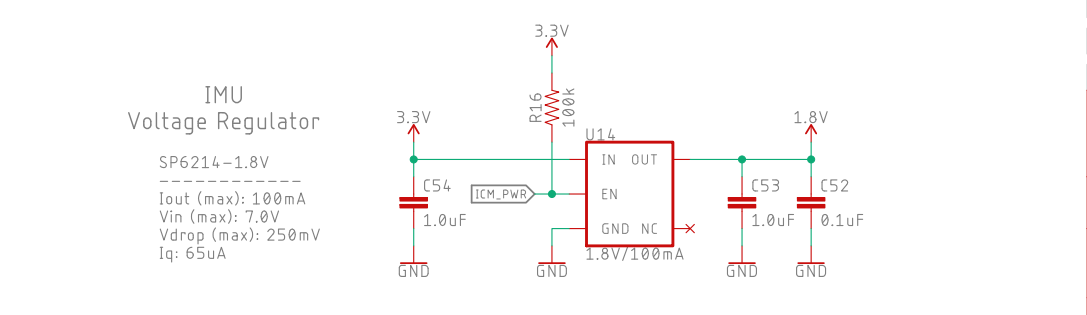
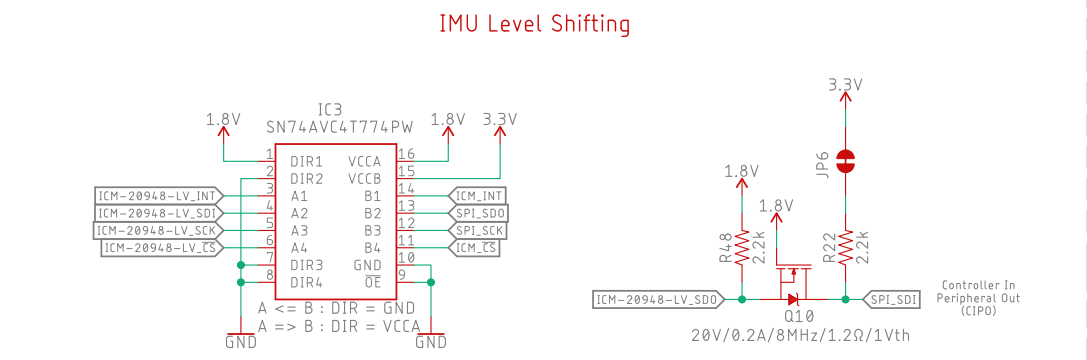
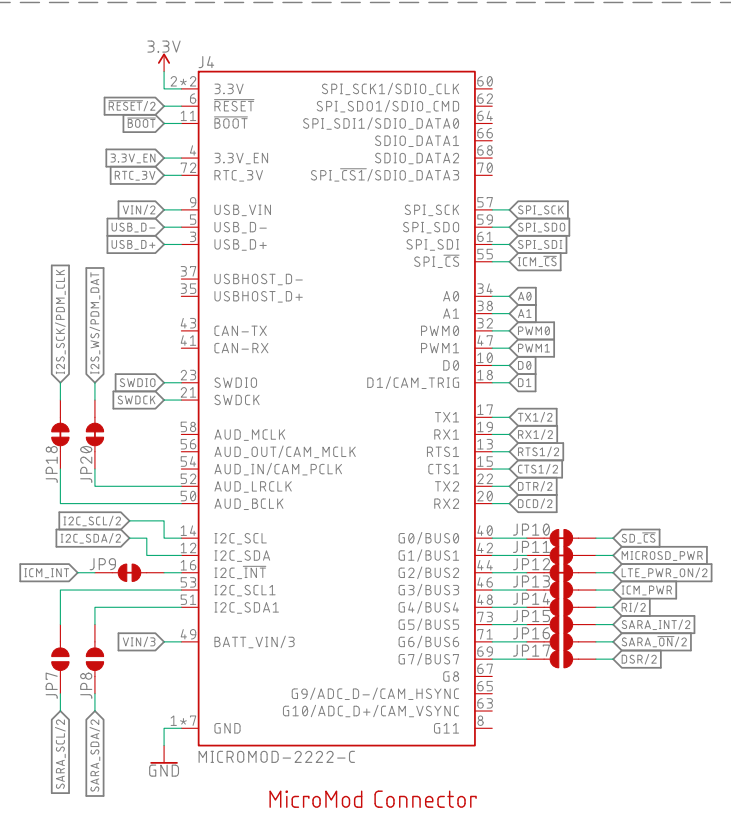
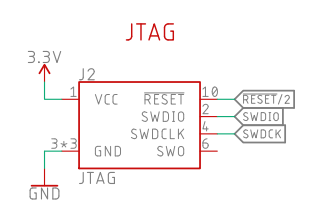


**Differential Pair Calculation:**  
Copper Thickness: 1oz  
Plating Thickness: 1oz  
Material: FR-4 STD Er: 4.6  
Conductor Width: 12mil / 0.47mm  
Conductor Spacing: 16mil / 0.63mm  
Prepreg dielectric thickness: 0.2mm (8mil)  
Differential: 89 Ohms  
[https://satornpcb.com/pcb\\_toolkit/](https://satornpcb.com/pcb_toolkit/)



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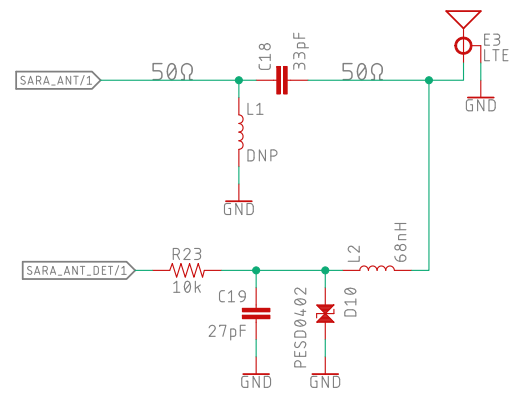
TITLE: MicroMod\_Asset\_Tracker

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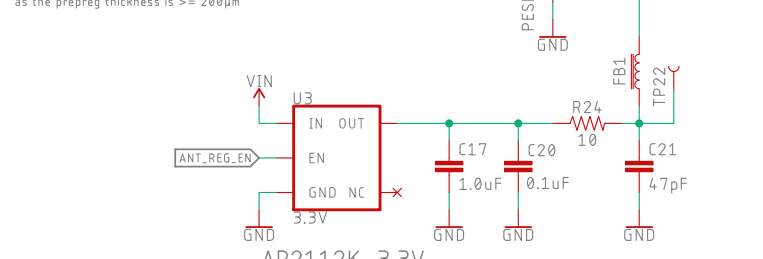
Sheet: 1/2

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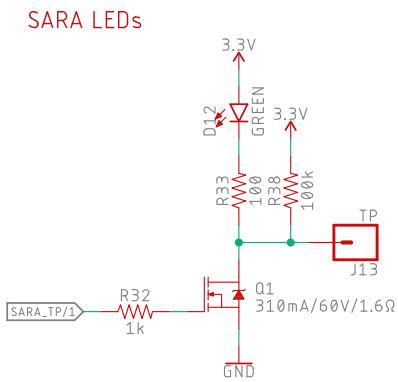
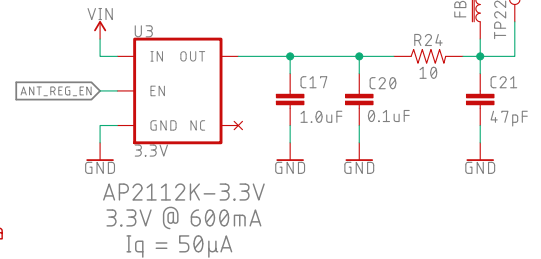


LTE Antenna

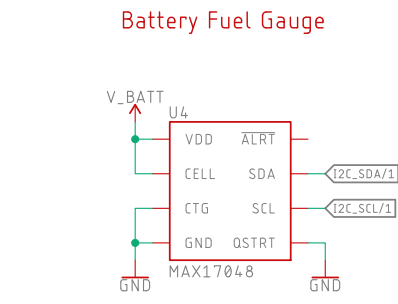
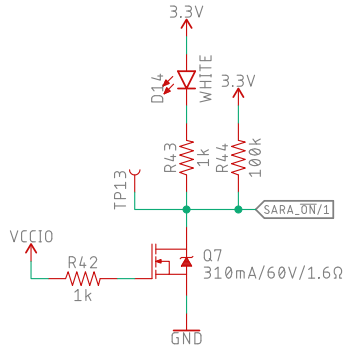
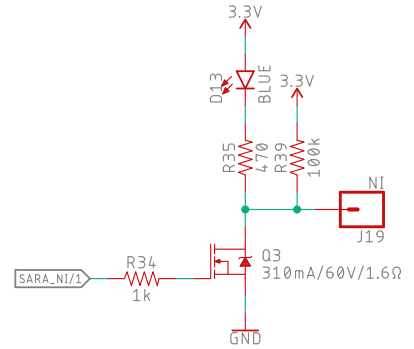
**Microstrip Calculation:**  
 Copper Thickness (1oz): 1.4mil/0.035mm  
 Board thickness: 1.6mm  
 Prepreg dielectric thickness (layer 1 to 2): 0.2mm  
 Er: 4.6  
 Polygon Isolation: 8mil/0.2032mm  
 RF Trace Width: 13.8mil/0.35mm  
<https://chemandy.com/calculators/coplanar-waveguide-with-ground-calculator.htm>  
 SARA ANT and ANT\_GNSS pads do not require restrict on layer 2 as the prepreg thickness is >= 200µm



GNSS Antenna

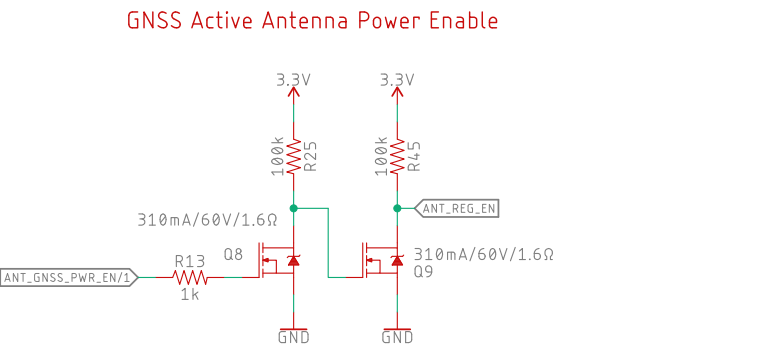


SARA LEDs



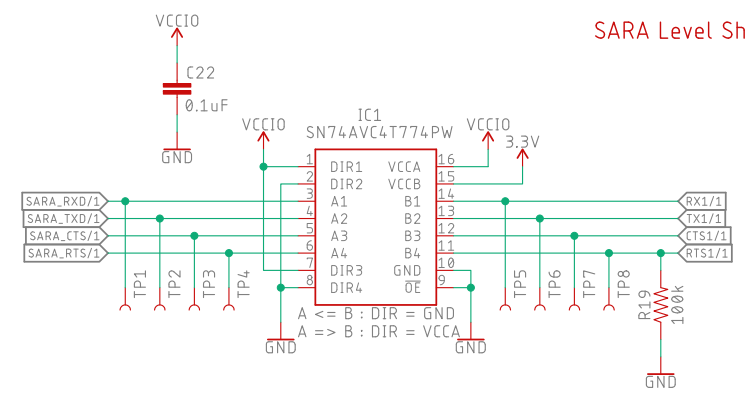
Battery Fuel Gauge

I2C Address = 0x36

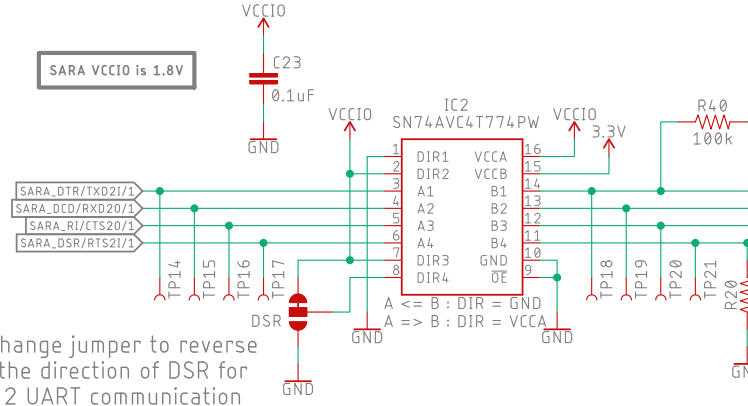
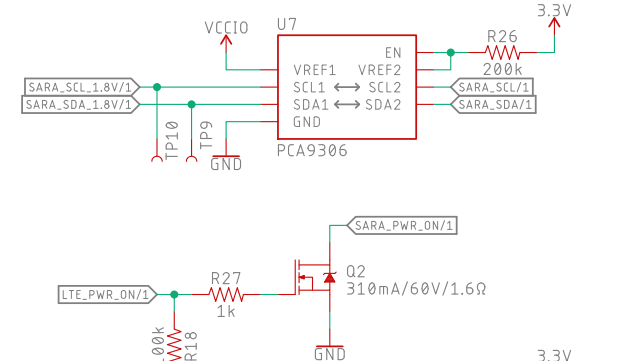


GNSS Active Antenna Power Enable

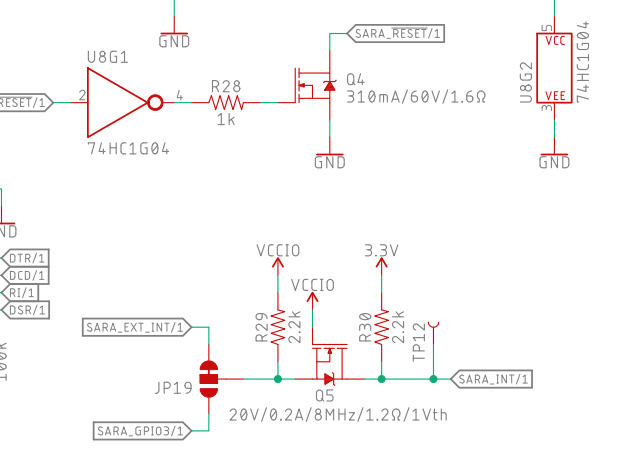
ANT\_GNSS\_PWR\_EN is 1.8V (from SARA GPIO2).  
 To minimise power draw when the SARA is OFF,  
 ANT\_REG\_EN needs to be low when ANT\_GNSS\_PWR\_EN is low.



SARA Level Shifting



Change jumper to reverse the direction of DSR for 2 UART communication



**SARA-R5 VCC Design Notes:**

VCC: Min. 3.3V Typ. 3.8V Max. 4.4V  
 VCC Extended: Min. 3.0V Max. 4.5V

**Worst case:**

Maximum current draw during Tx: 395mA  
 Estimated current for other components: 100mA  
 Total maximum current draw: ~500mA  
 AP7361C-33 drop out voltage: -170mV at 500mA output current; Vout = 3.3V; 25°C  
 D71LSM115J Schottky diode forward voltage: -210mV at 500mA; 25°C  
 AP7361C 3.3V output will start to fall when the battery voltage falls below 3.68V at 500mA  
 For a typical 2000mAh LiPo battery discharging at 500mA (0.25C), we would expect 3.68V to be reached when the battery is approximately 50% discharged.

**Typical:**

Typical current draw during Tx/Rx: 195mA at 23dBm  
 Estimated current for other components: 100mA  
 Total typical current draw: ~300mA  
 AP7361C-33 drop out voltage: -100mV at 300mA output current; Vout = 3.3V; 25°C  
 D71LSM115J Schottky diode forward voltage: -180mV at 300mA; 25°C  
 AP7361C 3.3V output will start to fall when the battery voltage falls below 3.58V at 300mA  
 For a typical 2000mAh LiPo battery discharging at 300mA (0.15C), we would expect 3.58V to be reached when the battery is approximately 90% discharged.

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