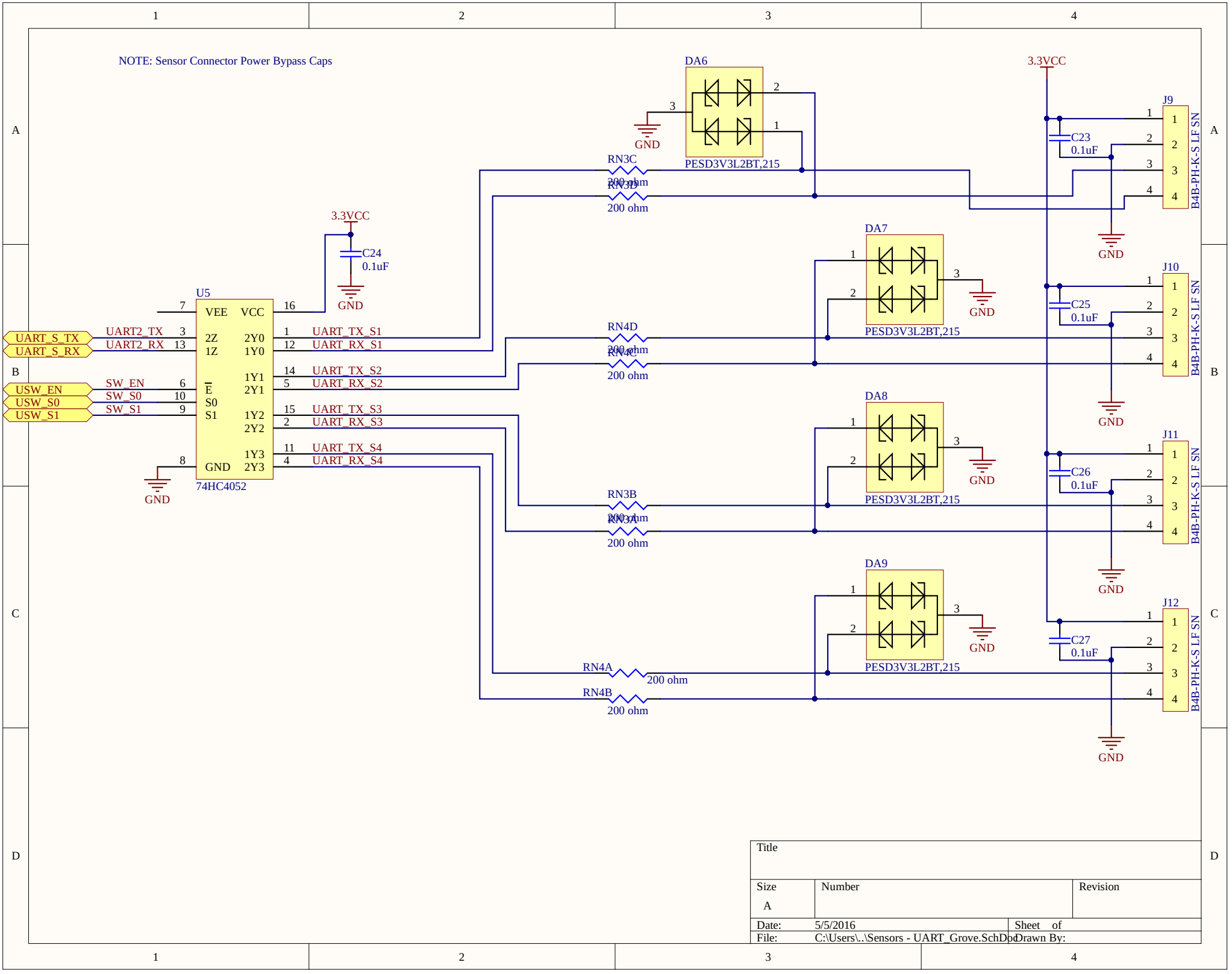
NOTE: Sensor Connector Power Bypass Caps
DA6
PESD3V3L2BT,215
3.3VCC
GND
RN3C
RN3D
200 ohm
J9
B4B-PH-K-S LF SN
C23
0.1uF
DA7
PESD3V3L2BT,215
RN4D
RN4C
200 ohm
J10
C25
0.1uF
C24
0.1uF
U5
74HC4052
VEE
VCC
2Z
2Y0
1Y0
1Y1
E
2Y1
S0
S1
1Y2
2Y2
1Y3
GND
2Y3
UART2_TX
UART2_RX
SW_EN
SW_S0
SW_S1
UART_S_TX
UART_S_RX
USW_EN
USW_S0
USW_S1
UART_TX_S1
UART_RX_S1
UART_TX_S2
UART_RX_S2
UART_TX_S3
UART_RX_S3
UART_TX_S4
UART_RX_S4
DA8
PESD3V3L2BT,215
RN3B
RN3A
200 ohm
J11
C26
0.1uF
DA9
PESD3V3L2BT,215
RN4A
RN4B
200 ohm
J12
C27
0.1uF
Title
Size
A
Number
Revision
Date:
5/5/2016
Sheet of
File:
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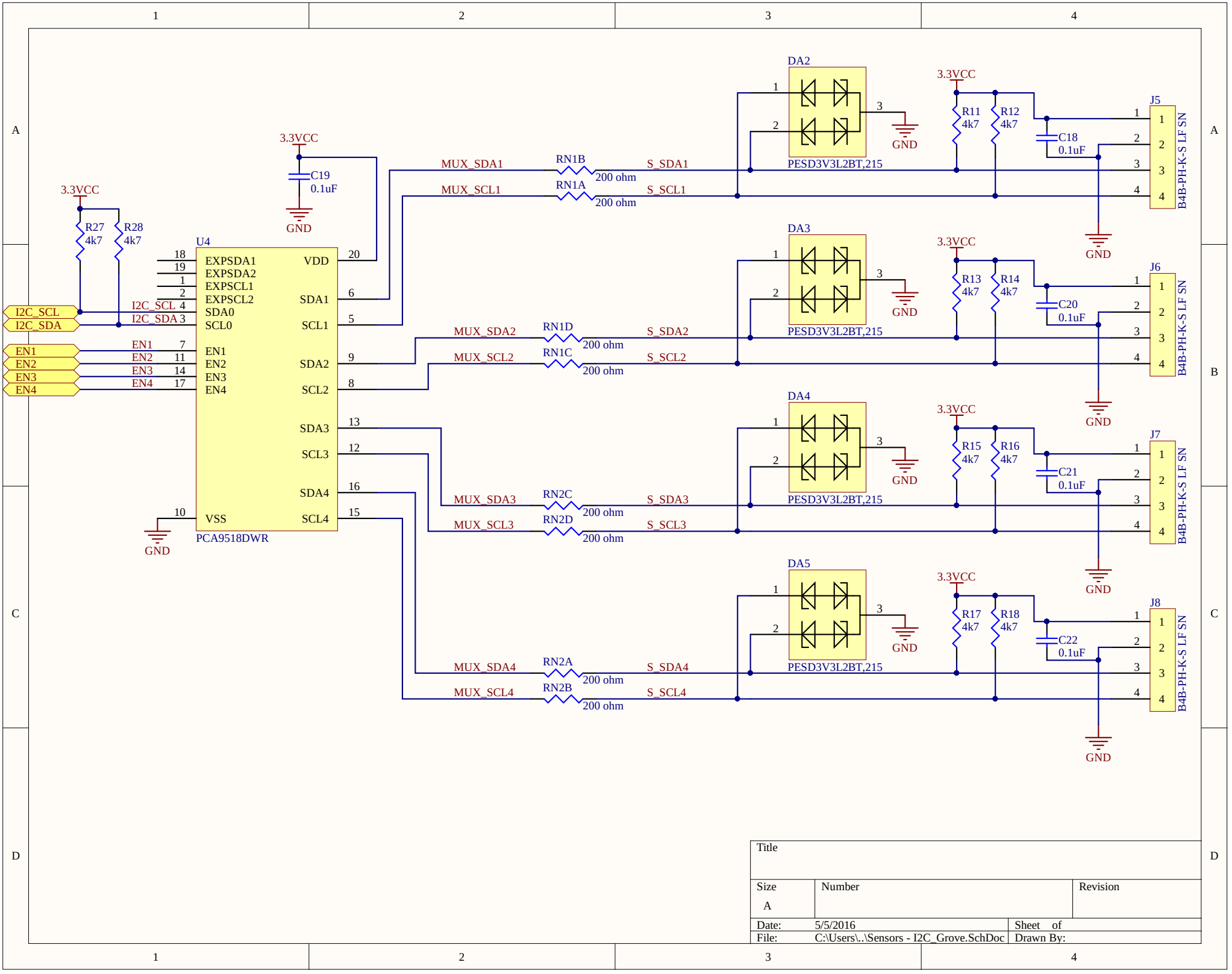
U4
PCA9518DWR
EXPSDA1
EXPSDA2
EXPSCL1
EXPSCL2
SDA0
SCL0
EN1
EN2
EN3
EN4
VDD
SDA1
SCL1
SDA2
SCL2
SDA3
SCL3
SDA4
SCL4
VSS
3.3VCC
GND
C19
0.1uF
R27
4k7
R28
4k7
I2C_SCL
I2C_SDA
MUX_SDA1
MUX_SCL1
MUX_SDA2
MUX_SCL2
MUX_SDA3
MUX_SCL3
MUX_SDA4
MUX_SCL4
RN1A
RN1B
RN1C
RN1D
RN2A
RN2B
RN2C
RN2D
200 ohm
S_SDA1
S_SCL1
S_SDA2
S_SCL2
S_SDA3
S_SCL3
S_SDA4
S_SCL4
DA2
DA3
DA4
DA5
PESD3V3L2BT,215
R11
R12
R13
R14
R15
R16
R17
R18
4k7
C18
C20
C21
C22
0.1uF
J5
J6
J7
J8
B4B-PH-K-S LF SN
Title
Size
A
Number
Revision
Date:
5/5/2016
Sheet of
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C:\Users\..\Sensors - I2C_Grove.SchDoc
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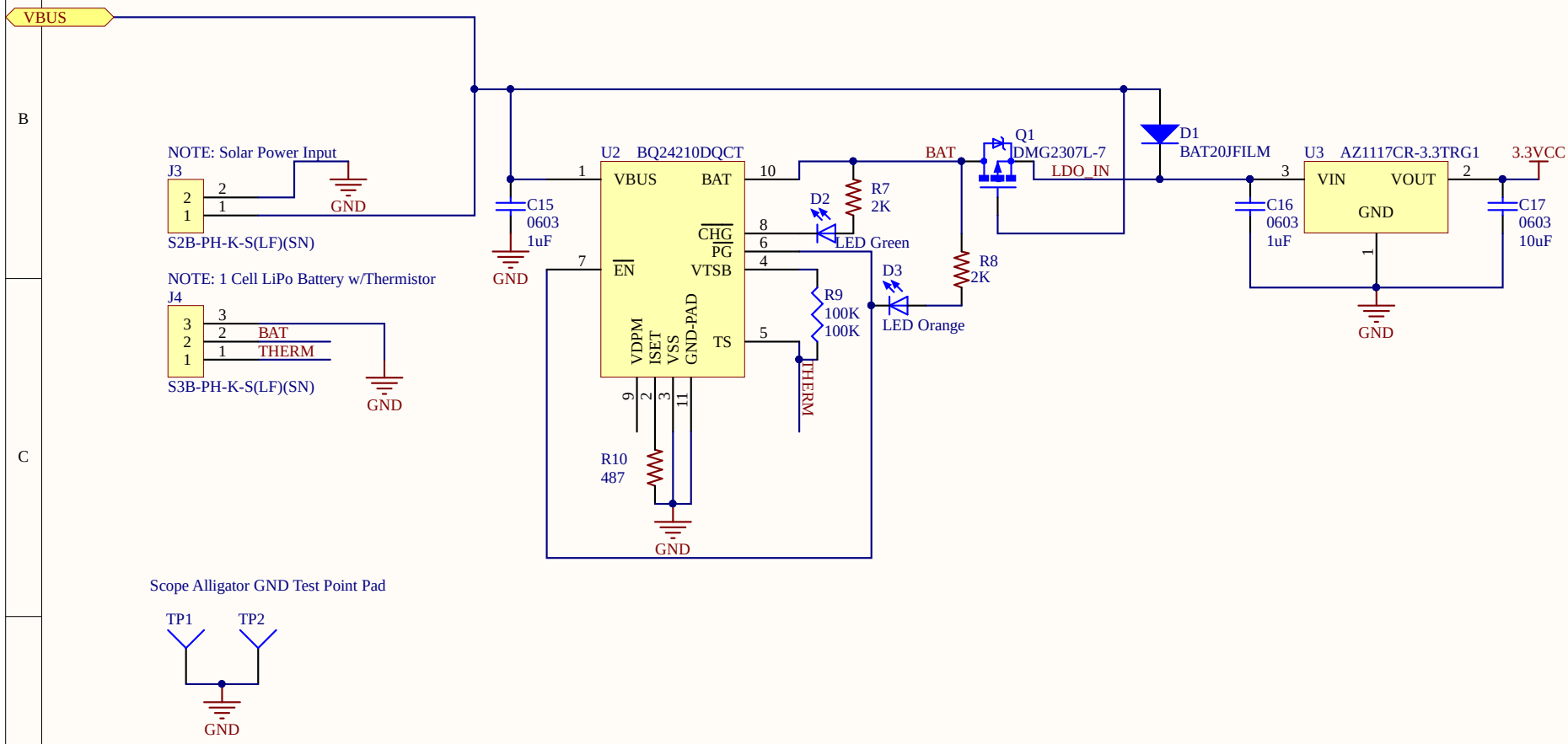

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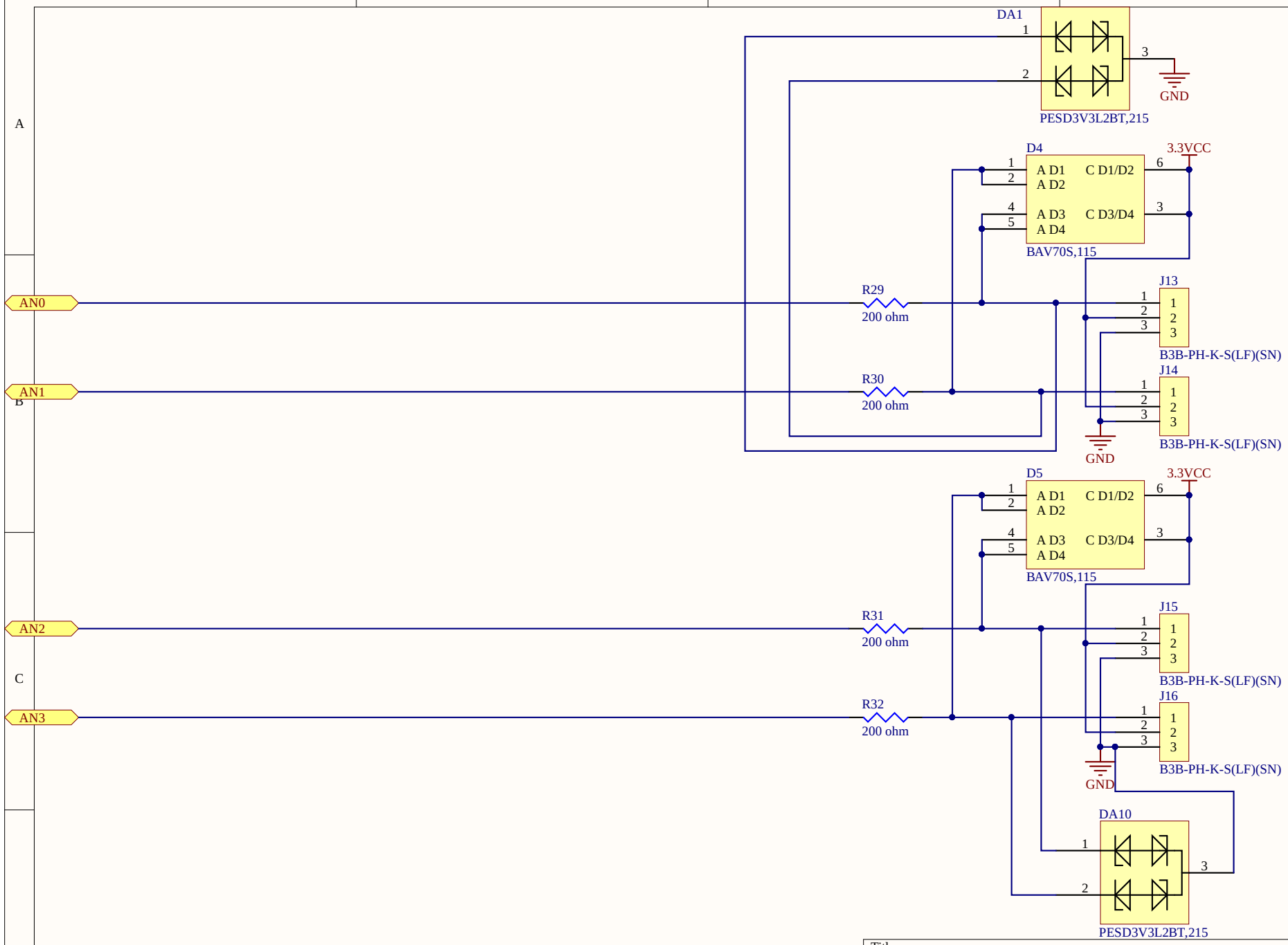

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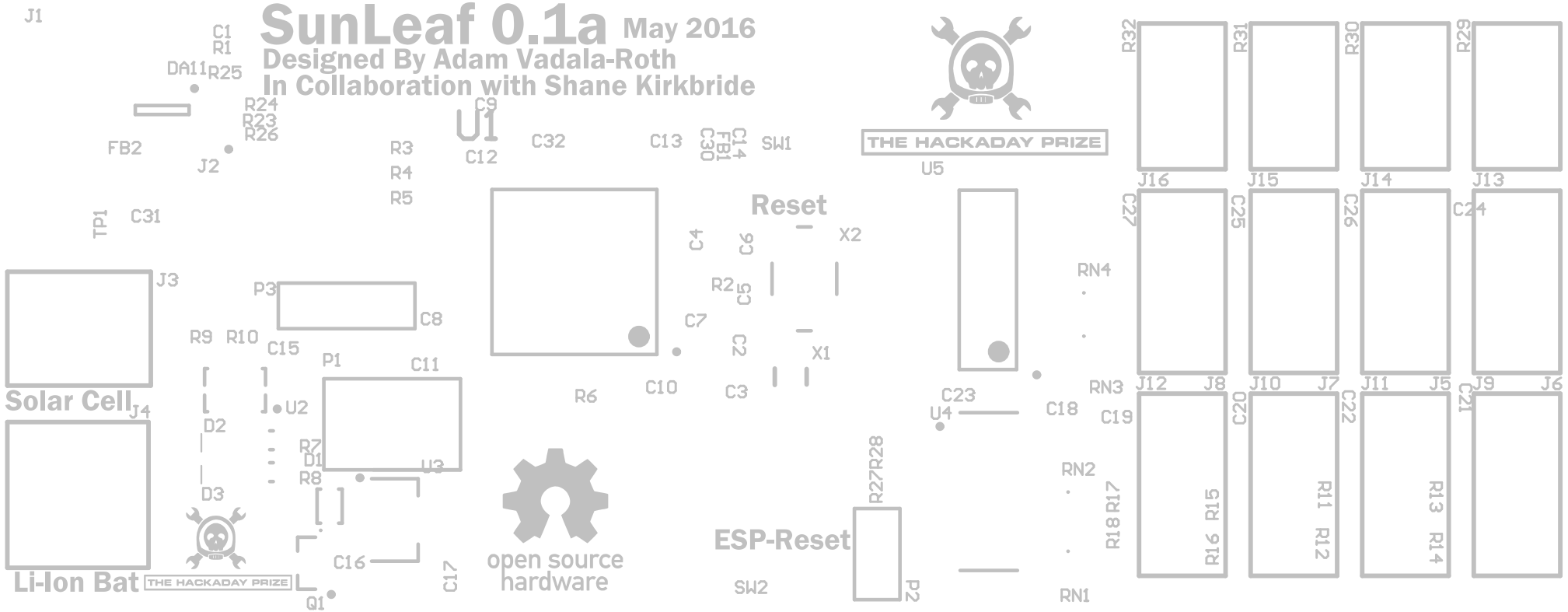
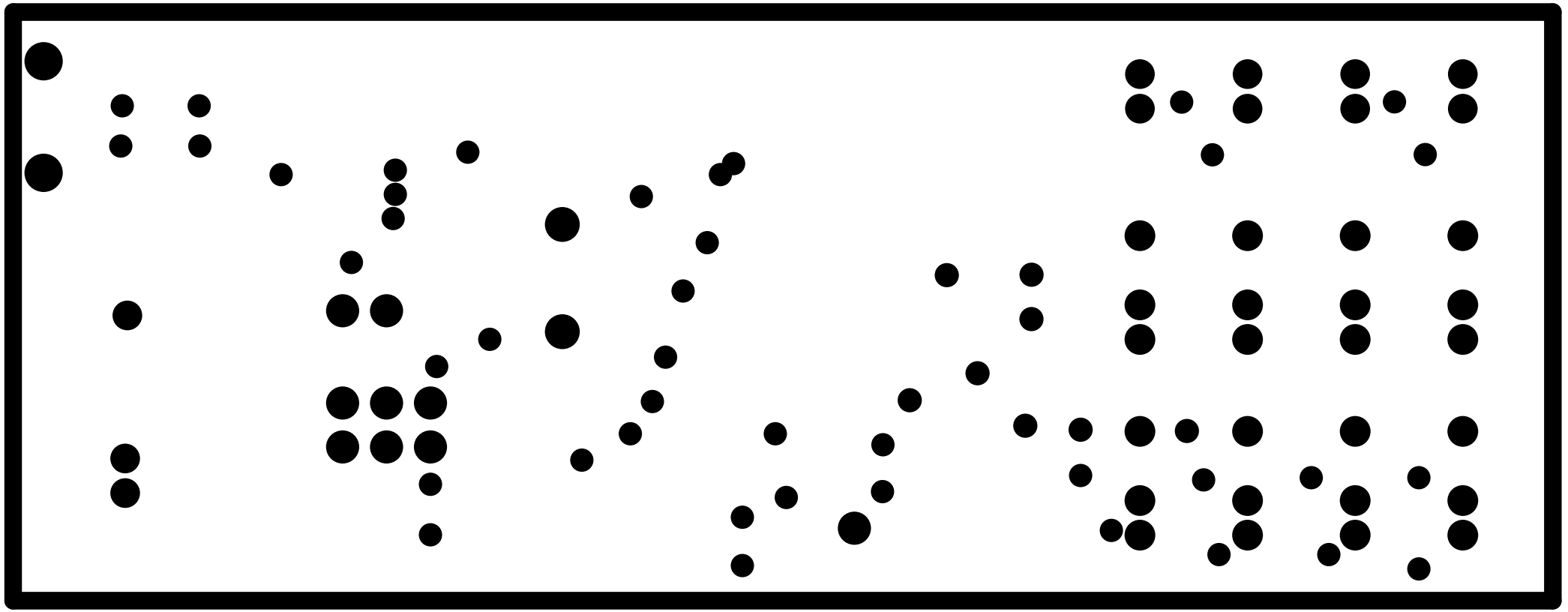
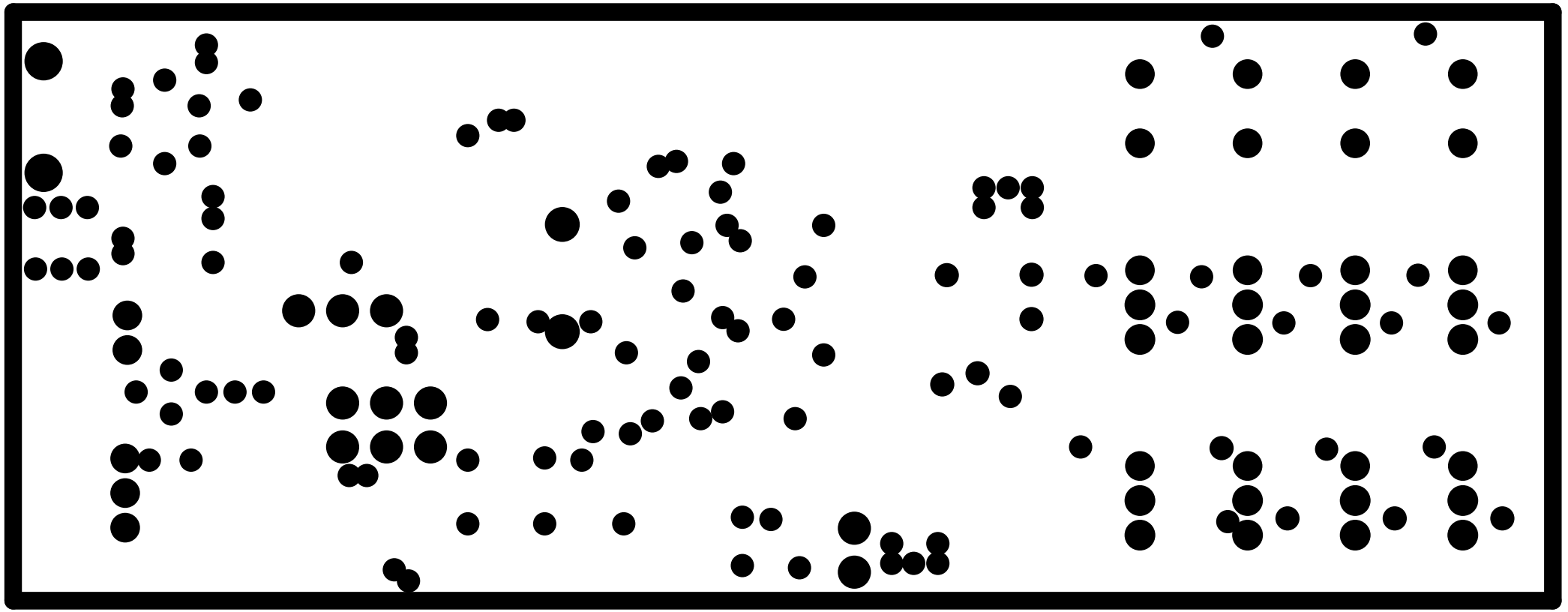
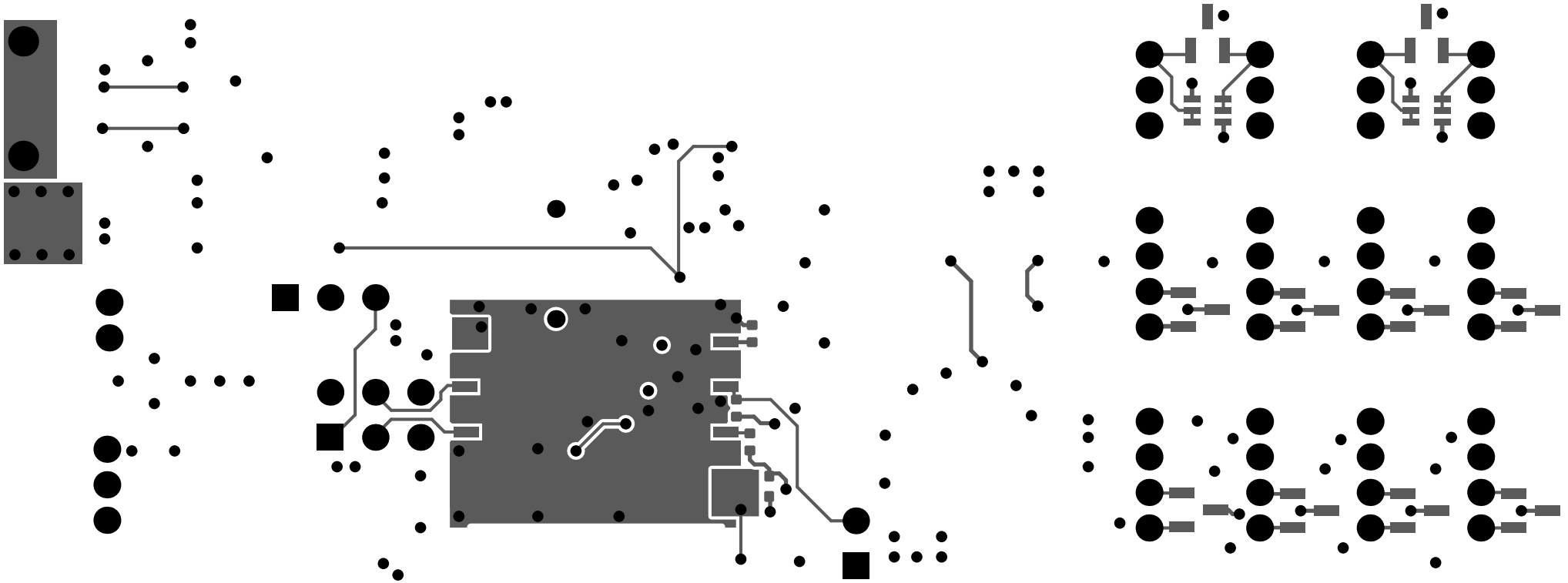
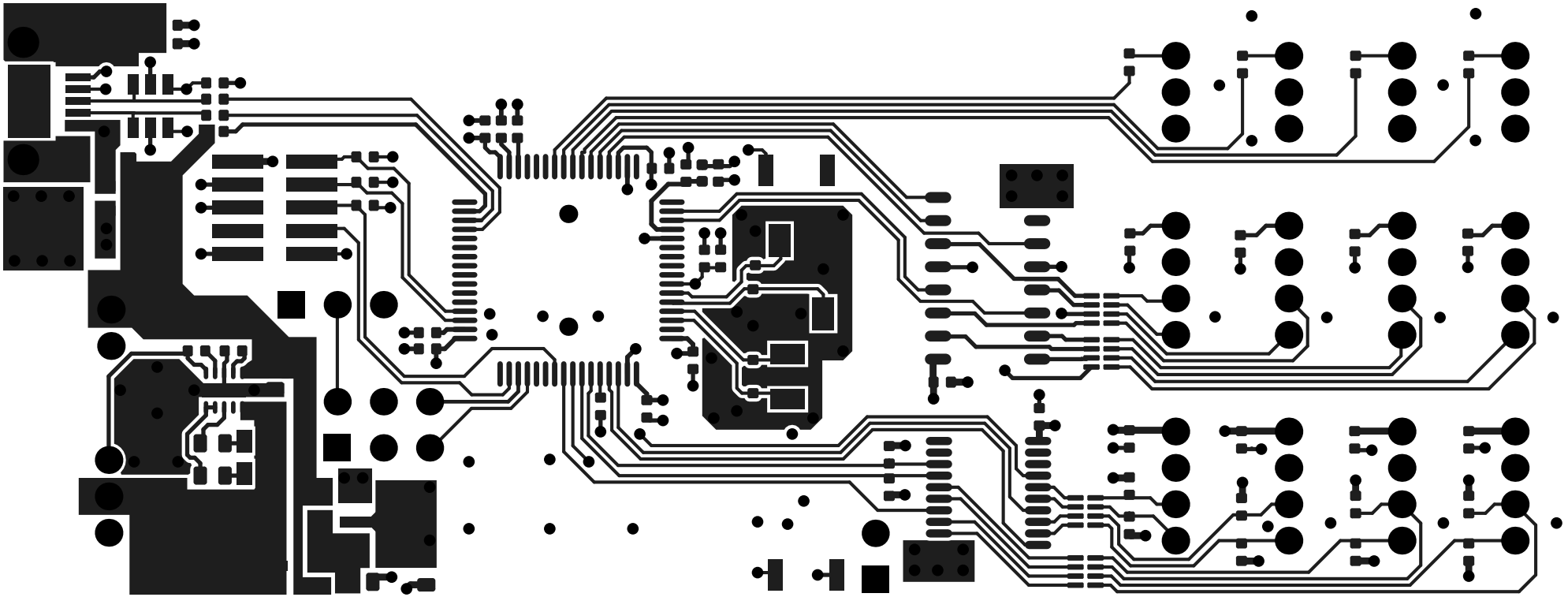
D10
D1
D5
D4
D9
D7
D8
D6
D5
D4
D2
D3
R22
C28
IC1
R29
C29
IC1
TP2

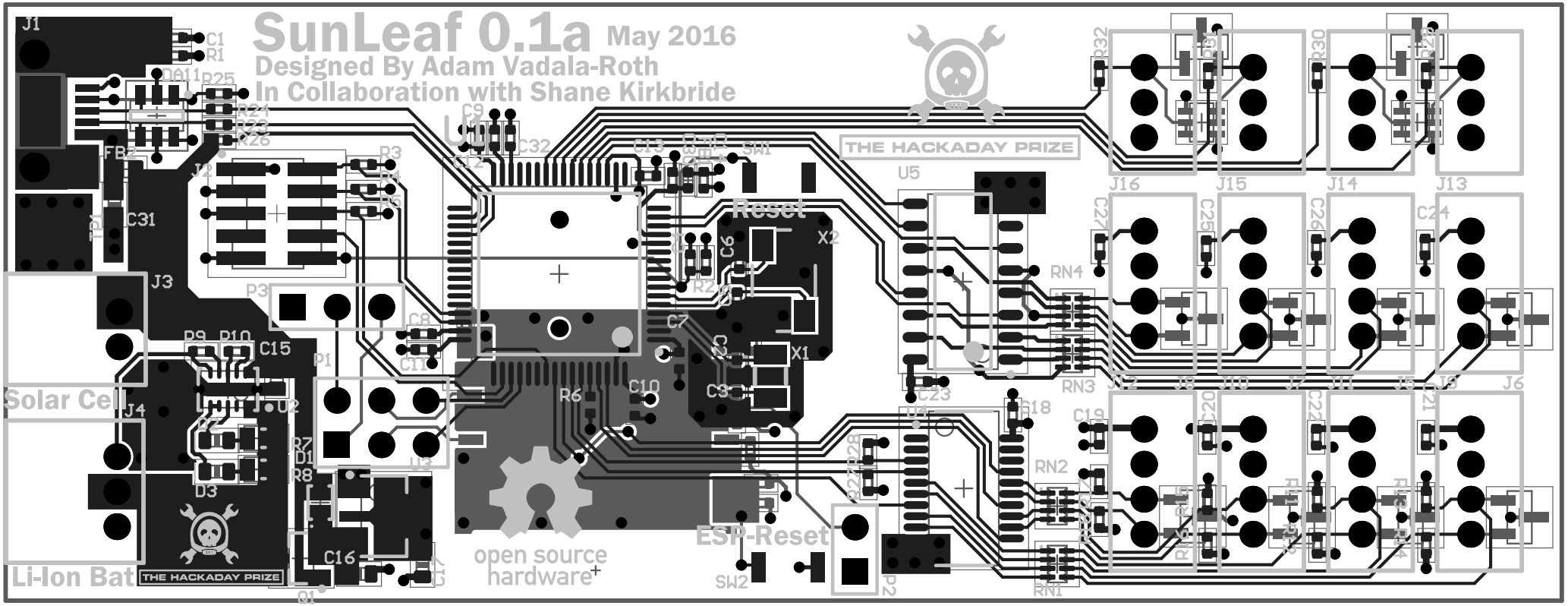

SunLeaf 0.1a
May 2016
Designed By Adam Vadala-Roth
In Collaboration with Shane Kirkbride
THE HACKADAY PRIZE
Reset
Solar Cell
Li-Ion Bat
ESP-Reset
open source hardware
J1
J2
J3
J4
U1
U2
U3
U4
U5
X1
X2
SW1
SW2
Q1
P1
P2
P3
TP1
FB2
DA11
RN1
RN2
RN3
RN4
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C30
C31
C32
D1
D2
D3
FB1
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
J16







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J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
J16
U1
U2
U3
U4
U5
X1
X2
SW1
SW2
RN1
RN2
RN3
RN4

Item #	mn Name Error:Manufac	#Column Name Error:Manufacturer No	Quantity	#Column Name Error:Note	Designator	Description	Footprint	Comment	LibRef
1			1		C1	CAP CER 47PF 50V NP0 0402	C0402	0402	CL05C470FB5NNNC
2			2		C2, C3	CAP CER 18PF 50V NP0 0402	C0402	18pF	CL05C180GB5NCNC
3			20		C4, C7, C10, C11, C12, C13, C14, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30	CAP CER 0.1UF 10V X7R 0402	C0402	0.1uF	CL05B104JP5NNNC
4			2		C5, C6	CAP CER 9PF 50V NP0 0402	C0402	9pF	CL05C090CB5NNNC
5			2		C8, C9	CAP CER 2.2UF 6.3V X5R 0402	C0402	2.2uF	CL05A225KQ5NSNC
6			3		C15, C16, C17	CAP CER 1UF 25V X5R 0402, CAP CER 1UF 25V X5R 0402, CAP CER 10UF 6.3V X5R 0603	C0603	0603	CL05A105KA5NQNC, CL05A105KA5NQNC, CL10A106KQ8NNNC
7			1		C31	CAP CER 10000PF 10V U2J 0603	C0603	0.01uF	GRM1857U1A103JA44D
8			1		C32	CAP CER 4.7UF 6.3V X5R 0402	C0402	4.7uF	CL05A475KQ5NRNC
9			1		D1	DIODE SCHOTTKY 23V 1A SOD323	BAT20JFILM - DIOM1712X11N	BAT20JFILM	BAT20JFILM
10			1		D2	LED GREEN CLEAR 0603 SMD	LED0603_GREEN	LED Green	LTST-C191KGKT
11			1		D3	LED ORANGE CLEAR 0603 SMD	LED0603_ORANGE	LED Orange	LTST-C191KFKT
12			2		D4, D5	DIODE ARRAY GP 100V 250MA 6TSSOP	BAV70S	BAV70S,115	BAV70S
13			10		DA1, DA2, DA3, DA4, DA5, DA6, DA7, DA8, DA9, DA10	TVS DIODE 3.3VWM 26VC SOT23	SOT95P230X110-3N	PESD3V3L2BT,215	PESD3V3L2BT,215
14			1		DA11	TVS DIODE 5VWM SOT23-6	ESDA6V1BC6	ESDA6V1BC6	ESDA6V1BC6
15			1		FB1	FERRITE BEAD 600 OHM 0402 1LN	BLM15HG601SN1D	BLM15HG601SN1D	BLM15HG601SN1D
16			1		FB2	FERRITE BEAD 30 OHM 0603 1LN	MI0603K300R-10	MI0603K300R-10	MI0603K300R-10
17			1		IC1	ESP8266 ESP-02	ESP8266 ESP-02	ESP8266 ESP-02	ESP8266 ESP-02
18			1		J1	Micro USB Jack B	Micro USB Circular Holes Only	DX4R005J91R5100	Micro USB
19			1		J2	20021121-00010C4LF ARM COrtex JTAG	FTSH-105-XX-X-DV	20021121-00010C4LF	20021121-00010C4LF
20			1		J3	CONN HEADER PH SIDE 2POS 2MM	S2B-PH-K-S(LF)(SN)	S2B-PH-K-S(LF)(SN)	S2B-PH-K-S(LF)(SN)
21			1		J4	CONN HEADER PH SIDE 2POS 2MM	S3B-PH-K-S(LF)(SN)	S3B-PH-K-S(LF)(SN)	S3B-PH-K-S(LF)(SN)
22			8		J5, J6, J7, J8, J9, J10, J11, J12	CONN HEADER PH TOP 4POS 2MM	B4B-PH-K-S(LF)(SN)	B4B-PH-K-S LF SN	B4B-PH-K-S LF SN
23			4		J13, J14, J15, J16	CONN HEADER PH TOP 3POS 2MM	B3B-PH-K-S(LF)(SN)	B3B-PH-K-S(LF)(SN)	B3B-PH-K-S(LF)(SN)
24			1		P1	Header, 3-Pin, Dual row	HDR2X3	Header 3X2	Header 3X2
25			1		P2	Header, 2-Pin	HDR1X2	Header 2	Header 2
26			1		P3	Header, 3-Pin	HDR1X3	Header 3	Header 3
27			1		Q1	MOSFET P-CH 30V 2.5A SOT-23	DMG2307L-7 - SOT92P240X102-3N	DMG2307L-7	DMG2307L-7
28			1		R1	RES SMD 1M OHM 1% 1/16W 0402	R0402	1M	RC1005F105CS
29			8		R2, R3, R4, R5, R19, R20, R21, R22	RES SMD 1K OHM 1% 1/16W 0402	R0402	1k	RC1005F102CS
30			2		R6, R26	RES SMD 10K OHM 1% 1/16W 0402	R0402	10K	RC1005F103CS
31			2		R7, R8	RES SMD 2K OHM 1% 1/8W 0805	R0805	ERJ-6ENF2001V	ERJ-6ENF2001V
32			1		R9	Standin 0402	R0402	100K	Standin 0402
33			1		R10	RES SMD 487 OHM 1% 1/16W 0402	R0402	RC1005F4870CS	RC1005F4870CS
34			10		R11, R12, R13, R14, R15, R16, R17, R18, R27, R28	4.7k Ohm ±1% 0.063W, 1/16W Surface Mount Resistor Thick Film ±100ppm/°C 0402 (1005 Metric)	R0402	4k7	RC1005F472CS
35			2		R23, R24	RES SMD 22 OHM 0.1% 1/16W 0402	R0402	22r	1879208-9
36			1		R25	RES SMD 47K OHM 1% 1/16W 0402	R0402	47K	RC1005F473CS
37			4		R29, R30, R31, R32	RES SMD 200 OHM 1% 1/16W 0402	R0402	200 ohm	RC1005F201CS
38			4		RN1, RN2, RN3, RN4	RES ARRAY 4 RES 200 OHM 0804	EXB-N8V201JX - CAC-50P200X100-8N	200 ohm	EXB-N8V201JX
39			2		SW1, SW2	SWITCH TACTILE SPST-NO 0.05A 12V	B3U-1000P	B3U-1000P	B3U-1000P
40			2		TP1, TP2	Socket	Alligator-TP	Test-Point	Test Point, Alligator-Style
41			1		U1		STM32F446RET6 - TSQFP50P1200X1200X160-64N	STM32F446RET6 - TQFP64	STM32F446RET6
42			1		U2	IC BATT CHARGER LI-ION 10WSON (VBUS and Solar Voltaic Cell)	bq24210 - QFN50P300X200X80-10N	BQ24210DQCT	BQ24210DQCT
43			1		U3	IC REG LDO 3.3V 0.8A SOT89	AZ1117CR-3.3TRG1 - SOT89-150P410X160-3N	AZ1117CR-3.3TRG1	AZ1117CR-3.3TRG1
44			1		U4	IC EXPANDABLE 5CH I2C HUB 20SOIC	PCA9518DWR	PCA9518DWR	PCA9518DWR
45			1		U5	Dual 4-channel analog multiplexer/demultiplexer	74HC4052	74HC4052	74HC4052
46			1		X1	32.768kHz ±20ppm Crystal 9pF 70 kOhm -40°C ~ 85°C Surface Mount 2-SMD	ABS07-32.768KHZ-9-T	ABS07-32.768KHZ-9-T	ABS07-32.768KHZ-9-T
47			1		X2	8MHz ±20ppm Crystal 18pF 200 Ohm 20° C ~ 70°C Surface Mount 4SMD, No Lead (DFN, LCC)	ABM3B8.000MHZB2T	8MHZ	ABM3B8.000MHZB2T