



Bio-Sensor Wearable Development Board

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Date 6/28/2020

Outline

- Schedule
 - Gantt Chart update
- Progress update
 - Current progress
 - Path forward

SCHEDULE

Schedule Gantt chart

Task	6/3-6/7	6/7-6/14	6/14-6/21	6/21-6/28	6/28-7/5	7/5-7/12	7/19-7/26	7/26-7/31
ELECTRONICS DEVELOPMENT								
-SCHEMATIC GENERATION	✕	✕						
-PCB LAYOUT AND ROUTING			✕	✕				
-HARDWARE DEBUGGING								
FIRMWARE DEVELOPMENT								
-PROJECT STACK ORGANIZATION					●			
-SENSOR DRIVERS					●			
-RTT AND SERIAL DATA LOGGING								
-FIRMWARE DEBUGGING								

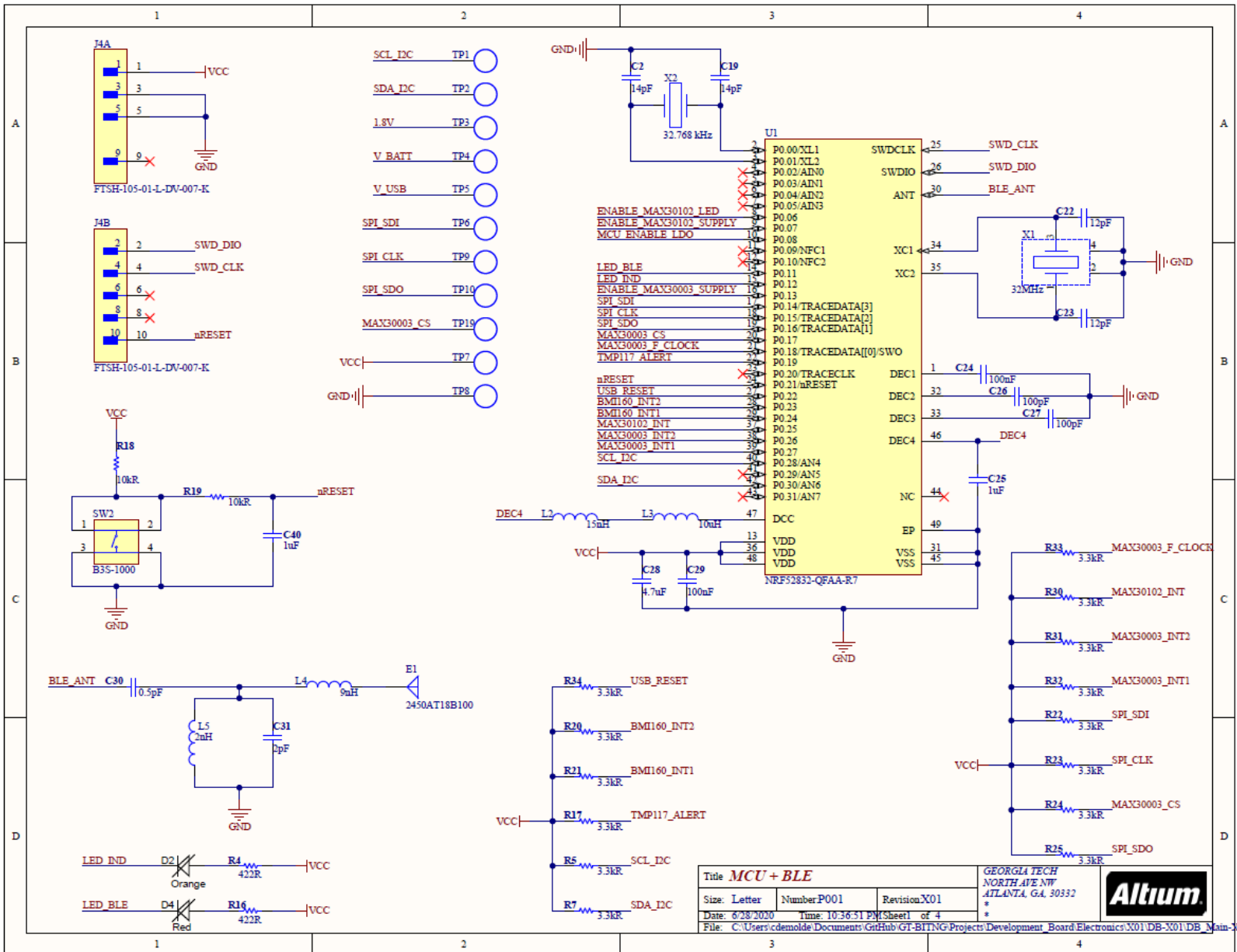
PROGRESS TO DATE

Electronics development: schematic

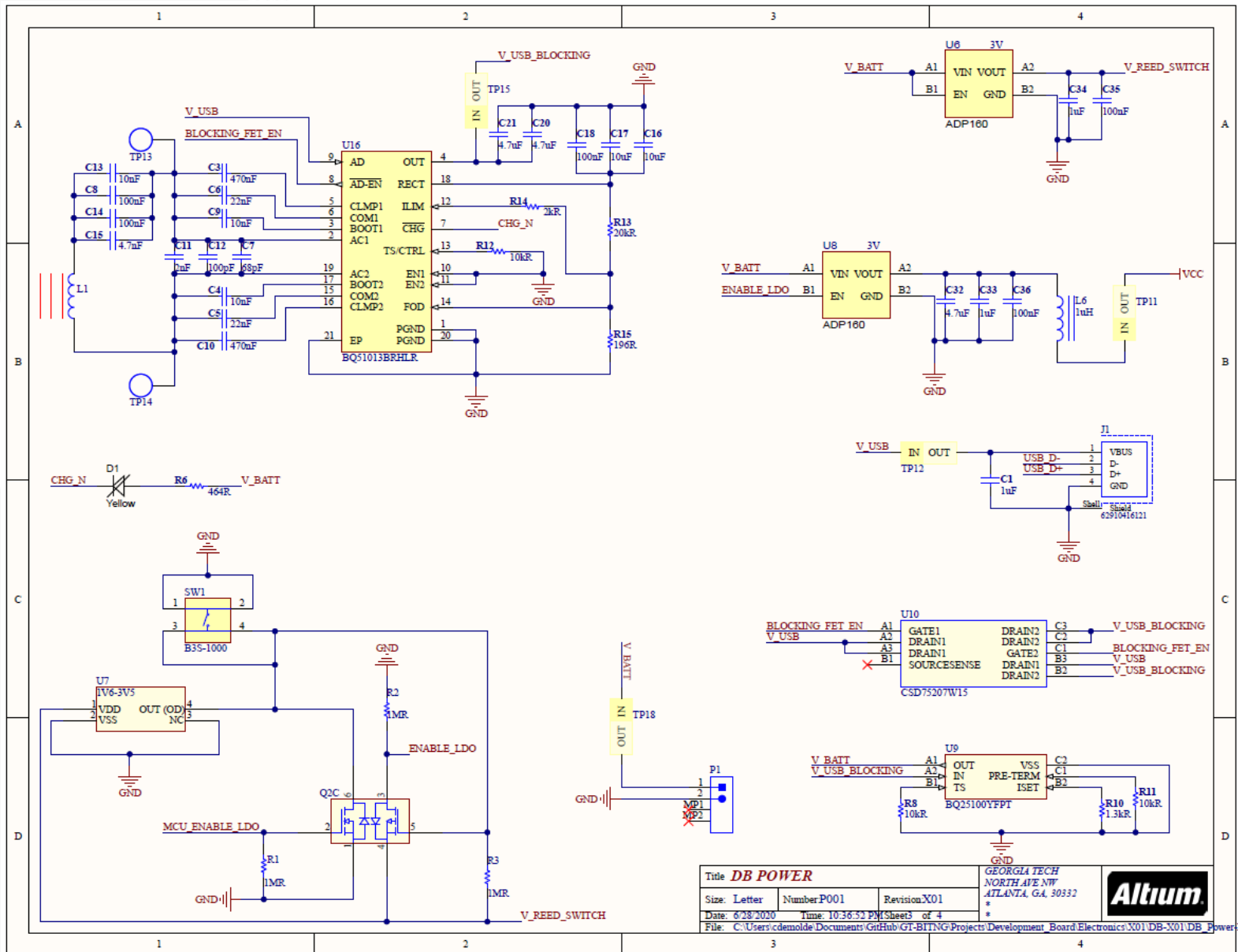
- Schematic generation
 - ~~nRF52 with supporting circuitry (2 hours)~~
 - ~~BLE antenna and impedance matching circuit (2 hours)~~
 - ~~Wireless charging (5 hours)~~
 - ~~Lithium battery charging (2 hours)~~
 - ~~UI interaction (1 hour)~~
 - ~~USB charging (2 hours)~~
 - ~~Biosensors: temperature, IMU, ECG (4 hours)~~
 - ~~Test points, connectors, jumpers (2 hours)~~
- Estimated time: 20 hours
- Actual time spent: 22 hours

*Not in scope for current phase of development.

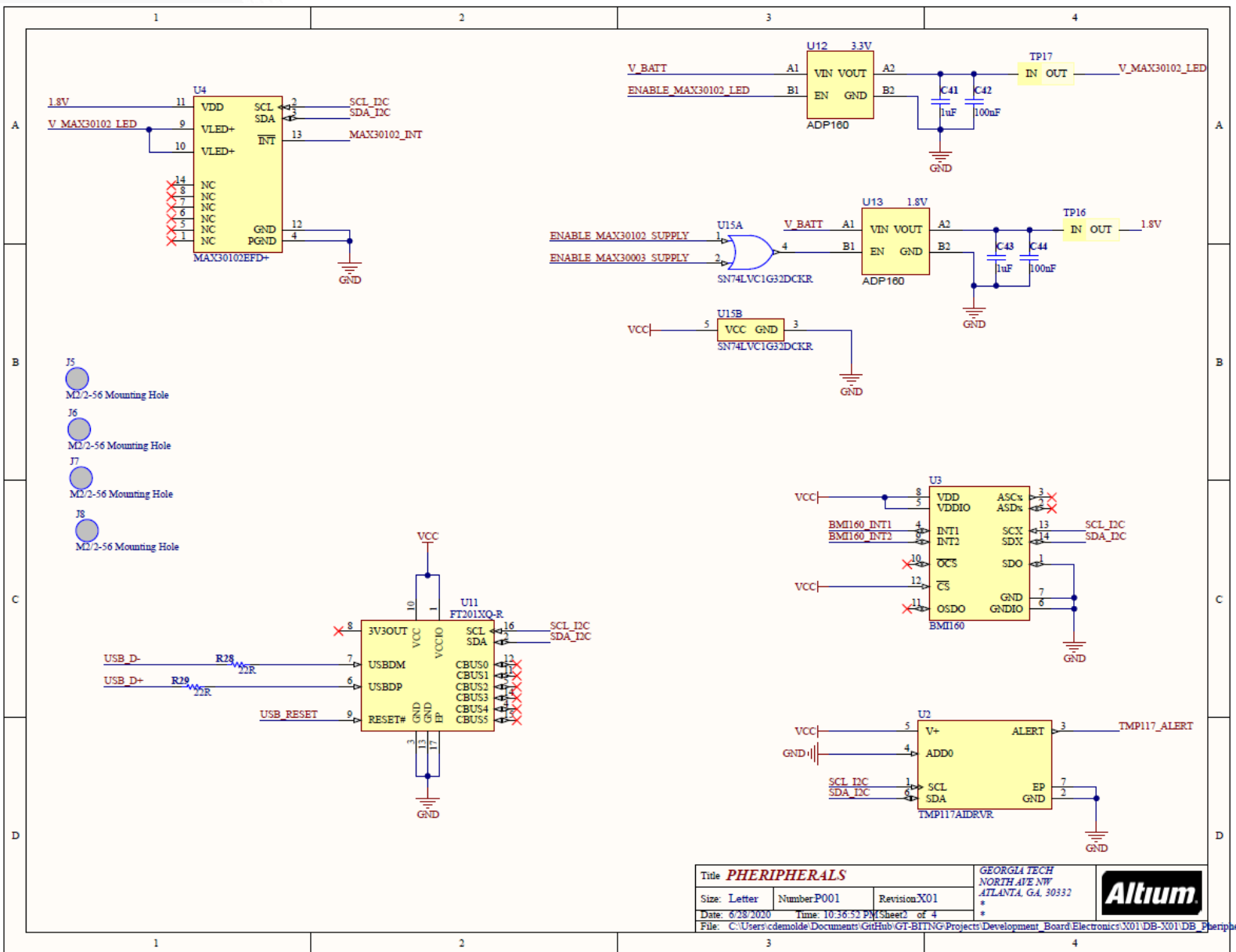
Progress to date: 6/28/2020



Progress to date: 6/28/2020



Progress to date: 6/28/2020



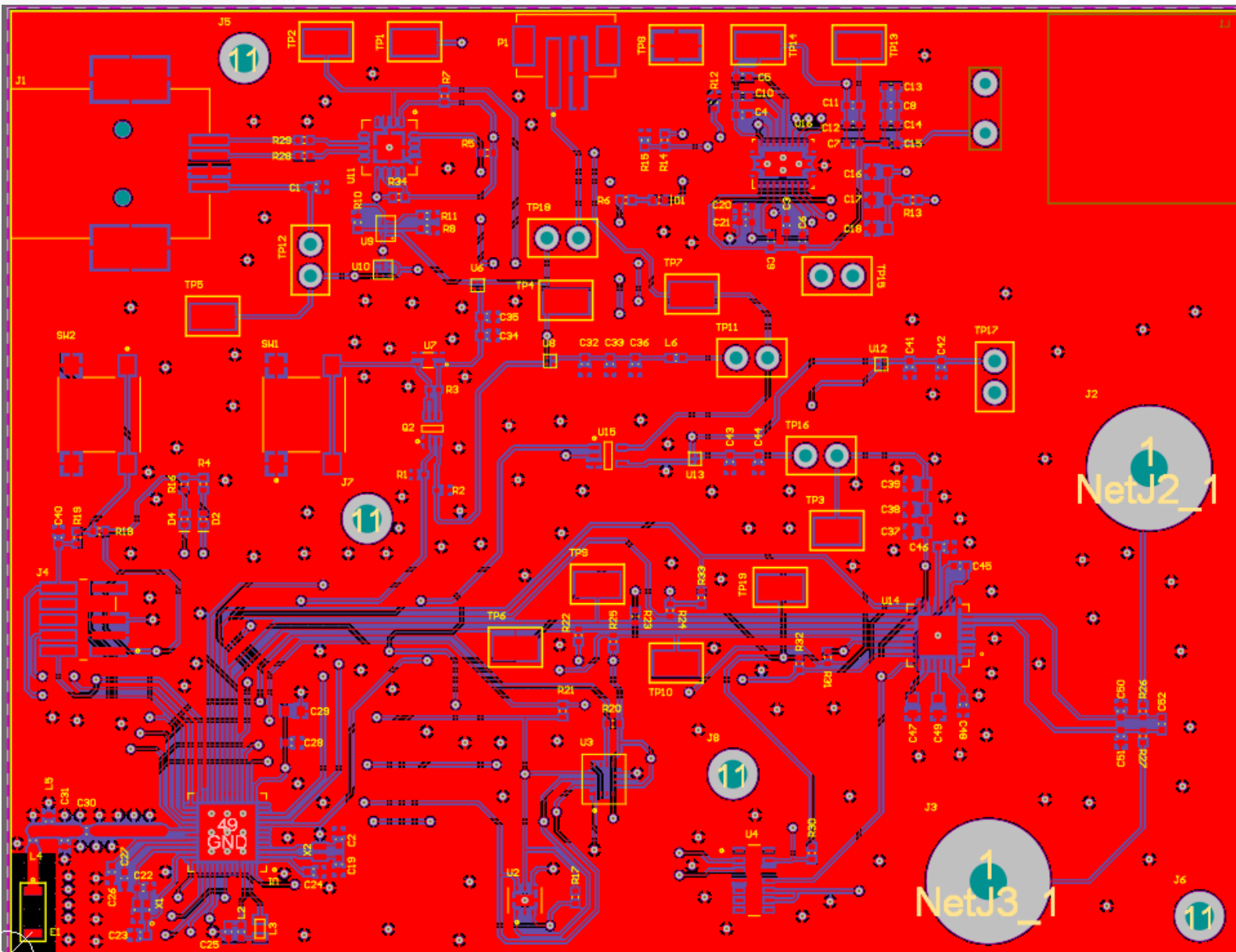
The diagram illustrates the PCB layout for the ECG STUD. It features two ECG STUD components connected to a MAX30003CTI+ IC (U14). The ECG STUD components are connected to the IC via 49.9k resistors (R26, R27) and 10pF capacitors (C50, C51). The IC is connected to a 1.8V supply via 100nF capacitors (C37, C38, C39). The IC also has several ground connections (AGND, DGND) and a 1uF capacitor (C45). The IC is labeled U14 and MAX30003CTI+.

Pin	Signal	Value
17	SPI_SDI	100nF
16	SPI_CLK	100nF
14	MAX30003_F_CLOCK	100nF
18	SPI_SDO	100nF
11	MAX30003_CS	100nF
7	ECGN	10pF
6	ECGP	10pF
9	CAPP	10pF
10	CAPN	10pF
22	AVDD	100nF
13	DVDD	100nF
19	OVDD	100nF
23	VREF	100nF
20	INT2B	100nF
21	INT1B	100nF
27	VBG	100nF
25	VCM	100nF
3	AGND	100nF
8	AGND	100nF
28	AGND	100nF
29	AGND	100nF
12	DGND	100nF

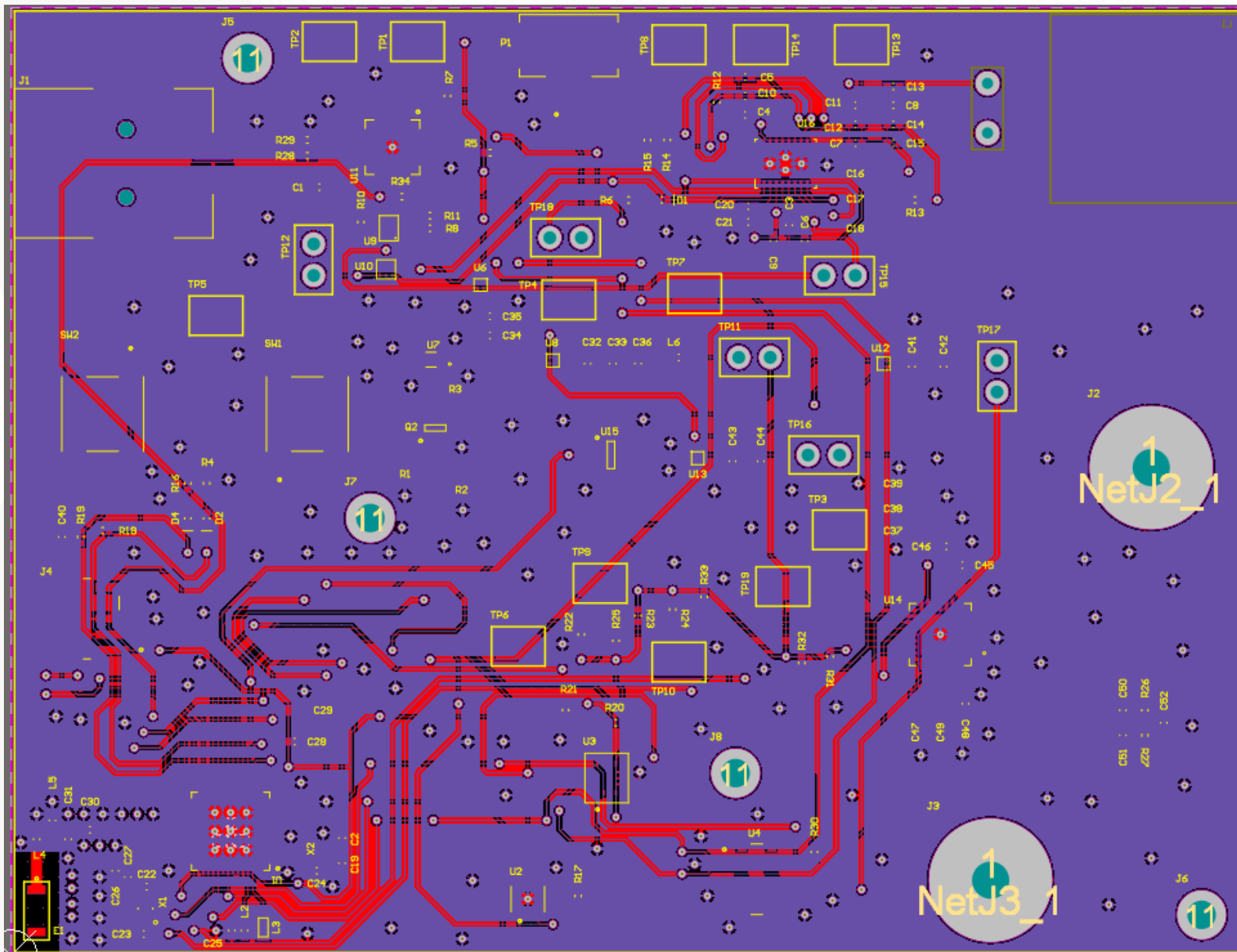
Electronics development: PCB design

- PCB design
 - ~~Major component layout (2 hours)~~
 - ~~BLE antenna and impedance matching circuit (3 hours)~~
 - ~~Wireless charging (2 hours)~~
 - ~~Lithium battery charging (1 hours)~~
 - ~~Overall board construction(1 hour)~~
 - ~~USB charging (2 hours)~~
 - ~~Biosensors: temperature, IMU, ECG (3 hours)~~
 - ~~Test points, connectors, jumpers (1 hours)~~
 - ~~Gerber file generation (2 hours)~~
 - ~~BOM generation (2 hours)~~
- Estimated time: 16 hours
- Actual time spent: 20 hours

Progress to date: 6/28/2020



Progress to date: 6/28/2020



Progress to date: 6/28/2020



PCB manufacturing specifications

- Dimensions: 99.568 x 76.454 mm
- Layers: 2
- Minimum trace/space: 6 mil
- Minimum hole size: 12 mil
- Thickness: 1.6mm
- Solder mask: Green
- Surface finish: HASL with lead
- Copper weight: 1 oz
- Material type: FR4

PCA quote

- PCB Manufacturing:
 - Price: \$20
 - Manufacturer: PCBMinions
 - Lead time: 4 days
- BOM:
 - Price: ~\$289.63
 - Board Quantity: 3
 - Supplier: Digikey/Mouser
 - Lead time: 1-5 days
- Stencil:
 - Price: ~46.25
 - Supplier: OSH Stencil
 - Lead time:

PATH FORWARD

Path forward (6/28/20 – 7/05/20)

- Project and BLE
- Sensor drivers
 - I²C driver
 - Temperature driver