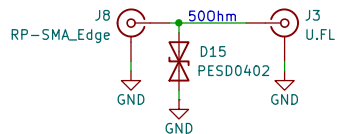
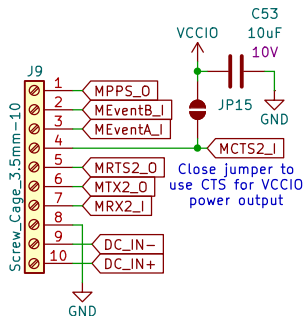


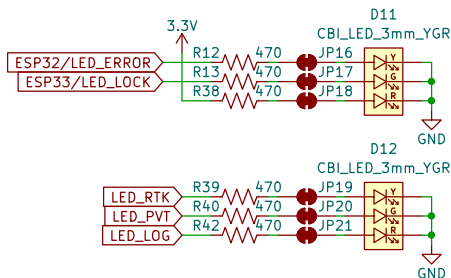
ESP32 RF



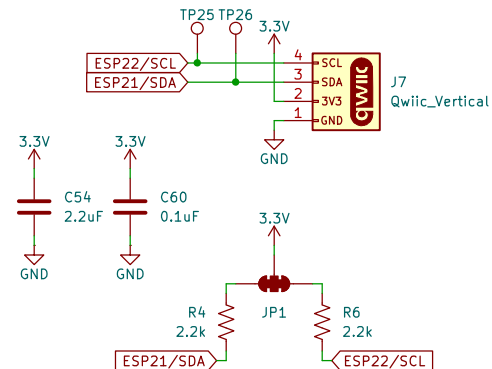
I/O Connector



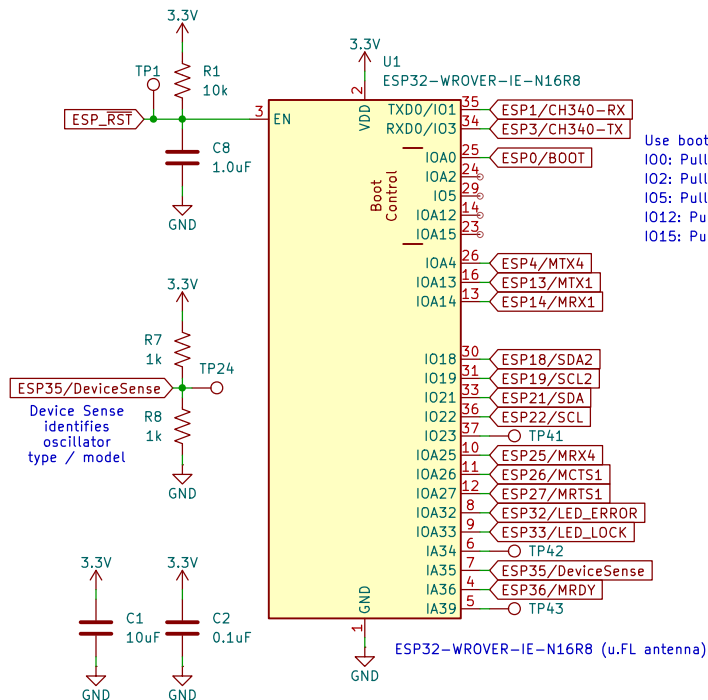
LEDs



Qwiic I²C (for OLED)



ESP32-WROVER



Power

File: Power.kicad_sch

USB

File: USB.kicad_sch

GNSS

File: GNSS.kicad_sch

Ethernet

File: Ethernet.kicad_sch

Level_Shifting

File: Level_Shifting.kicad_sch



Designed by: P.C.



Sheet: /
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Title: RTK mosaic-T

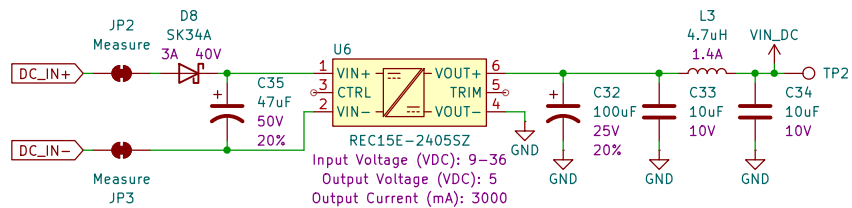
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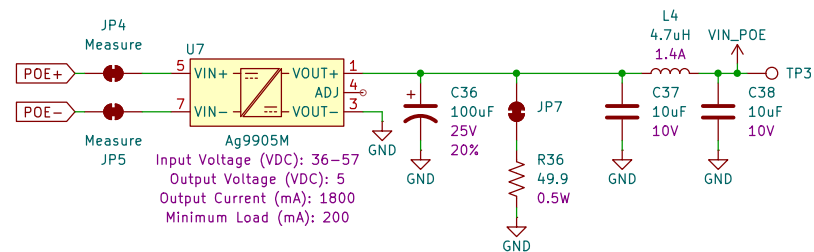
Rev: v01

Id: 1/6

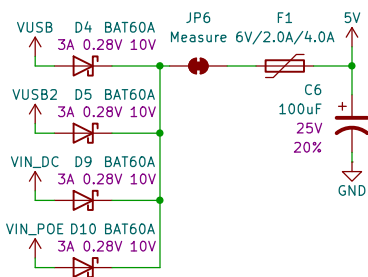
DC Power In



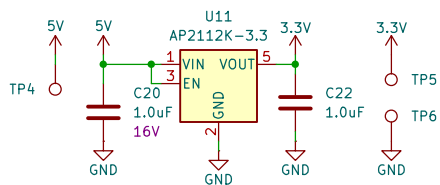
Power Over Ethernet



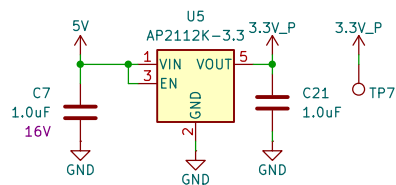
Power Mux



Main 3.3V



Peripheral 3.3V



Sheet: /Power/
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Title:

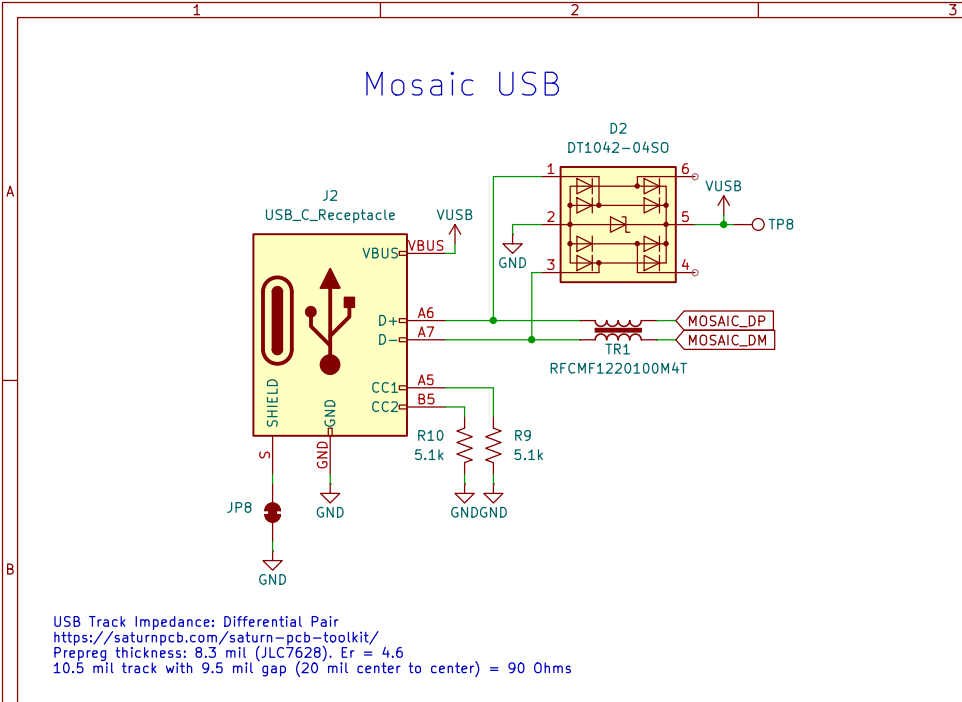
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Mosaic USB

The schematic diagram illustrates the Mosaic USB interface circuit. It features a USB_C_Receptacle (J2) with pins for SHIELD, GND, CC1, CC2, D+, D-, and VBUS. The SHIELD pin is connected to JP8, which is grounded. The GND pin is connected to a common ground. The CC1 and CC2 pins are connected to A5 and B5, which are then connected to R10 and R9 (5.1k resistors) and grounded. The D+ and D- pins are connected to A6 and A7, which are connected to the MOSAIC_DP and MOSAIC_DM pins through a TR1 transformer (RFCMF1220100M4T). The VBUS pin is connected to VBUS, which is then connected to the VBUS pin of the DT1042-0450 differential line driver. The DT1042-0450 driver has pins 1, 2, 3, 4, 5, and 6. Pins 1 and 2 are connected to the MOSAIC_DP and MOSAIC_DM pins. Pins 3 and 4 are connected to GND. Pins 5 and 6 are connected to VUSB, which is then connected to TP8.

USB Track Impedance: Differential Pair
<https://saturnpcb.com/saturn-pcb-toolkit/>
Prepreg thickness: 8.3 mil (JLC7628). Er = 4.6
10.5 mil track with 9.5 mil gap (20 mil center to center) = 90 Ohms



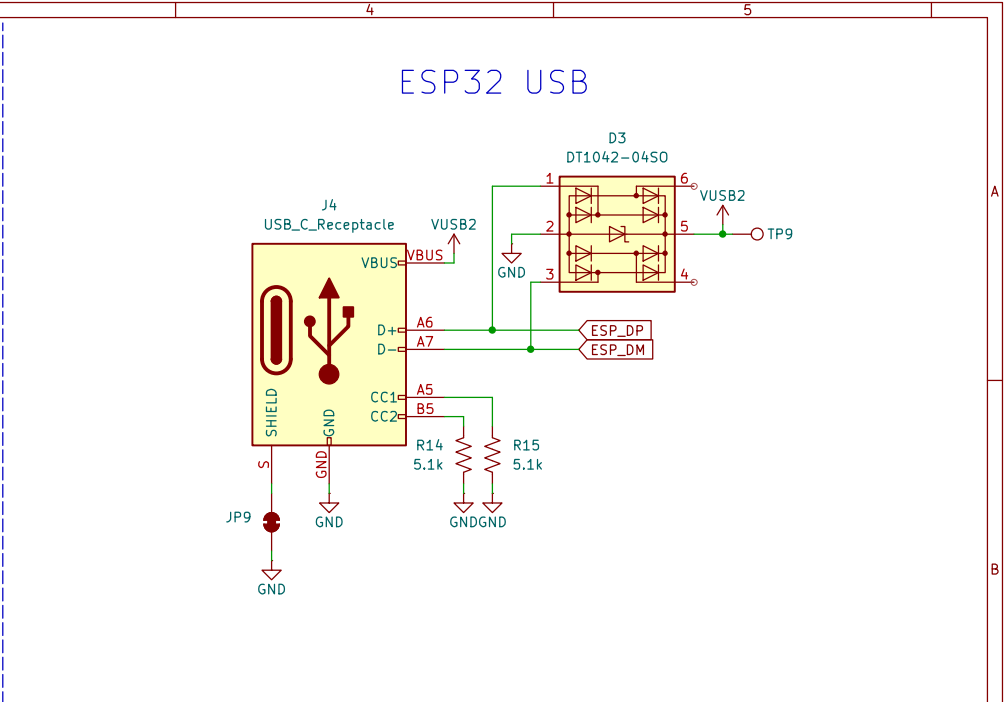
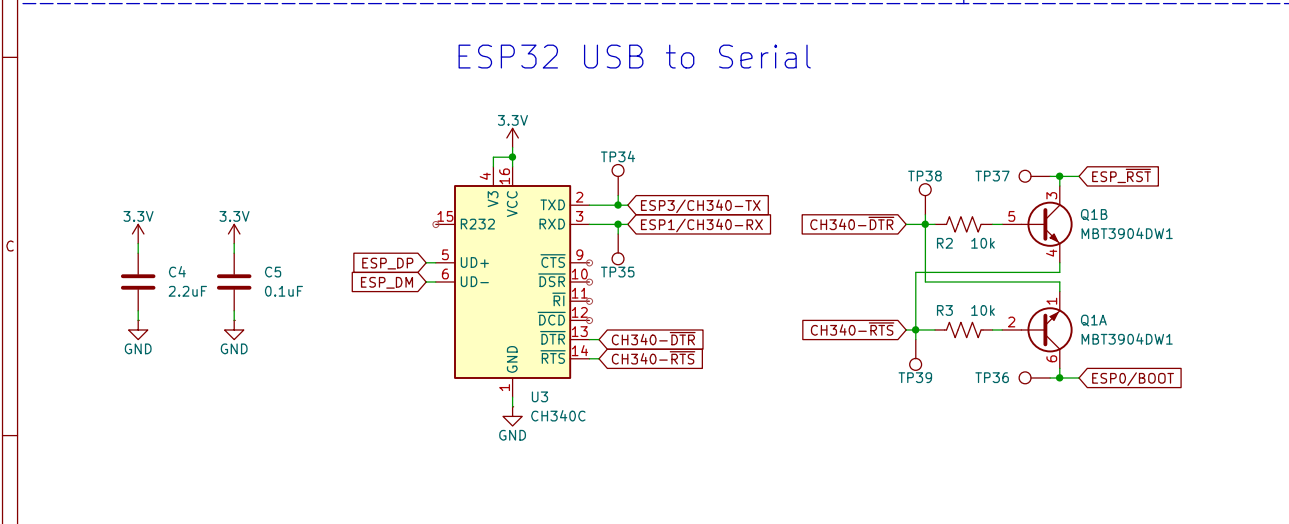
Mosaic USB

The schematic diagram illustrates the Mosaic USB interface circuit. It features a USB_C_Receptacle (J2) connected to a shielded cable (JP8). The receptacle pins are labeled SHIELD, GND, CC1, CC2, D+, D-, VBUS, and USB. The shield is connected to ground through JP8. The D+ and D- signals are connected to A6 and A7, respectively, which are also connected to the MOSAIC_DP and MOSAIC_DM signals via a differential pair consisting of two resistors (R10 and R9, both 5.1k) and a transformer (TR1, RFCMF1220100M4T). The VBUS signal is connected to pin 1 of the DI1042-0450 diode array, which is also connected to the TP8 test point. The diode array has six pins: 1 (VBUS), 2 (GND), 3 (GND), 4 (GND), 5 (VUSB), and 6 (TP8).

USB Track Impedance: Differential Pair
https://saturnpcb.com/saturn-pcb-toolkit/
Prepreg thickness: 8.3 mil (JLC7628). Er = 4.6
10.5 mil track with 9.5 mil gap (20 mil center to center) = 90 Ohms

ESP32 USB

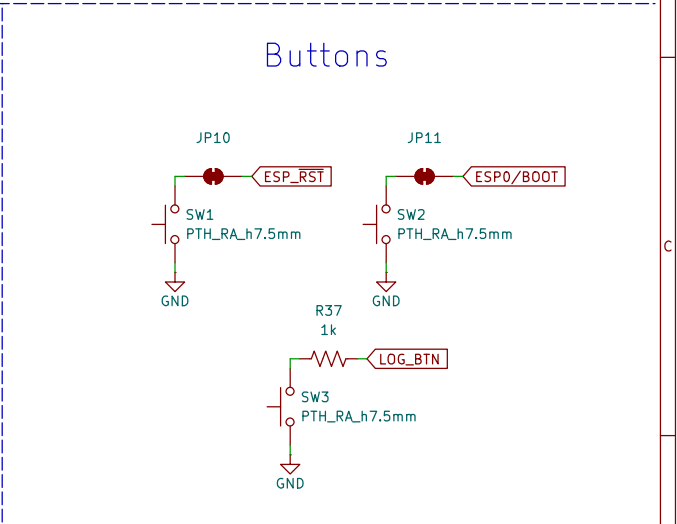
The diagram illustrates the USB interface for the ESP32. It features a USB-C receptacle (J4) and a USB-to-UART bridge (D3, DT1042-0450). The bridge's VBUS pin is connected to the receptacle's VBUS pin and a USB2 pin. Its GND pin is connected to the receptacle's GND pin and a TP9 pin. Its D+ pin is connected to the receptacle's D+ pin and the ESP_DP pin. Its D- pin is connected to the receptacle's D- pin and the ESP_DM pin. The bridge's CC1 pin is connected to the receptacle's CC1 pin and a 5.1k resistor (R14) to GND. Its CC2 pin is connected to the receptacle's CC2 pin and a 5.1k resistor (R15) to GND. The receptacle's SHIELD pin is connected to a JP9 pin and GND. The receptacle's S pin is connected to GND.

[illegible]

Buttons

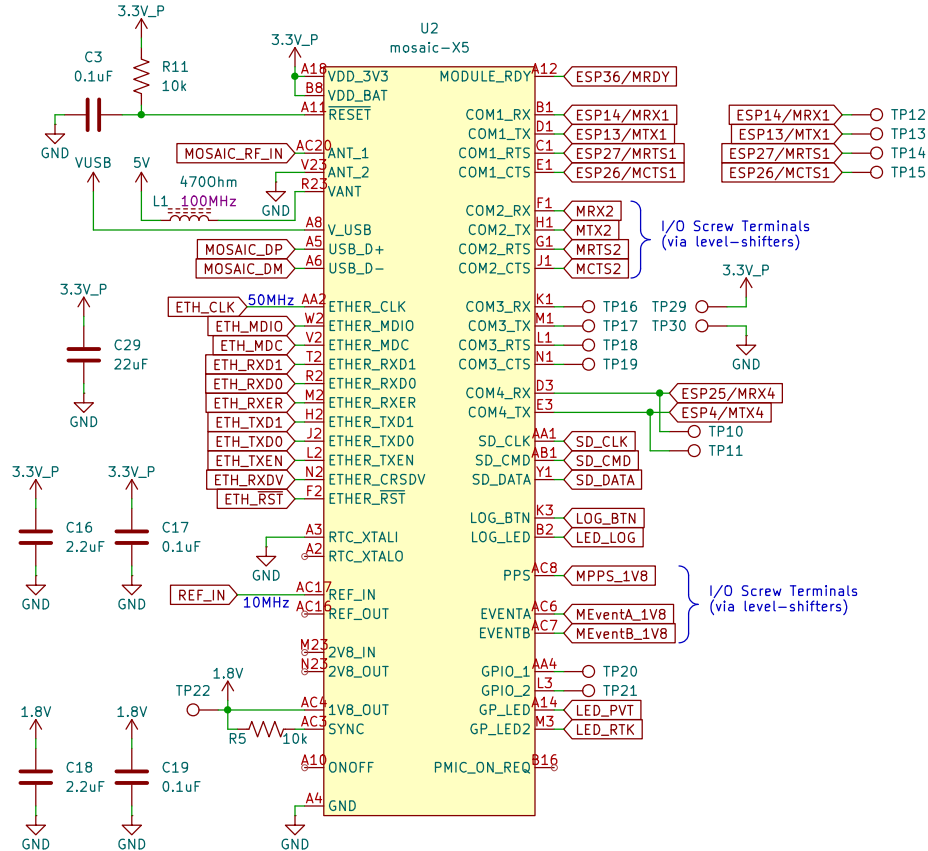
The diagram illustrates the wiring for three push buttons (SW1, SW2, SW3) connected to a microcontroller. Each button is connected to GND through a 7.5mm PTH_RA_h7.5mm pad. A 1k resistor (R37) is connected between SW3 and LOG_BTN.

- SW1:** Connected to JP10 (ESP_RST).
- SW2:** Connected to JP11 (ESP0/BOOT).
- SW3:** Connected to LOG_BTN through a 1k resistor (R37).

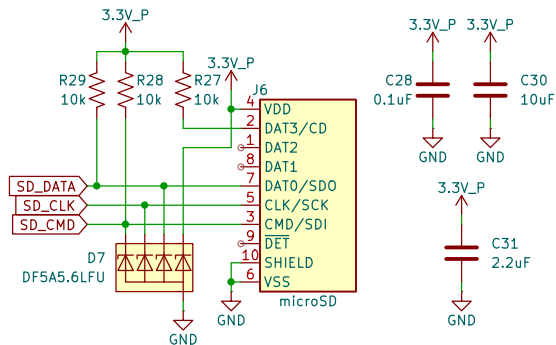


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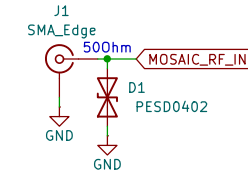
mosaic Tri-band GNSS



microSD



GNSS Antenna



Microstrip Calculation:

Copper Thickness (1oz): 1.4mil/0.035mm

Board thickness: 1.6mm

Dielectric thickness (layer 1 to 2): 0.2mm

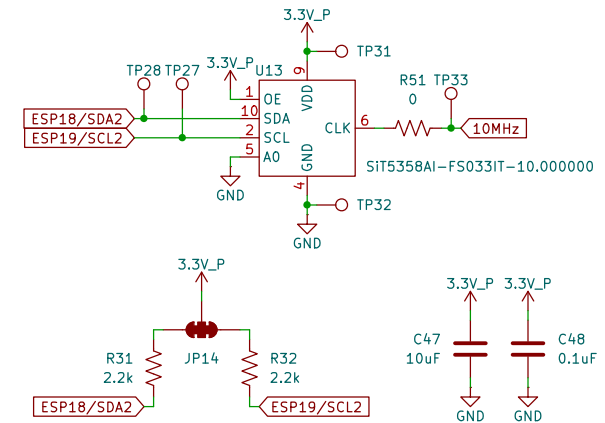
Er: 4.6

Polygon Isolation: 6mil/0.1524mm

RF Trace Width: 13mil/0.33mm

<https://chemandy.com/calculators/coplanar-waveguide-with-ground-calculator.htm>

10MHz Oscillator



Sheet: /GNSS/

File: GNSS.kicad_sch

Title:

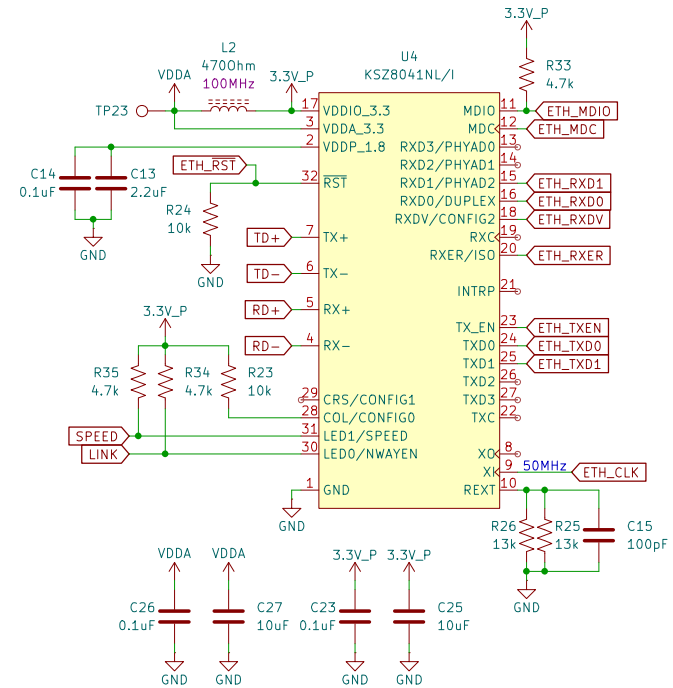
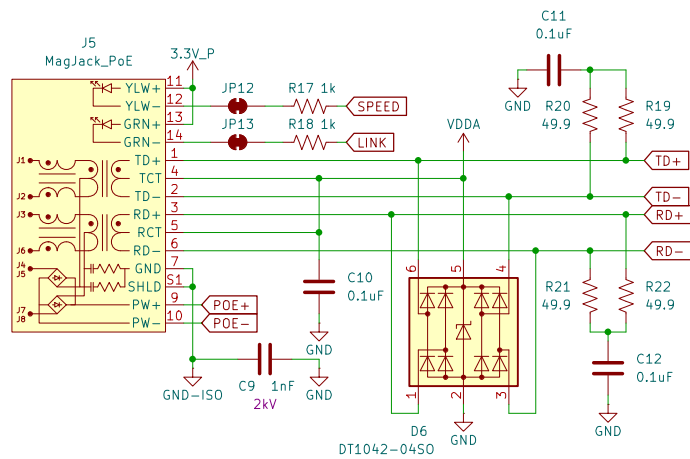
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Rev:

Id: 4/6

Ethernet



Ethernet Track Impedance: Differential Pair
<https://saturnpcb.com/saturn-pcb-toolkit/>
 Prepreg thickness: 8.3 mil (JLC7628). Er = 4.6
 9.0 mil track with 11.0 mil gap (20 mil center to center) = 100 Ohms
 Each pair should match in length to better than 0.5mm

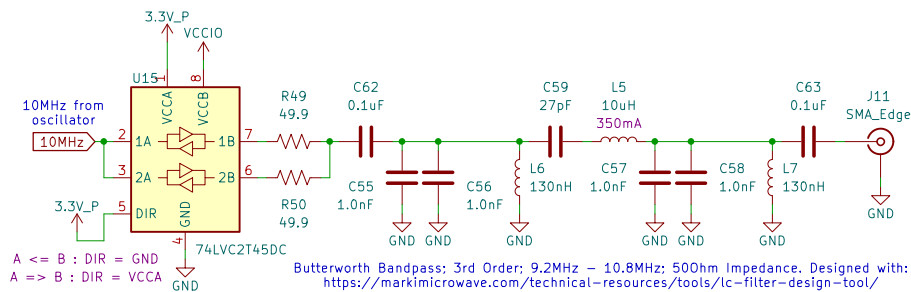
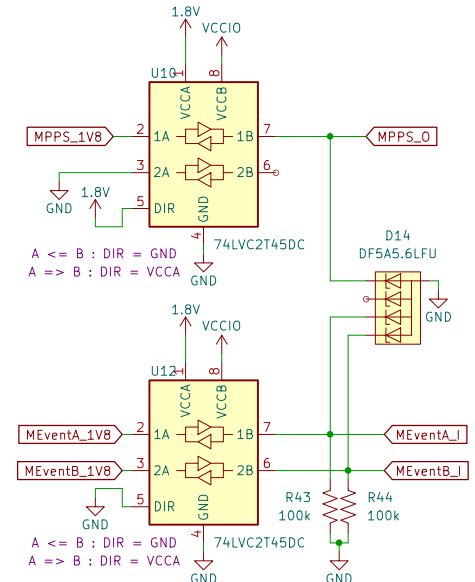
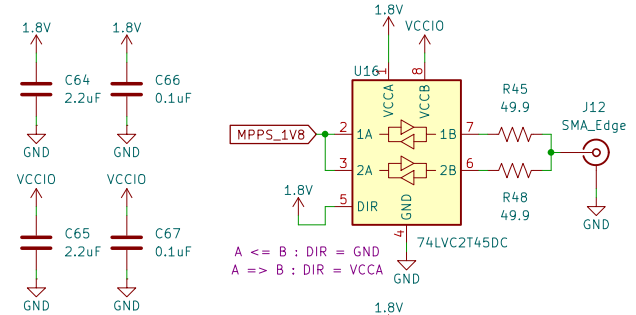
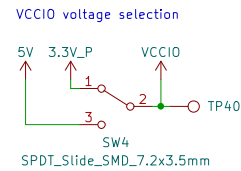
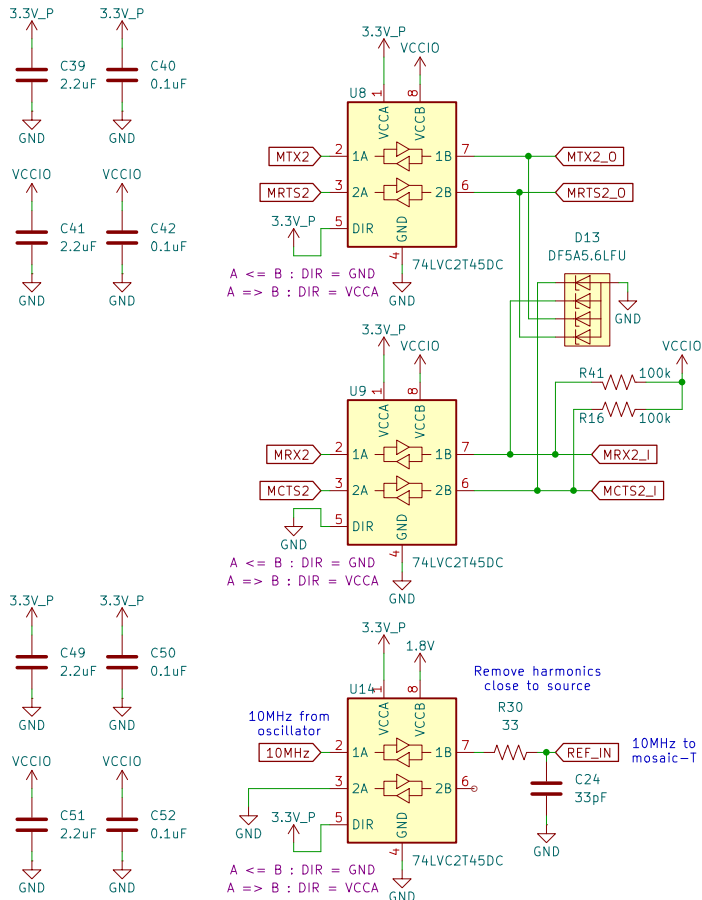
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Id: 5/6

Level-Shifting



Butterworth Bandpass: 3rd Order; 9.2MHz - 10.8MHz; 500hm Impedance. Designed with: <https://markimicrowave.com/technical-resources/tools/lc-filter-design-tool/>

Sheet: /LevelShifting/
File: LevelShifting.kicad_sch

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Id: 6/6