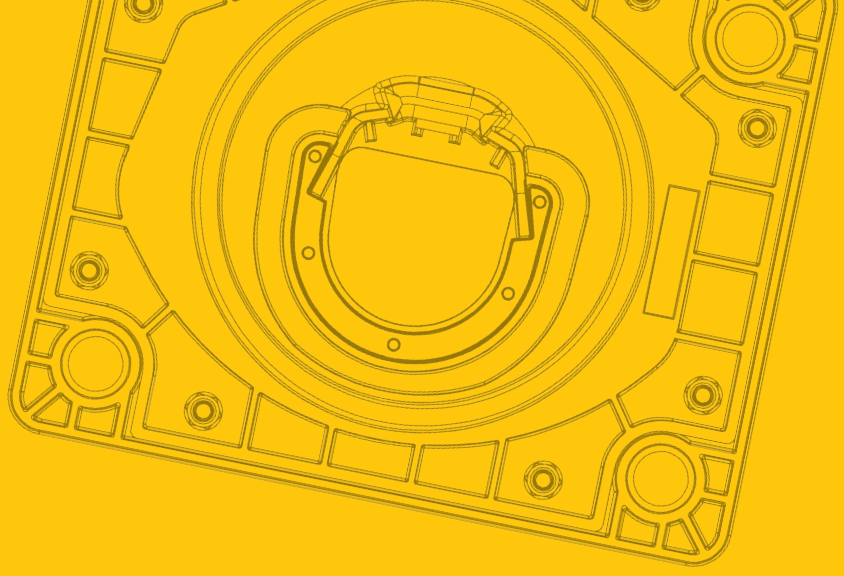
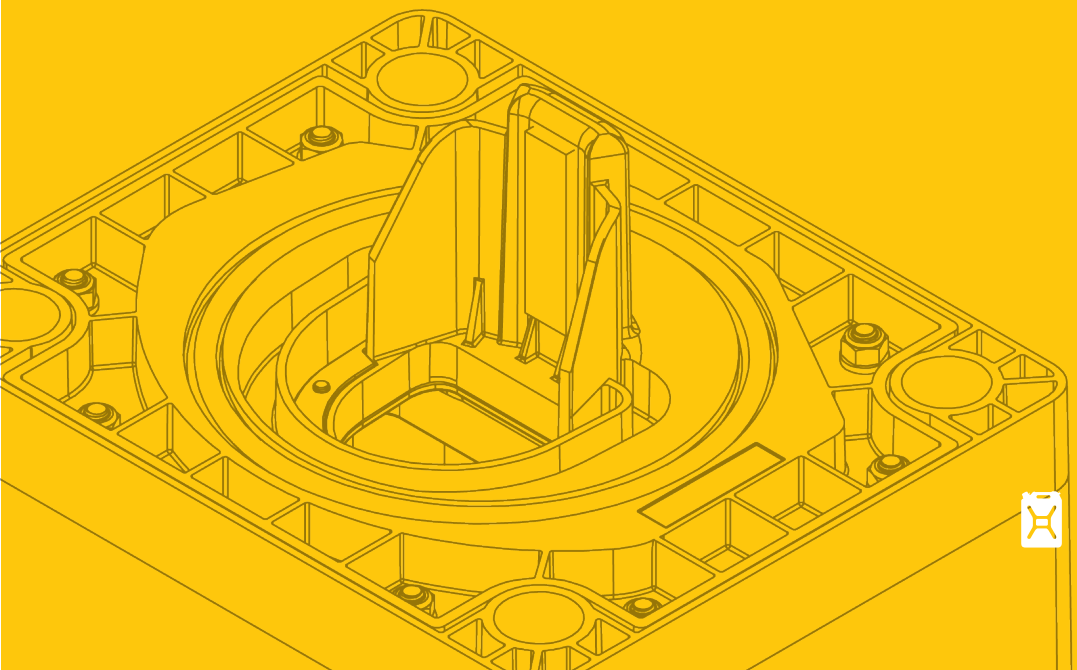


AFD-2

Afridev Sensor

The AFD-2 meter measures water flow rates within an Afridev hand pump and transmits data so local repair teams can respond when something goes wrong. It was created to ensure that clean water continues to flow at charity: water projects around the world.



charity: water

charity: water

AFD–2

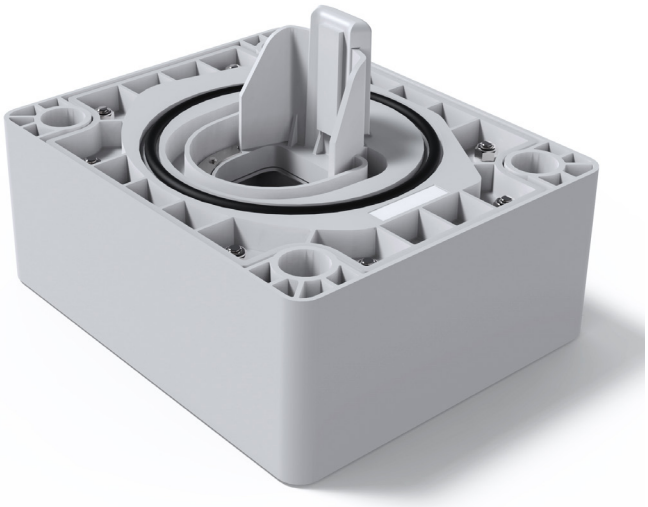
Sensor

Data Sheet: Technical Data
06/2018

Afridev Water Flow Sensor

SELF-CALIBRATING WATER DETECTION ALGORITHM

- Detects the presence of air and water over six capacitive sensor pads
- Proportional coverage of individual sensor with water is estimated
- Water flow is calculated by height of water in collection area over time
- Trending of water detection data over a 4 week period enables for “Red Flag” reporting of usage changes
- Data Reporting over 2G WAN Modem connection
- GPS location fix upon installation (first water measurement)
- Device receives Over the Air Firmware updates



SPECIFICATIONS

COMPONENTS	
Ambient Temperature Sensor	Chip NTC thermistor Optimized for measurement between 10°C and 50°C
Battery	19Ah Lithium battery 6 years estimated working lifetime Optimized for pulsed loads and extended temperature range
GPS Sensor	100 yard accuracy[1]
Processor	TI MSP430G2955 Ultra-Low Power Consumption Powerful 16-bit RISC CPU, 16-bit registers, and constant generators that contribute to maximum code efficiency.
WAN Modem	2G Quad-band GSM/GPRS modem AMR926EJ-S core Class 4 (2W @ 850/900MHz) Class 1 (1W @ 1800/1900MHz)

OPERATING RANGES	
Operating Temperature	0°C – 70 °C2
Flow Rate	0 – 366 mL/sec
Water Temperature	10°C – 30°C

PERFORMANCE	
Battery Life	6 years estimated working lifetime
Data Collection Rate	1800 measurements/hr active (once water is detected) 180 measurements/hr inactive (after 5 min. no water detected)
Flow Rate Accuracy	90 – 95%[3]
Reporting Rate	1 report/day active 1 report/4 weeks inactive
Sample Rate	2 capacitive measurements/sec, 4 per sample

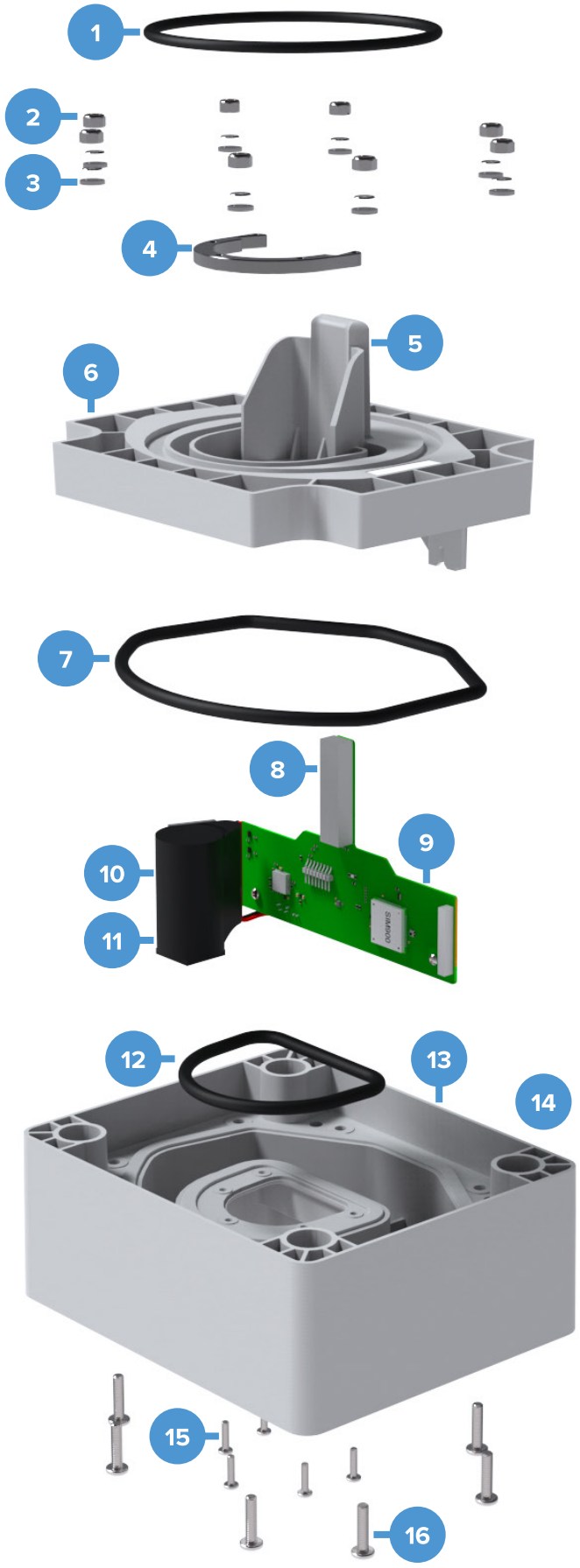
[1] GPS range/accuracy currently under testing & verification

[2] Accuracy error specification tested and optimized between 10°C – 50°C

[3] Requires level installation, operation within operating flow rate and temperature ranges

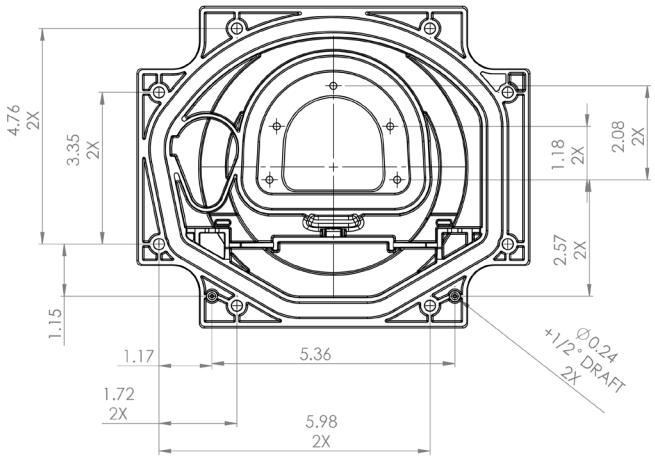
BILL OF MATERIALS

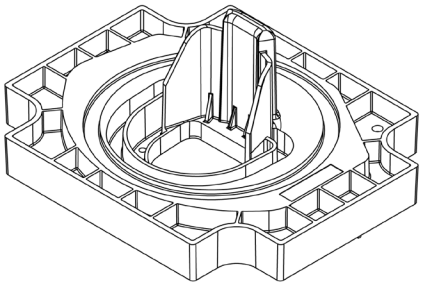
#	PART DESCRIPTION	Qty.
1.	O-RING	1
2.	316 STAINLESS STEEL NYLON-INSERT LOCKNUT SUPER-CORROSION-RESISTANT, M6 X 1 MM THREAD	8
3.	316 STAINLESS STEEL WASHER FOR M6 SCREW SIZE, 6.4 MM ID, 12 MM OD	8
4.	NUT PLATE INTERNAL	1
5.	LABEL BARCODE (NOT PICTURED)	1
6.	TOP HOUSING	1
7.	O-RING	1
8.	PCB FOAM PAD	1
9.	PCB ASSEMBLY	1
10.	BATTERY ASSEMBLY	1
11.	FOAM PAD BATTERY	1
12.	O-RING	1
13.	LABEL OR (NOT PICTURED)	1
14.	BOTTOM HOUSING	1
17.	316 STAINLESS STEEL PAN HEAD PHILLIPS SCREWS M4 X 0.70 MM THREAD, 16MM LONG	5
19.	316 STAINLESS STEEL PAN HEAD PHILLIPS SCREWS M6 X 1.00 MM THREAD, 25MM LONG	8

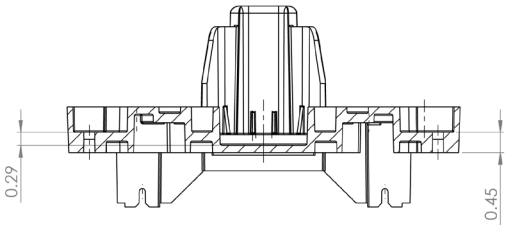


DRAWINGS

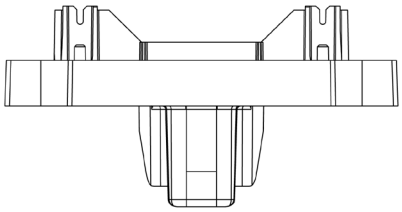
TOP HOUSING

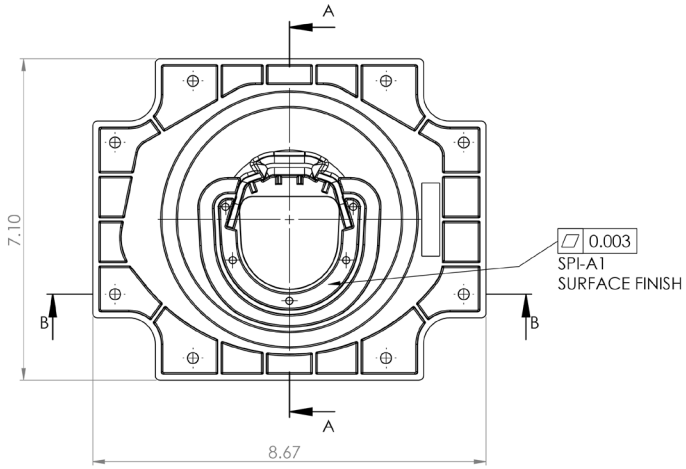


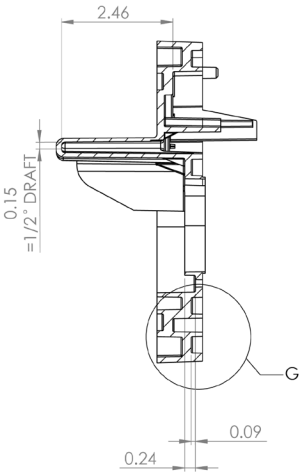




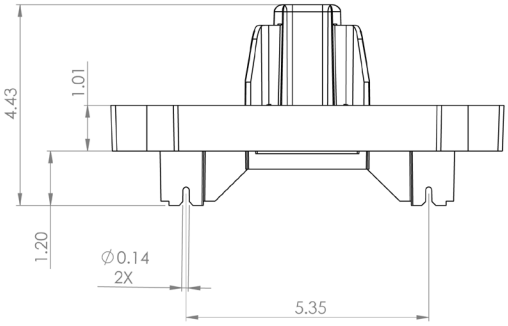
SECTION B-B
SCALE 1 : 2

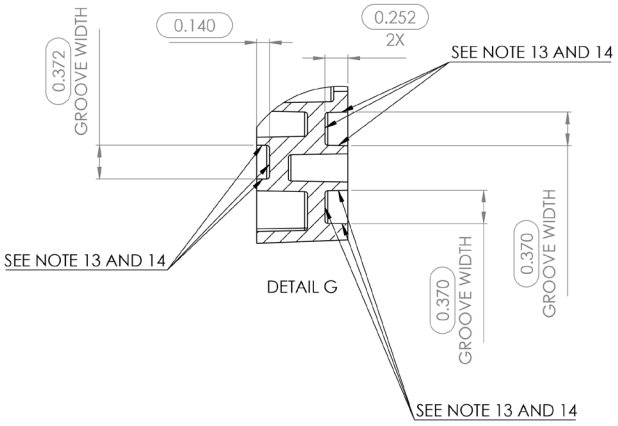






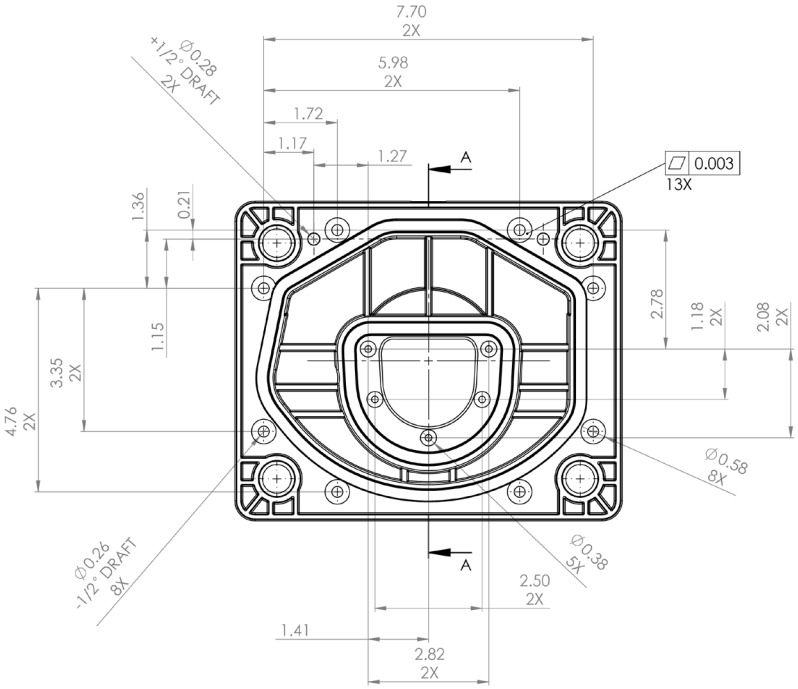
SECTION A-A
SCALE 1 : 2

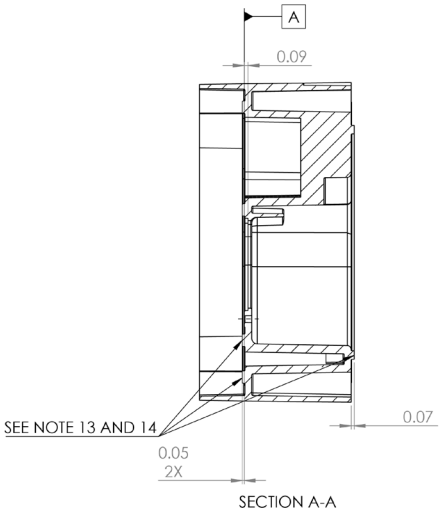


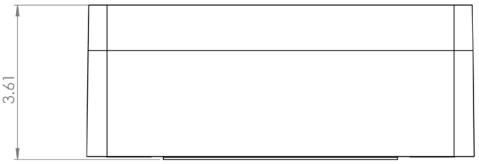


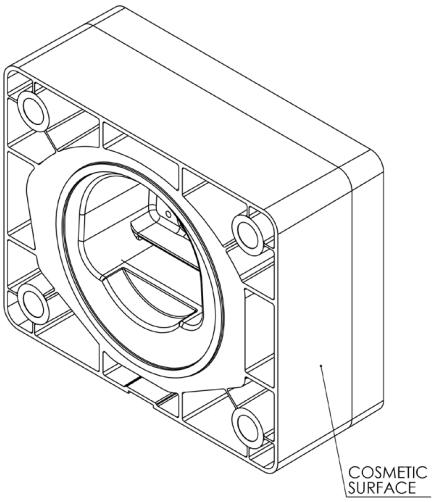
DRAWINGS

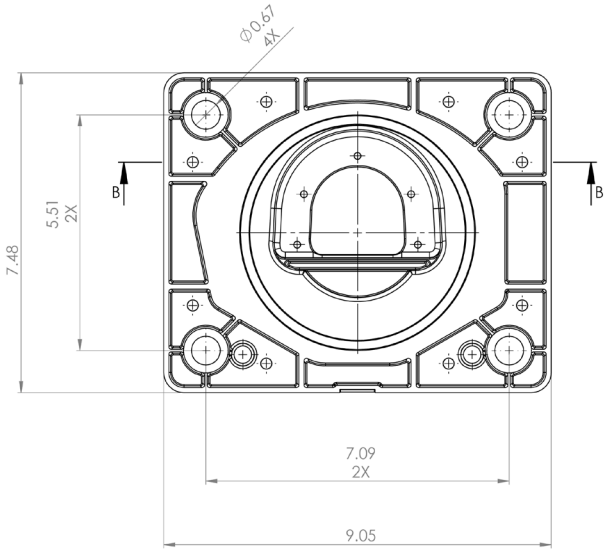
BOTTOM HOUSING

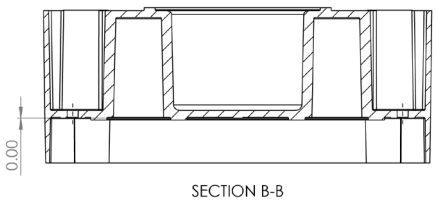




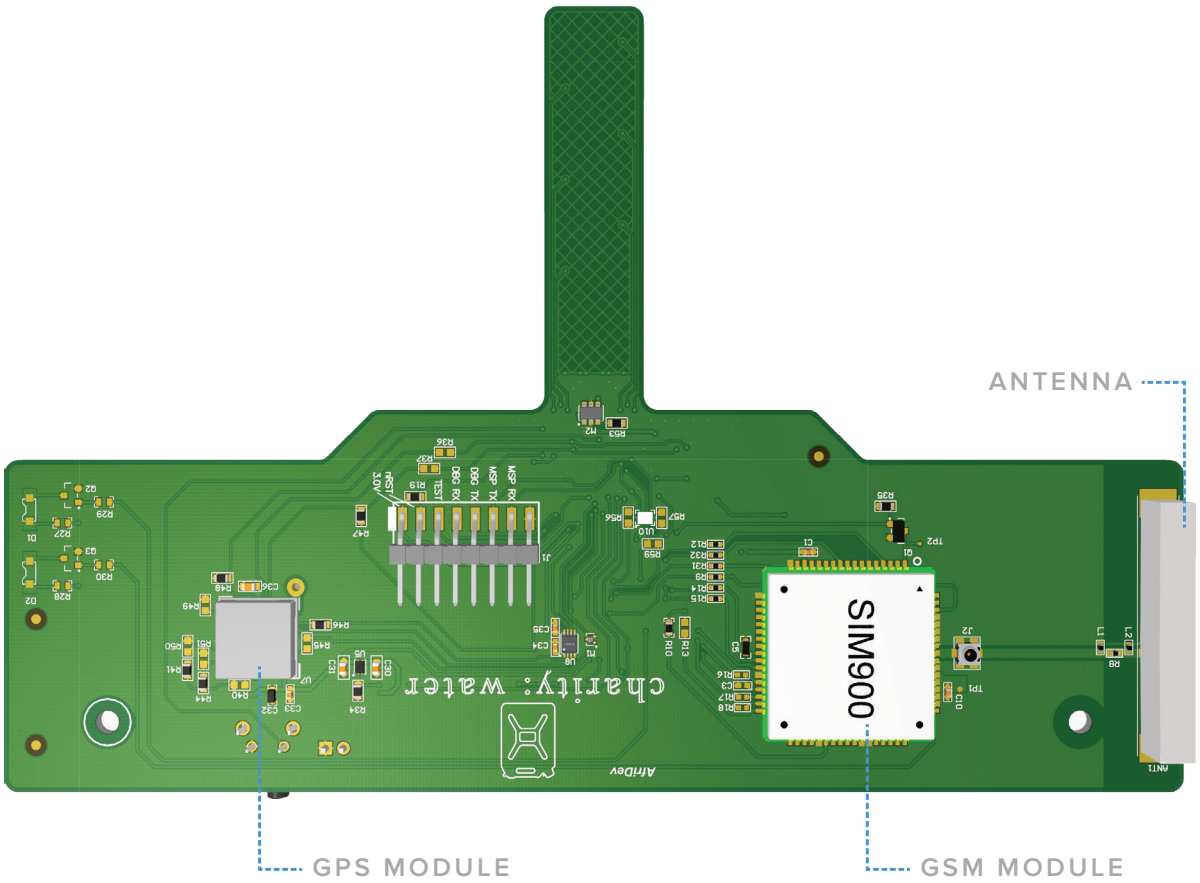


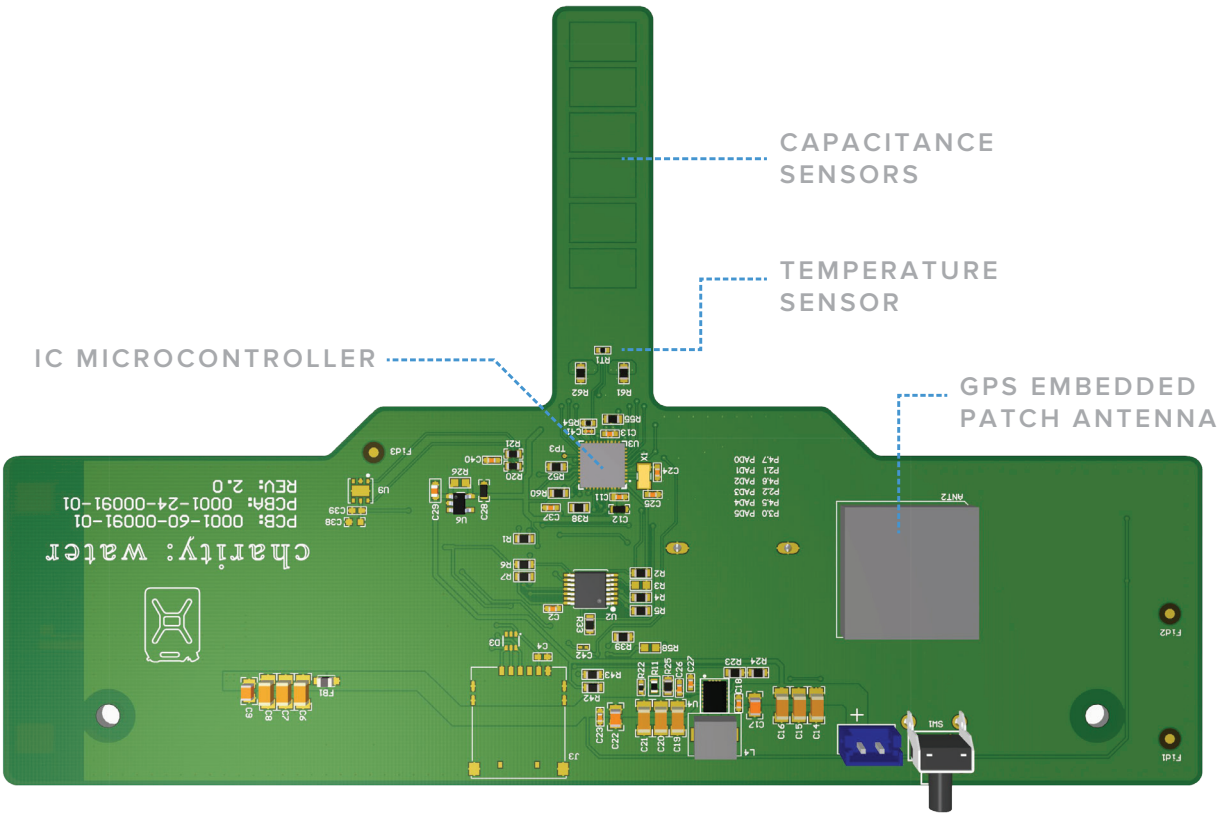






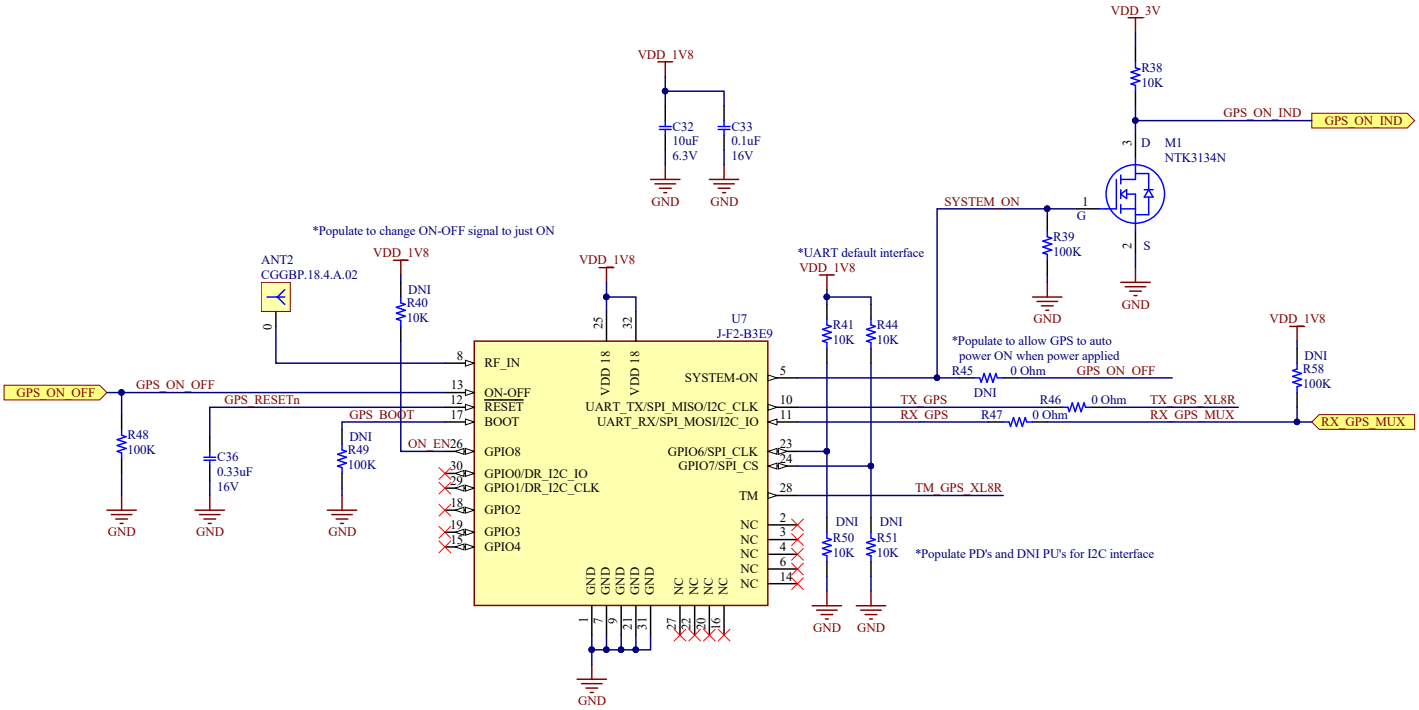
SENSOR PCB

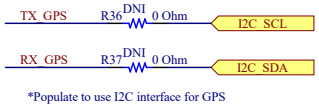

ANTENNA
SIM900
GPS MODULE
GSM MODULE

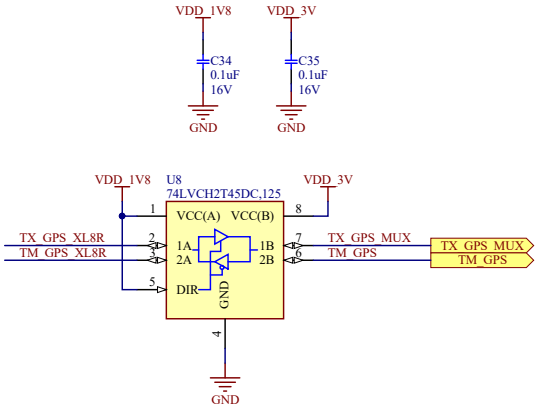

CAPACITANCE SENSORS
TEMPERATURE SENSOR
IC MICROCONTROLLER
GPS EMBEDDED PATCH ANTENNA

SCHEMATICS

GPS

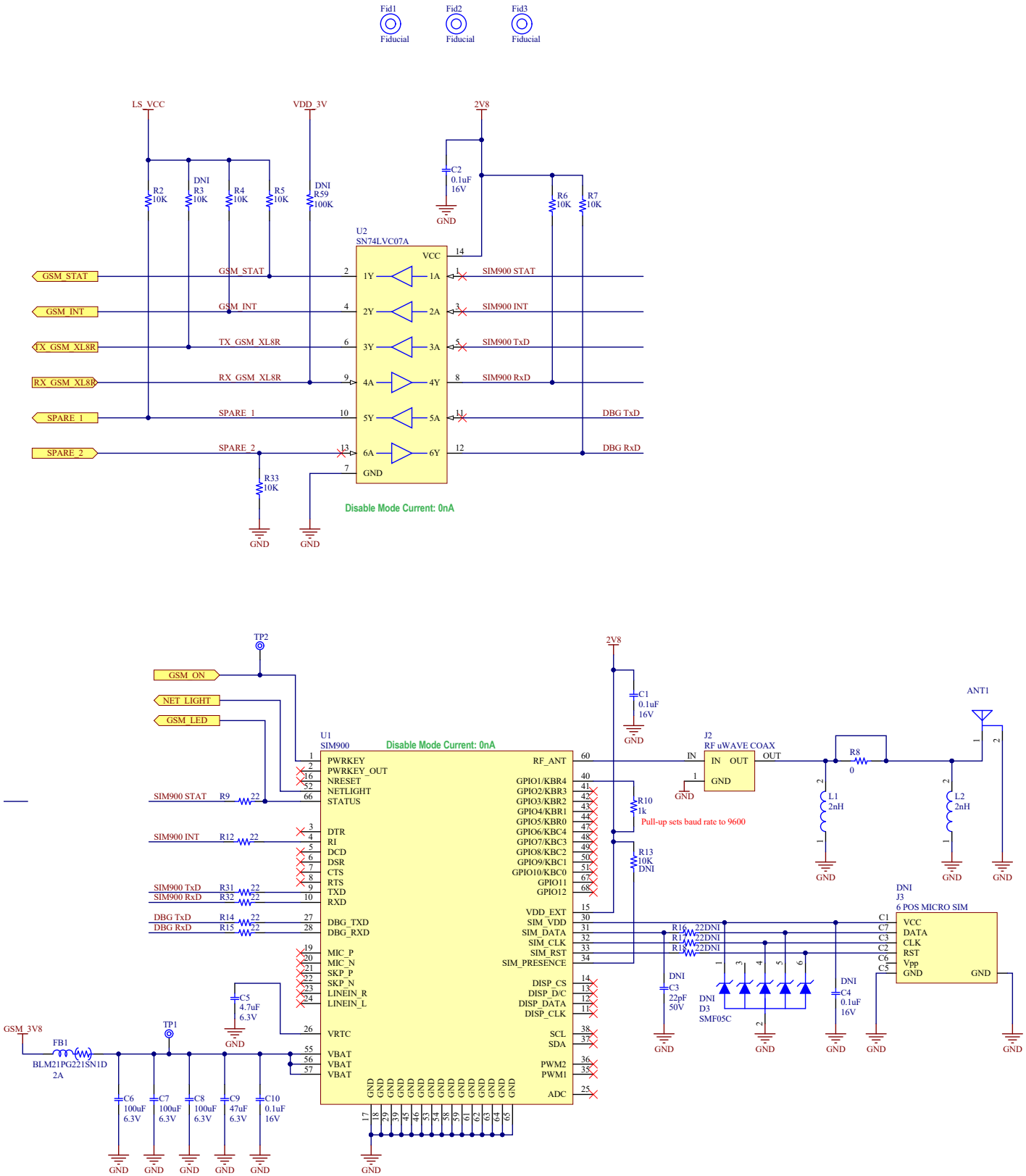






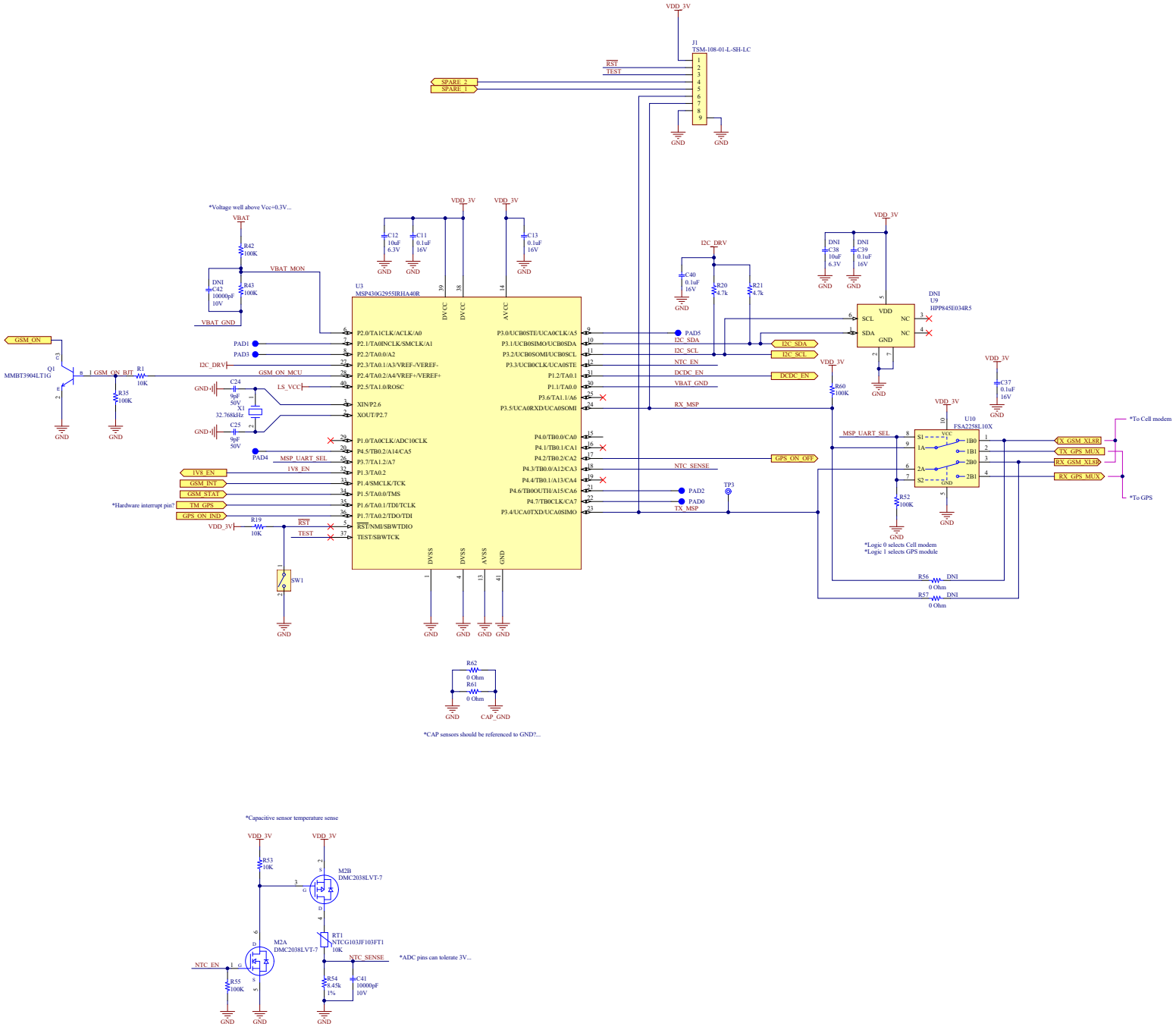
SCHEMATICS

GSM



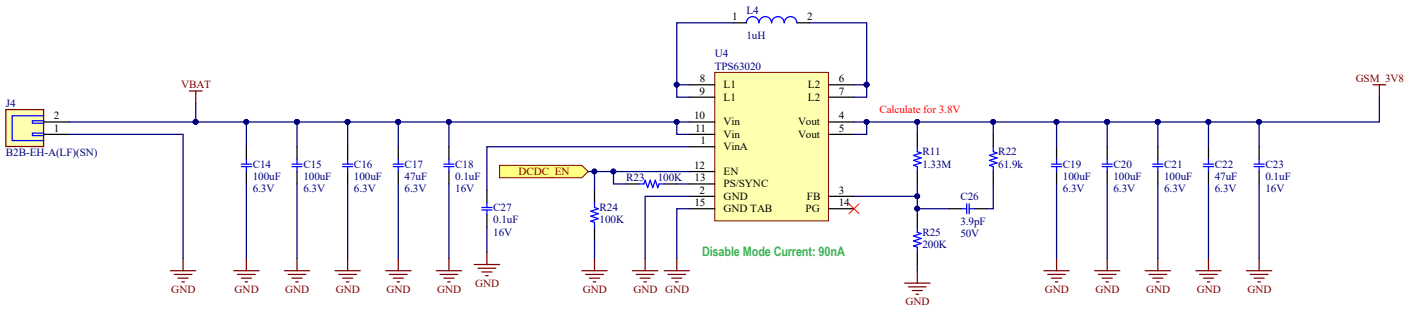
SCHEMATICS

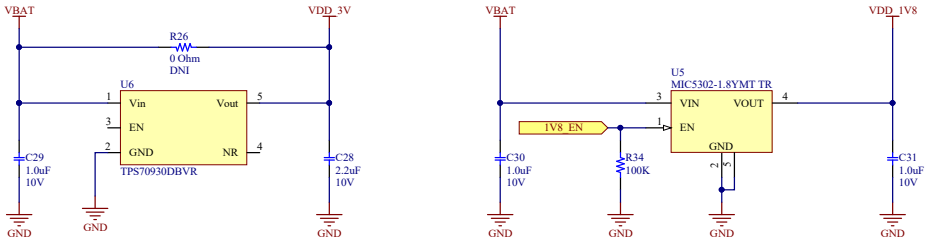
MCU

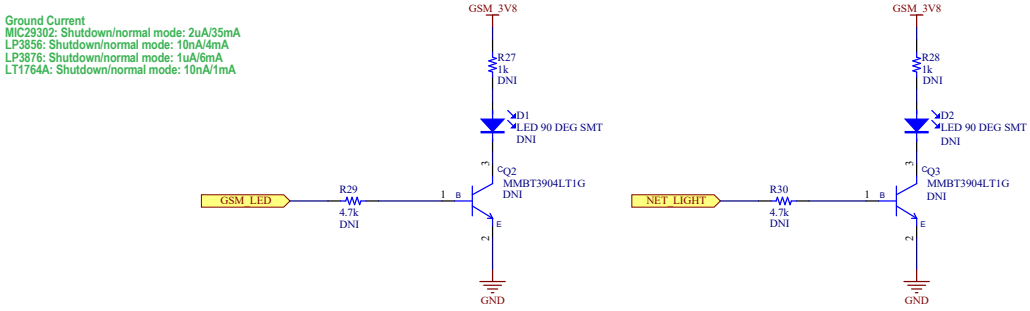


SCHEMATICS

POWER

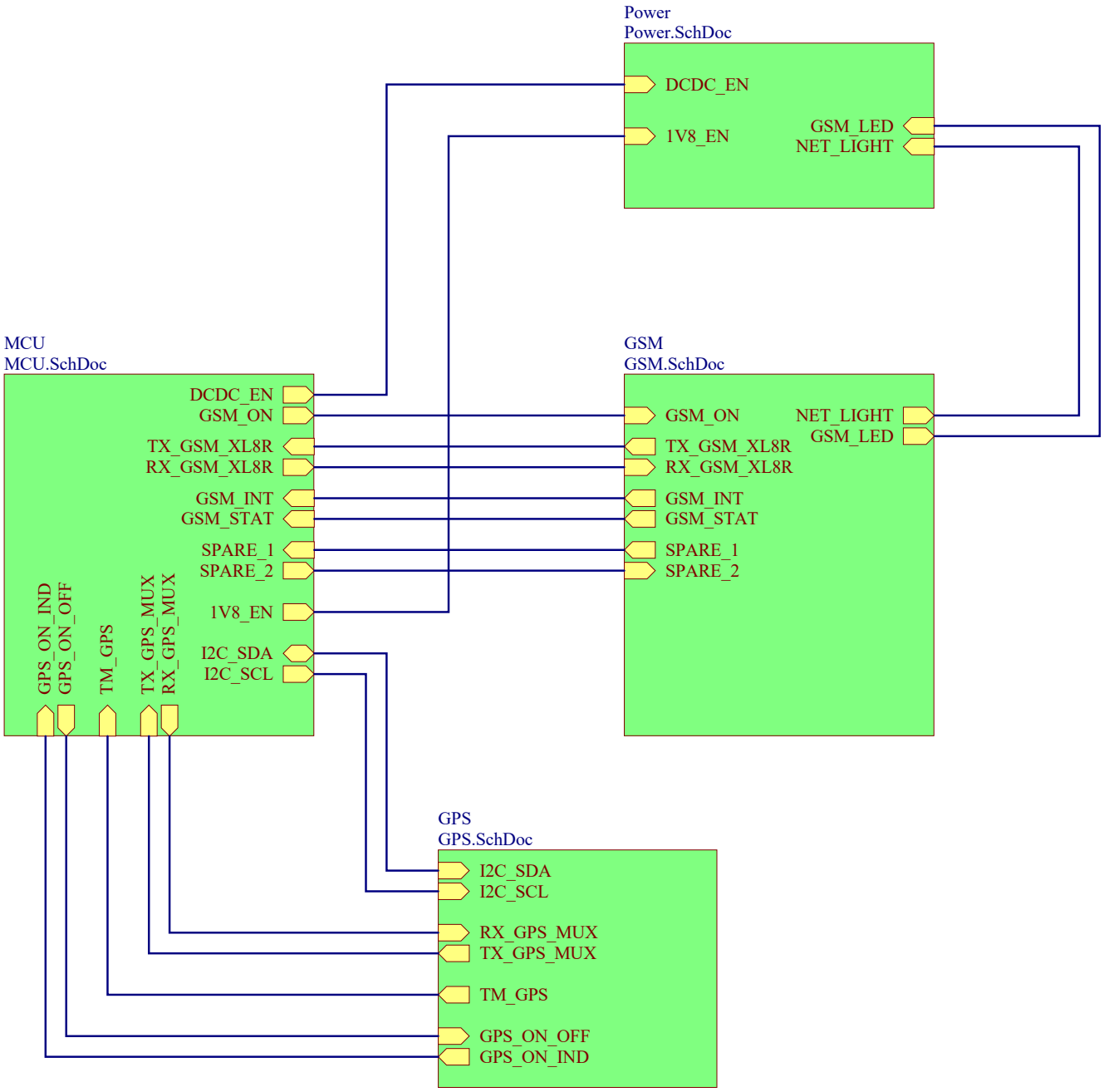






SCHEMATICS

BLOCK DIAGRAM



SCHEMATICS

POWER TREE DIAGRAM