

NRF9160

The main circuit features the **NRF9160** IC (U9) connected to various components:

- Power Supply:** VCC, GND, VDD, VBAT, VSOL, VSEC, and IO_SUPPLY pins are connected to the appropriate power rails.
- Antenna:** The ANT pin is connected to an antenna (ANT1 1462350001) through a matching network consisting of inductors L1, L2, L3 and capacitors C20, C21.
- GPS Module:** The GPS module (U2) is connected to the NRF9160 via I2C (SDATA, SCLK, VIO) and provides a GPS_EN signal.
- RTC Module:** The RTC module (U1) is connected to the NRF9160 via I2C (SCL, SDO, SDI, CS) and provides an RST signal.
- Other Components:** Various capacitors (C1, C10, C13, C14, C15, C20, C21) and resistors (R7, R8, R9, R10) are used for timing and signal conditioning.

RTC

The RTC module (U1) is connected to the NRF9160 and includes:

- Power Supply:** VCC, VBAT, and VSS pins are connected to the appropriate power rails.
- Crystal:** A crystal (X1 ABS07-32.768KHZ-7-T) is connected to the XTAL pins.
- Timing Components:** A capacitor (C1) and a resistor (R10) are used for timing.
- Other Components:** Various capacitors (C10, C13, C14, C15) and resistors (R7, R8, R9) are used for timing and signal conditioning.

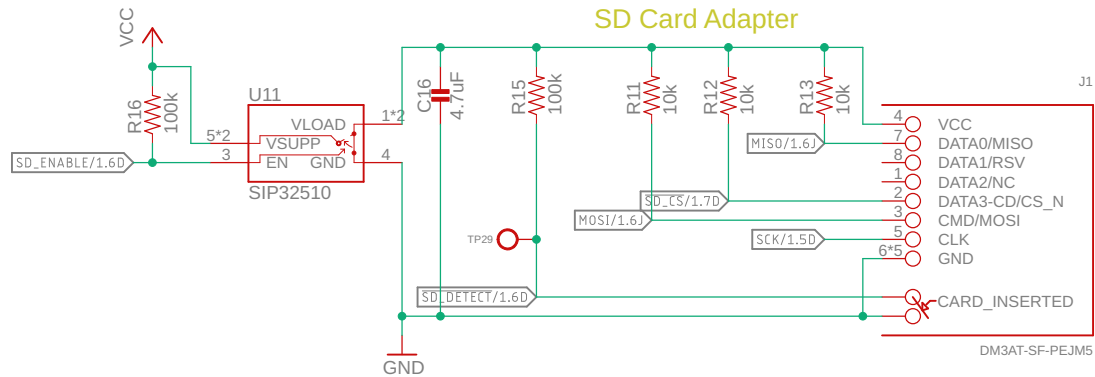
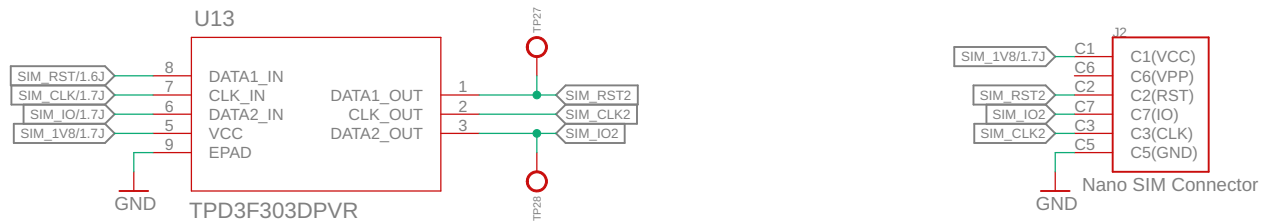
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Author: MEGHNA MANDAVA

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REV: A



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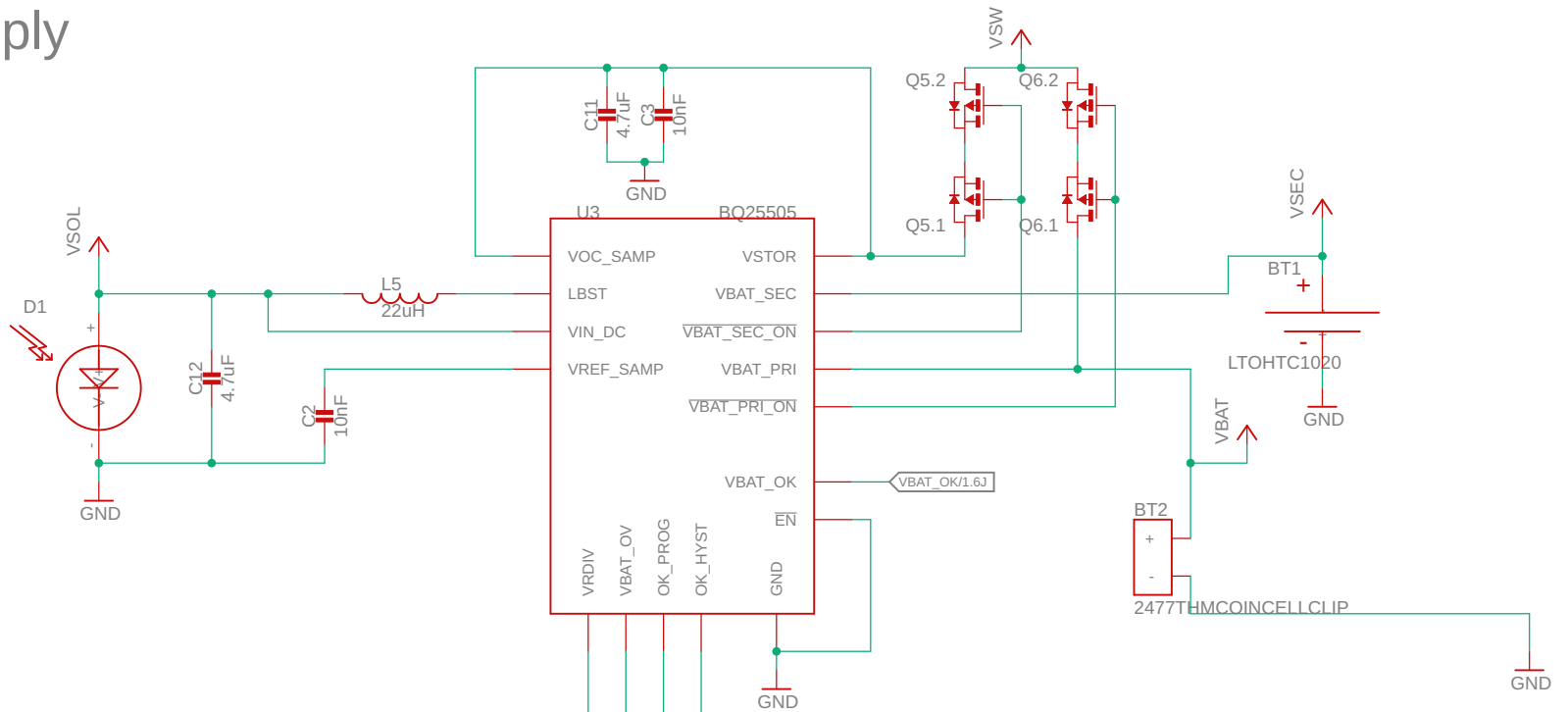
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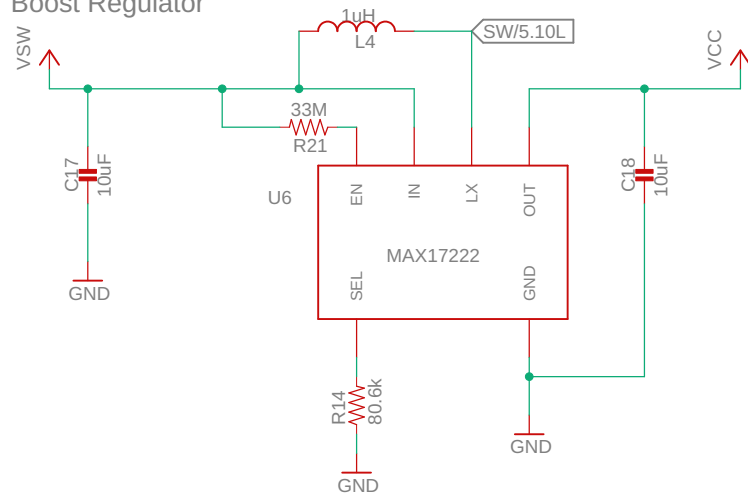
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Power Supply

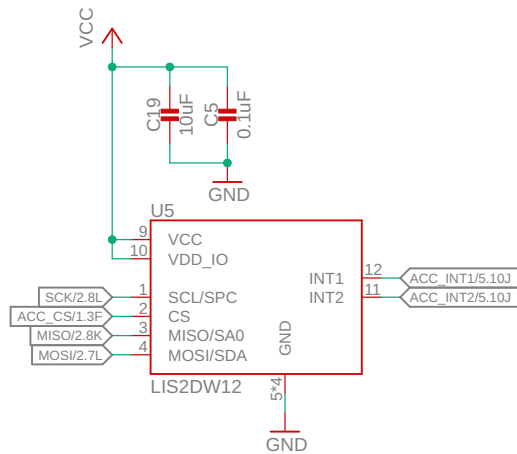


Boost Regulator

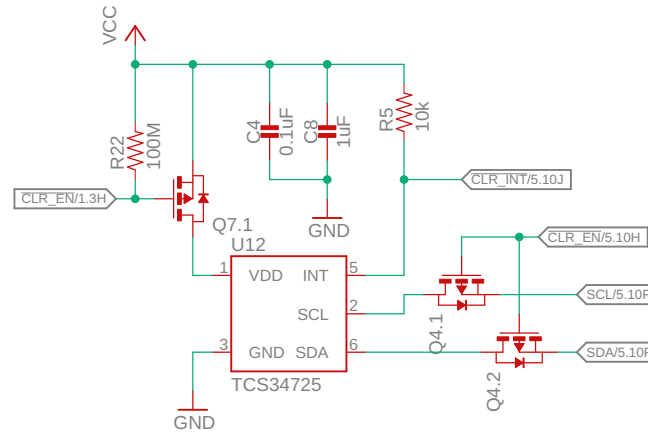


Sensors

Accelerometer

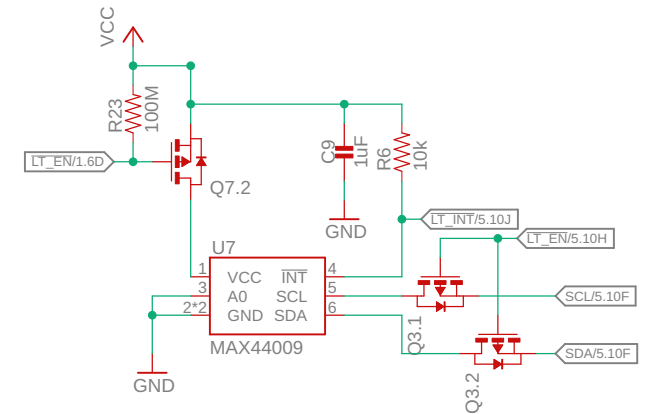


Light Color



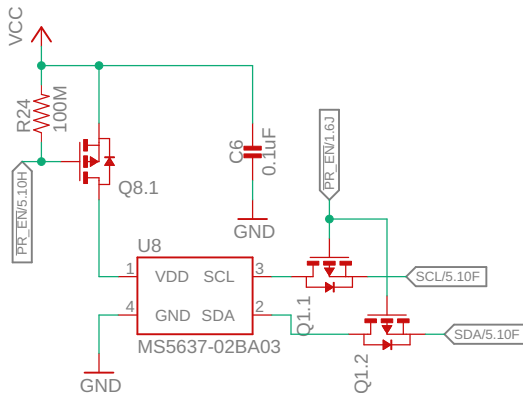
Light

Ambient Light

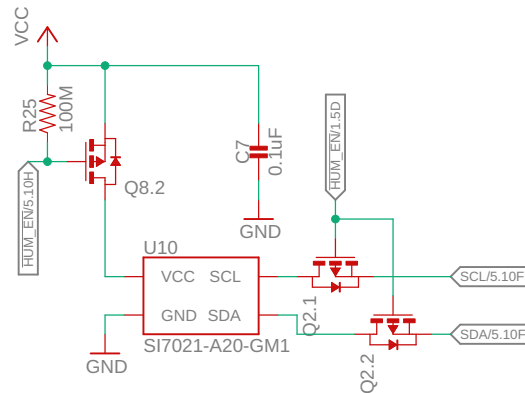


Temperature

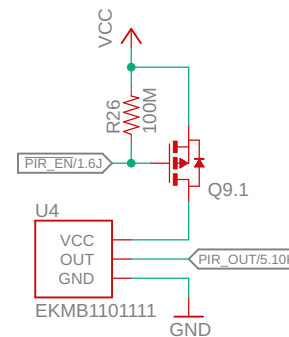
Pressure



Humidity



Occupancy



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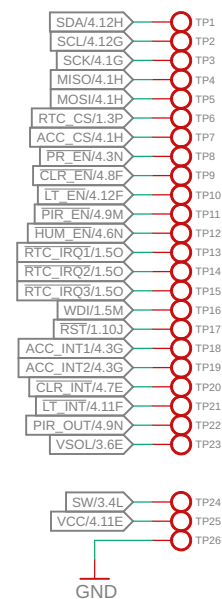
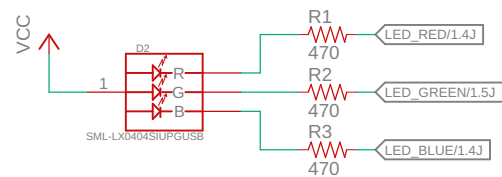
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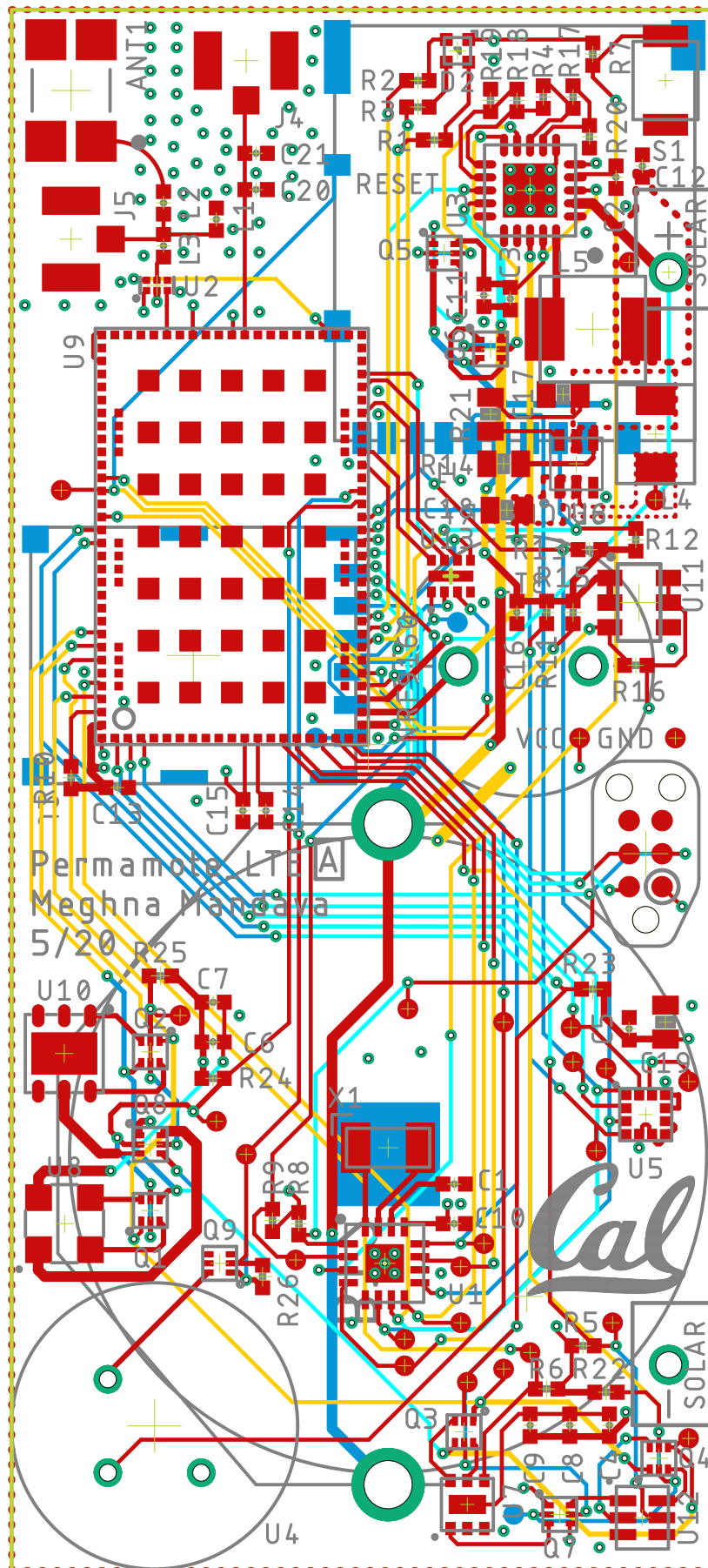
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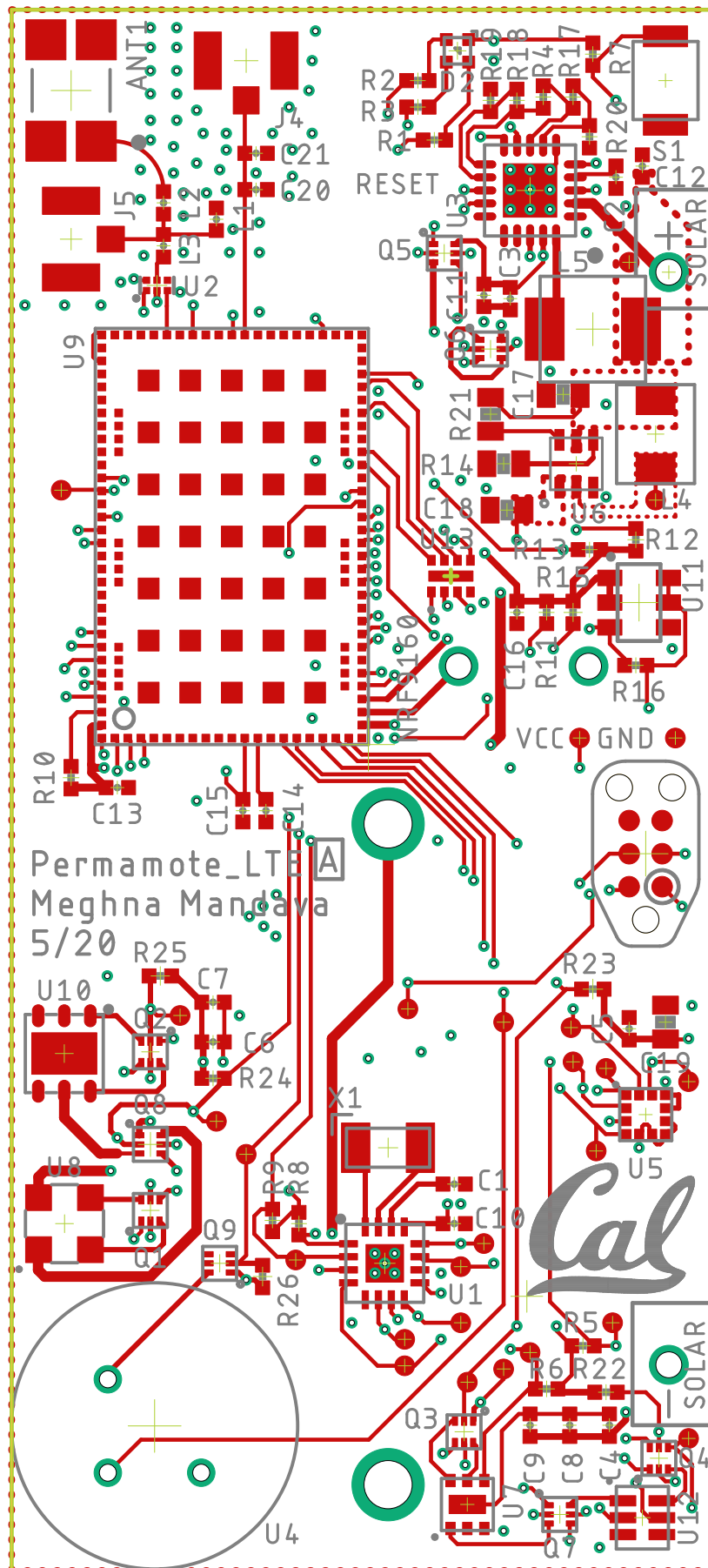
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Debugging

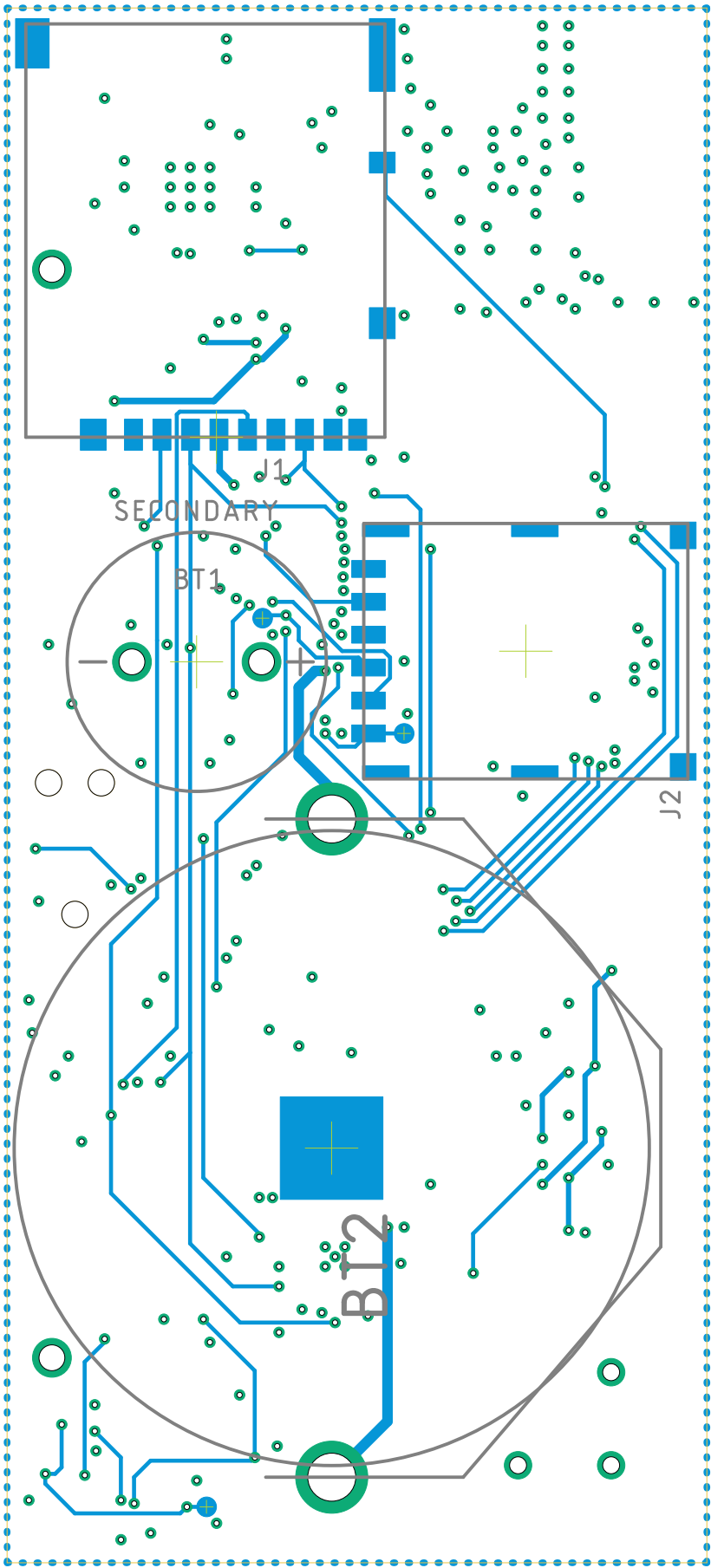


Top and Bottom Layers

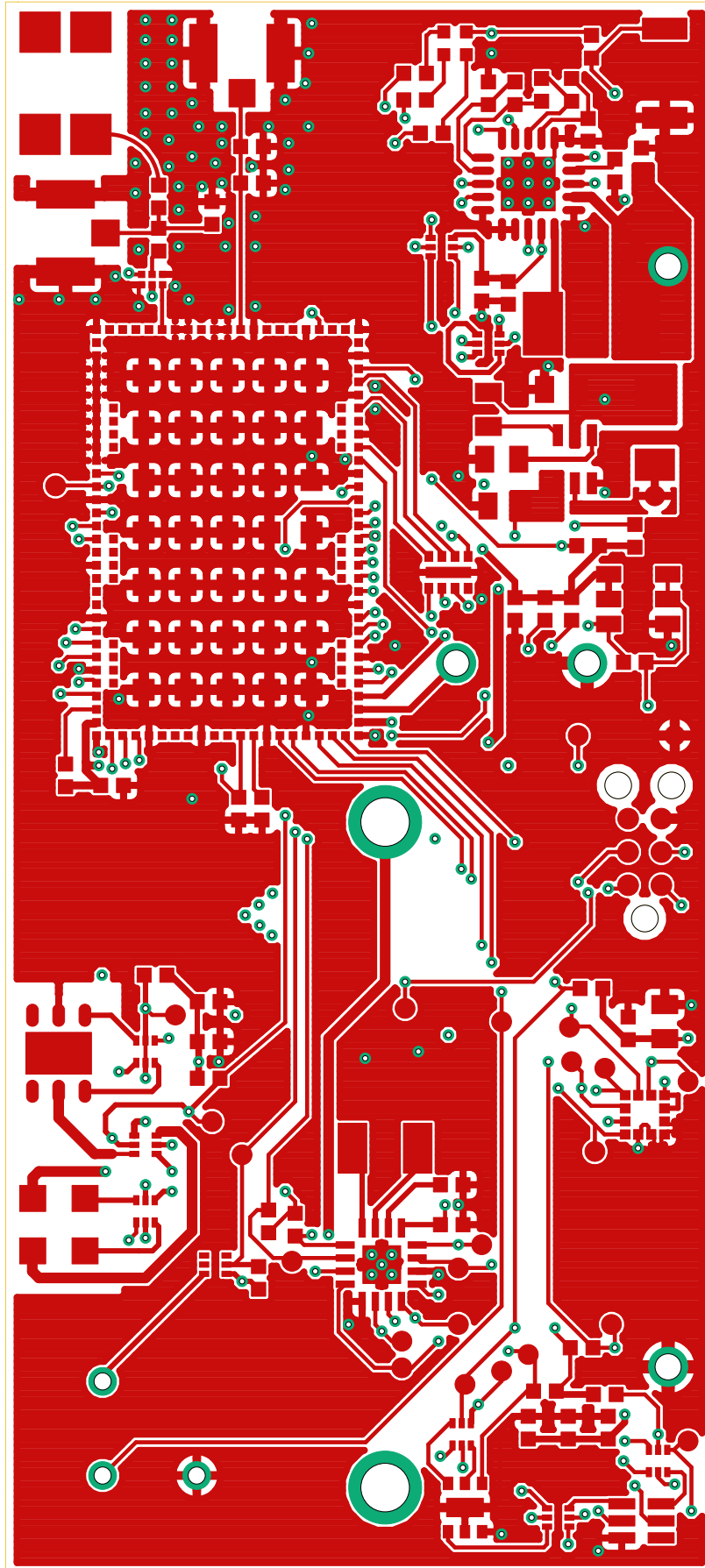




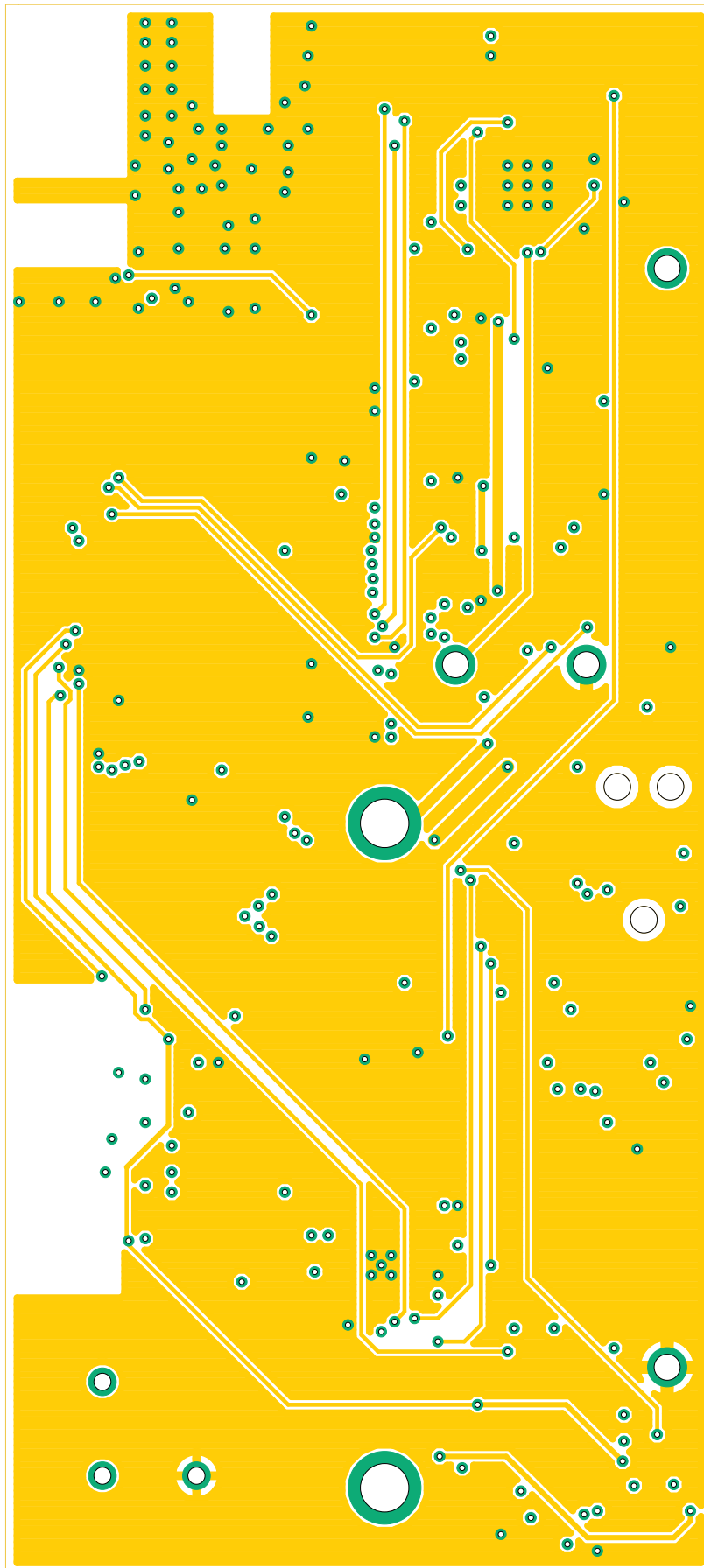
Bottom Layer



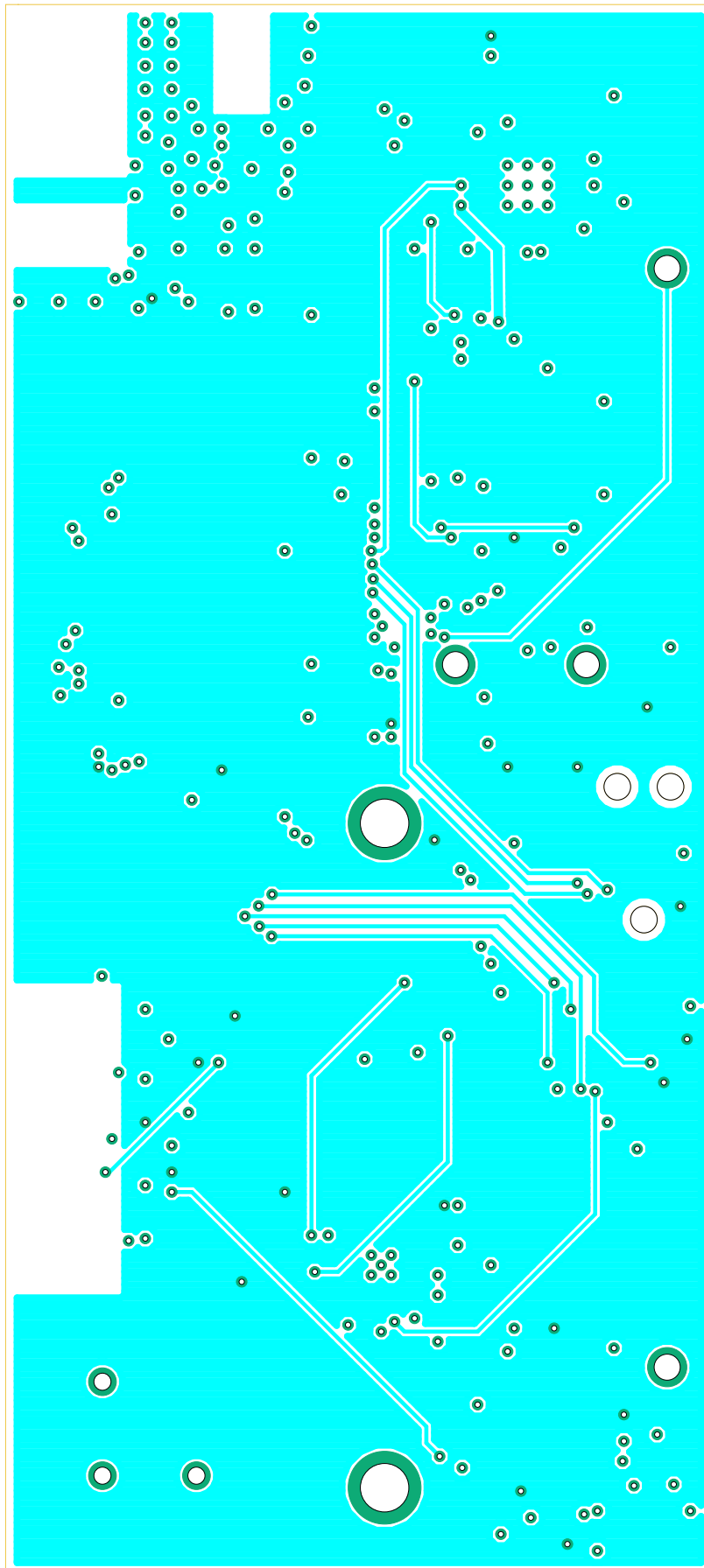
Top Copper Layer



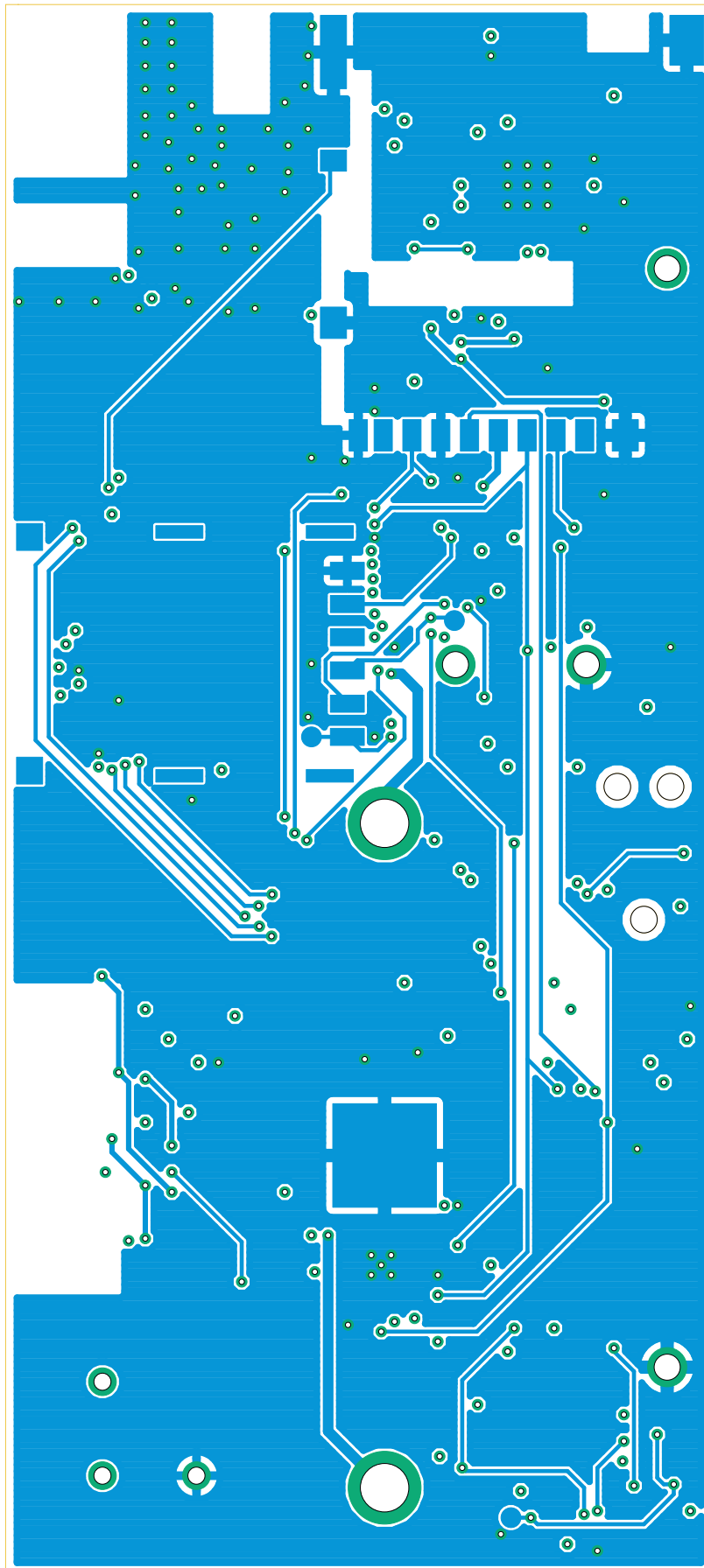
Layer 2 Copper

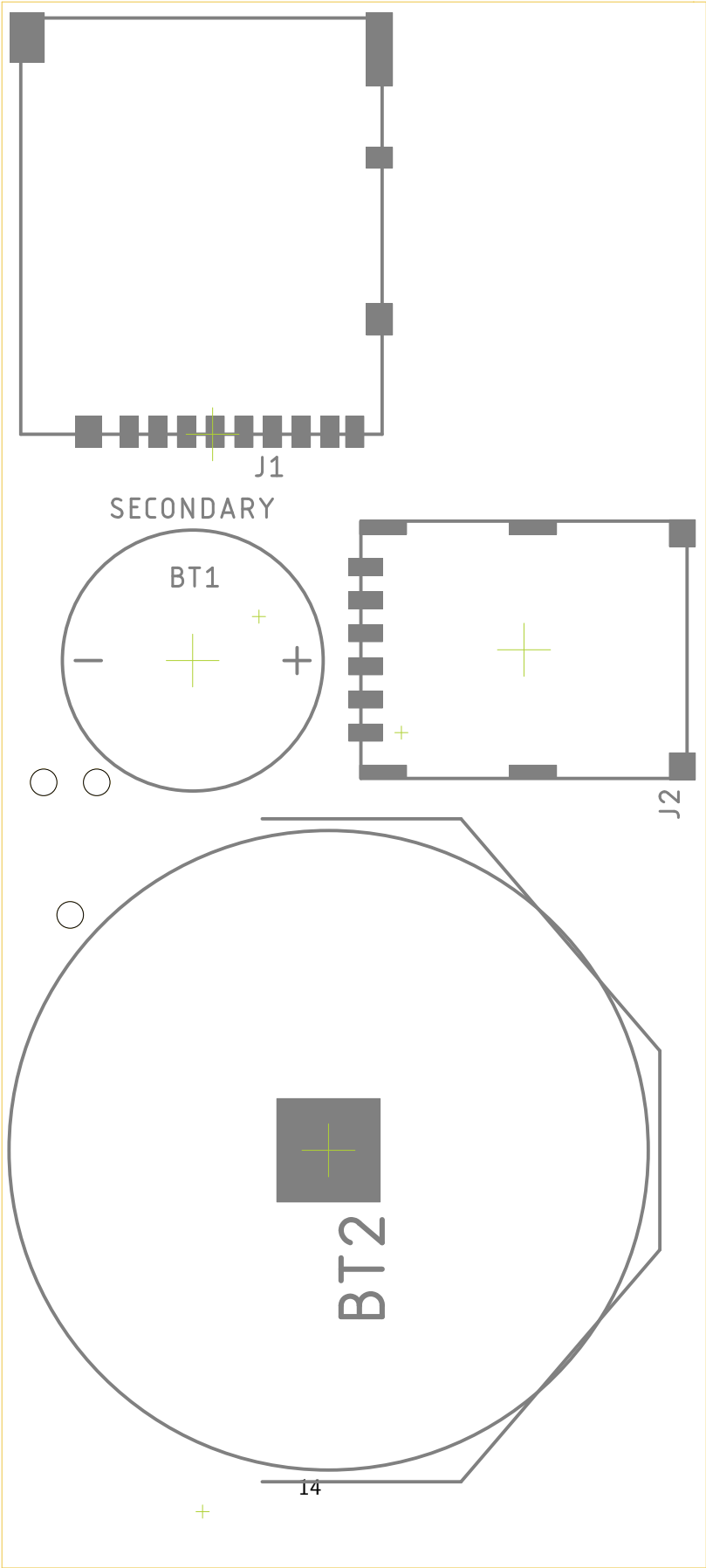


Layer 3 Copper

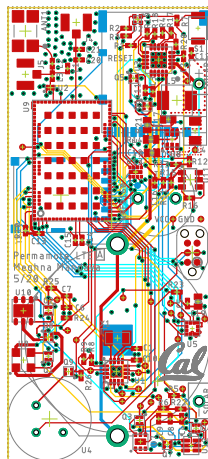


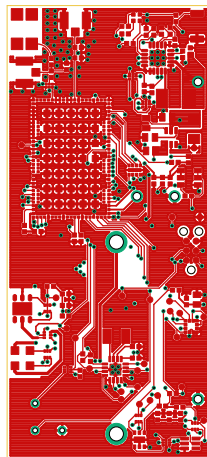
Bottom Copper Layer

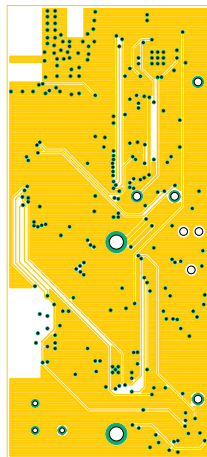


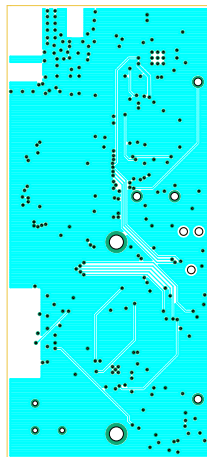


Top and Bottom Layers 1:1 Scale

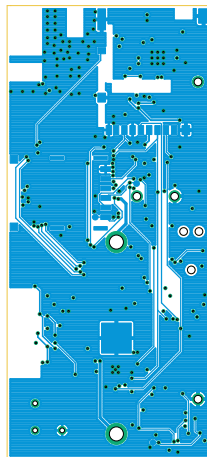








Bottom Copper Layer 1:1 Scale



Qty	Value	Device	Package	Parts	Description	DESCRIPTION
4	0.1uF	CAPACITOR0402_CAP	0402_CAP	C4, C5, C6, C7	SMD Capacitor	
1	1.8nH	INDUCTOR0402	0402_CAP	L1	A very specific inductor	
5	100M	RESISTOR0402_RES	0402_RES	R22, R23, R24, R25, R26	Resistor	
2	100k	RESISTOR0402_RES	0402_RES	R15, R16	Resistor	RES SMD 100K OHM 1%
9	10k	RESISTOR0402_RES	0402_RES	R5, R6, R7, R8, R9, R10, R11, R12, R13	Resistor	
2	10nF	CAPACITOR0402_CAP	0402_CAP	C2, C3	SMD Capacitor	
3	10uF	CAPACITOR0603_CAP	0603_CAP	C17, C18, C19	SMD Capacitor	
1	1462350001	1462350001	ANT_1462350001	ANT1	Antenna GPS 1.4dBi Gain 1578MHz SMD T/R	Antenna GPS 1.4dBi Gain
3	1uF	CAPACITOR0402_CAP	0402_CAP	C8, C9, C10	SMD Capacitor	
1	1uH	INDUCTORIH1L	IH1L-1212BZ-11	L4	A very specific inductor	
1	22uH	INDUCTOR74437324220	74437324220	L5	A very specific inductor	
1	2477THMCOINCELLCLIP	2477THMCOINCELLCLIP	2477THMCOINCLIP	BT2	Battery clip for 2477 Coin Cell	
1	3.9M	RESISTOR0402_RES	0402_RES	R17	Resistor	
1	33M	RESISTOR0603_RES	0603-RES	R21	Resistor	
6	4.7uF	CAPACITOR0402_CAP	0402_CAP	C11, C12, C13, C14, C15, C16	SMD Capacitor	
3	470	RESISTOR0402_RES	0402_RES	R1, R2, R3	Resistor	
1	47pF	CAPACITOR0402_CAP	0402_CAP	C1	SMD Capacitor	
1	5.1uH	INDUCTOR0402	0402_CAP	L2	A very specific inductor	
1	6.04k	RESISTOR0402_RES	0402_RES	R4	Resistor	
1	6.2M	RESISTOR0402_RES	0402_RES	R18	Resistor	
1	6.8M	RESISTOR0402_RES	0402_RES	R19	Resistor	
1	7.5nH	INDUCTOR0402	0402_CAP	L3	A very specific inductor	
1	80.6k	RESISTOR0603_RES	0603-RES	R14	Resistor	
1	9.1M	RESISTOR0402_RES	0402_RES	R20	Resistor	
1	AB1815-T3	AB1815-T3	QFN-16-3MM	U1	Ultra-low current RTC. 55nA quiescent @ 3V. 1.5-3.6V input.	
1	ABS07-32.768KHZ-7-T	ABS07-32.768KHZ-7-T	2-SMD	X1	32.768kHz Crystal	
1	B3U-1000P	B3U-1000P	B3U-1000P	S1	Switch	
1	BGA725L6	BGA725L6	LNA-TSLP-6-2-ORIG	U2		
1	BQ25505	BQ25505	S-PVQFN-N20-RGR	U3		
1	DM3AT-SF-PEJM5	DM3AT-SF-PEJM5	DM3AT-SF-PEJM5	J1	EH front end for switching between primary and secondary cells	
2	DNP	CAPACITOR0402_CAP	0402_CAP	C20, C21	CONN MICRO SD R/A PUSH-PUSH SMD	CONN MICRO SD CARD
1	EKMB1101111	EKMB1101111	AMN2	U4	SMD Capacitor	
1	LIS2DW12	LIS2DW12	LGA-12	U5	Passive infrared human detection sensor with built-in amp.	
1	LTOHTC1020	LTOHTC1020	1020	BT1	ultra low power 3 axis accelerometer	
1	MAX17222	MAX17222	UDFN-6-MAXIM	U6	Very high efficiency, very low power boost converter suitable for EH applications	
1	MAX44009	MAX44009	UDFN-6-EXPOSED	U7	low power ambient light sensor	
1	MS5637-02BA03	MS5637-02BA03	4-SMD	U8	low power pressure sensor	
1	NANO_SIM	NANO_SIM	WURTH_NANO_SIM	M2	WURTH Nano SIM Connector	
1	NRF9160	NRF9160	NRF9160	U9		
9	PMDXB950UPEL	PMDXB950UPEL	XDFN-6	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9	20 V 500mA, dual P-channel Trench MOSFET	
1	SI7021-A20-GM1	SI7021-A20-GM1	DFN-6/3MM	U10	IC TEMP SENSOR RH 2% DFN	
1	SIP32510	SIP32510	TSOT23-6	U11	Load switch, slew rate controlled. By Vishay	IC LOAD SWITCH SOT23
1	SML-LX0404SIUPGUSB	SML-LX0404SIUPGUSB	1MM_SQ_4PAD	D2	1mm*2 RGB LED	
1	SOLARCELLHOLES	SOLARCELLHOLES	SOLAR_HOLES	D1	Generic solar cell	
1	TCS34725	TCS34725	FN-6	U12	Color Light-to-Digital Converter with IR Filter	
1	TPD3F303DPVR	TPD3F303DPVR	DPV8_1P7X0P4	U13		
2	U.FL-R-SMT	U.FL-R-SMT	U.FL_SMT	J4, J5	U.FL-R-SMT Antenna Connector	