

Diagram illustrating the wiring for the MCT5200 module:

- Connector J9:**
  - Pins 1-4: MGP2\_0, MGP1\_0, MEventB\_1, MRTS2\_0
  - Pins 5-8: MXTX2\_0, MRX2\_1, DC\_IN-, DC\_IN+
  - Pin 10: GND
- Capacitor C53:** 10uF, 10V, 20% connected between VCCIO and GND.
- Diode JP15:** Connected between VCCIO and MCT52\_1.
- Note:** Close jumper to use CTS for VCCIO power output.
- Label:** Screw\_Cage\_3.5mm-10

[illegible]

The diagram illustrates the pin connections for the ESP32-WROVER-IE-N16R8 module. The module is represented by a yellow rectangle with pins numbered 1 through 39. The connections are as follows:

- Power and Ground:**
  - Pin 1 (GND) is connected to ground.
  - Pin 2 (VDD) is connected to 3.3V.
  - Pin 3 (EN) is connected to a 3.3V supply through a 10k resistor (R1) and a 1.0uF capacitor (C8) to ground.
  - Pin 4 (ESP35/DeviceSense) is connected to a 3.3V supply through a 1k resistor (R7) and a 2.2k resistor (R8) to ground.
  - Pin 5 (TP43) is connected to ground.
  - Pin 6 (ESP34/MTX3) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 7 (ESP35/DeviceSense) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 8 (ESP27/MRTS1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 9 (ESP33/LED\_LOCK) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 10 (ESP25/MRX4) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 11 (ESP26/MCTS1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 12 (ESP27/MRTS1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 13 (ESP14/MRX1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 14 (ESP13/MTX1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 15 (ESP4/MTX4) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 16 (ESP13/MTX1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 17 (ESP14/MRX1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 18 (ESP18/SDA2) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 19 (ESP19/SCL2) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 20 (ESP21/SDA) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 21 (ESP22/SCL) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 22 (ESP23/MRX3) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 23 (ESP25/MRX4) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 24 (ESP26/MCTS1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 25 (ESP27/MRTS1) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 26 (ESP33/LED\_LOCK) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 27 (ESP34/MTX3) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 28 (ESP35/DeviceSense) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 29 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 30 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 31 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 32 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 33 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 34 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 35 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 36 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 37 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 38 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
  - Pin 39 (ESP36/MRDY) is connected to 3.3V through a 10uF capacitor (C1) and a 6.3V capacitor (C2) to ground.
- I2C Communication:**
  - Pin 33 (ESP18/SDA2) is connected to SDA.
  - Pin 34 (ESP19/SCL2) is connected to SCL.
- Other Connections:**
  - Pin 35 (ESP1/CH340-RX) is connected to RX.
  - Pin 36 (ESP3/CH340-TX) is connected to TX.
  - Pin 37 (ESP0/BOOT) is connected to BOOT.

The diagram also includes a note: "Device Sense identifies oscillator type / model".

## Power

## USB

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## GNSS

## Ethernet

[illegible]

### Level\_Shiftin

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## Level Shifting

Level\_Shifting\_10MHz

File: LevelShifting\_10MHz.kicad\_sch

## Oscillator

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File: Oscillator.kicad\_sch



Sheet: /

File: SparkPNT\_GNSSDO\_Plus.kicad\_sch

Title: GNSSDO Plus (mosaic-T, STP3593LF)

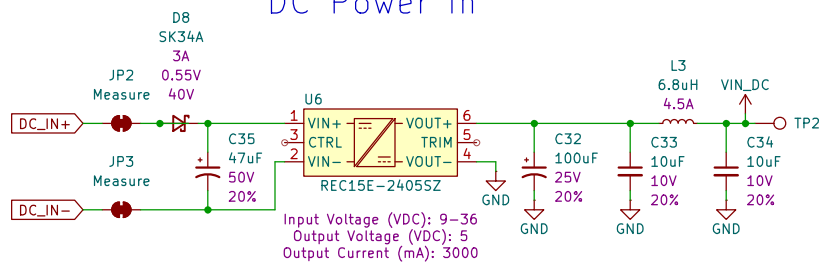
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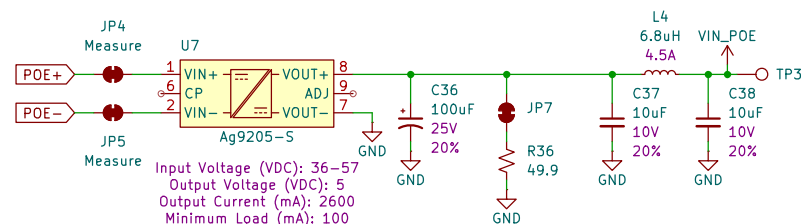
Rev: v10

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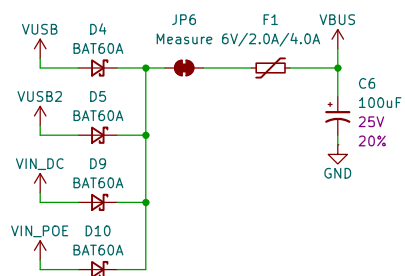
## DC Power In



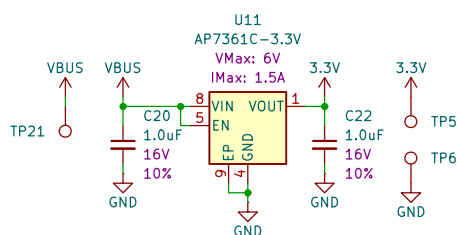
## Power Over Ethernet



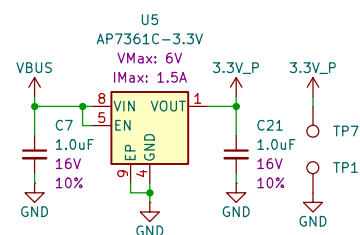
## Power Mux



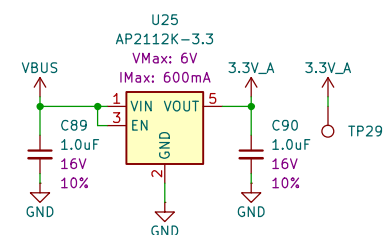
## Main 3.3V



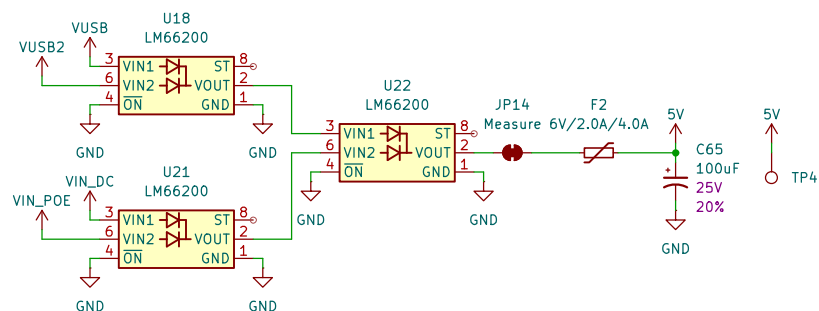
## Peripheral 3.3V



## Analog 3.3V



## OCX0 Power Mux



Sheet: /Power/  
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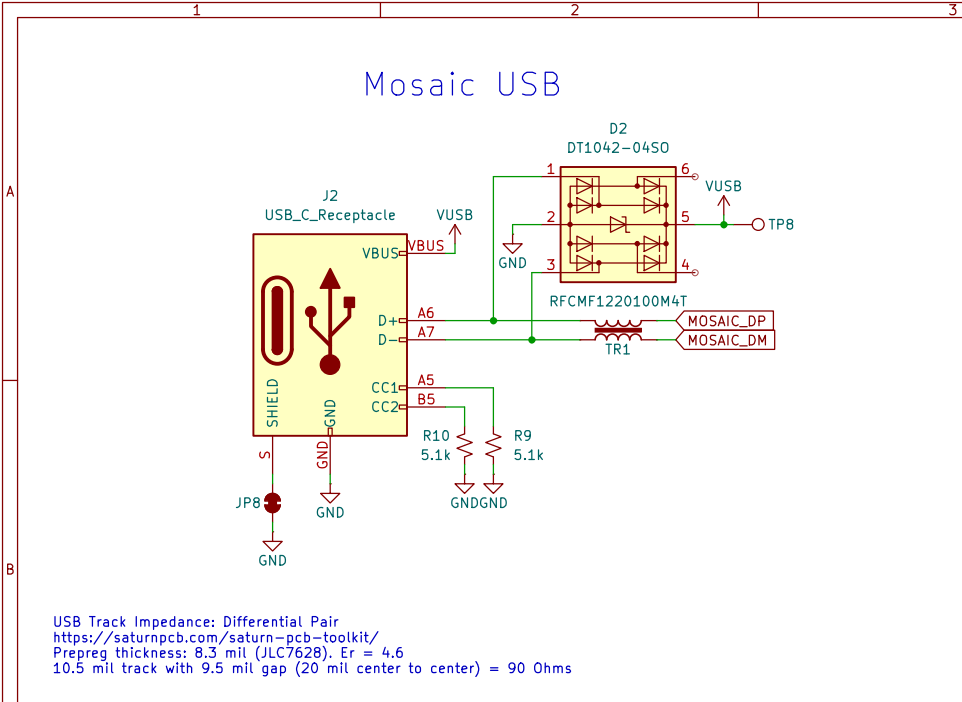
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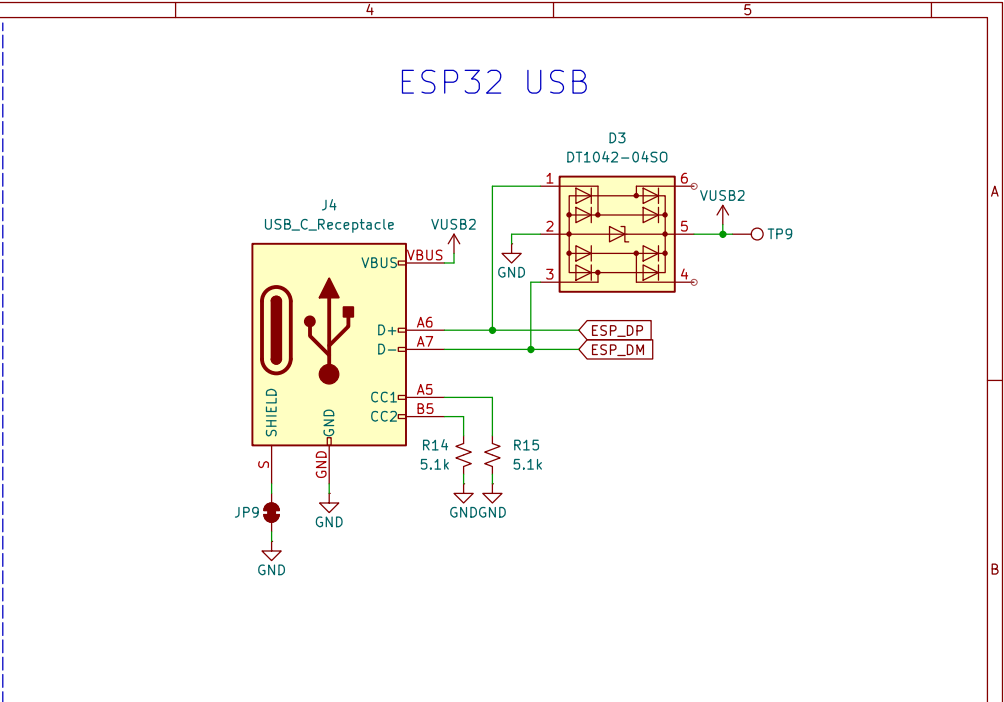
[illegible]

# Mosaic USB

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

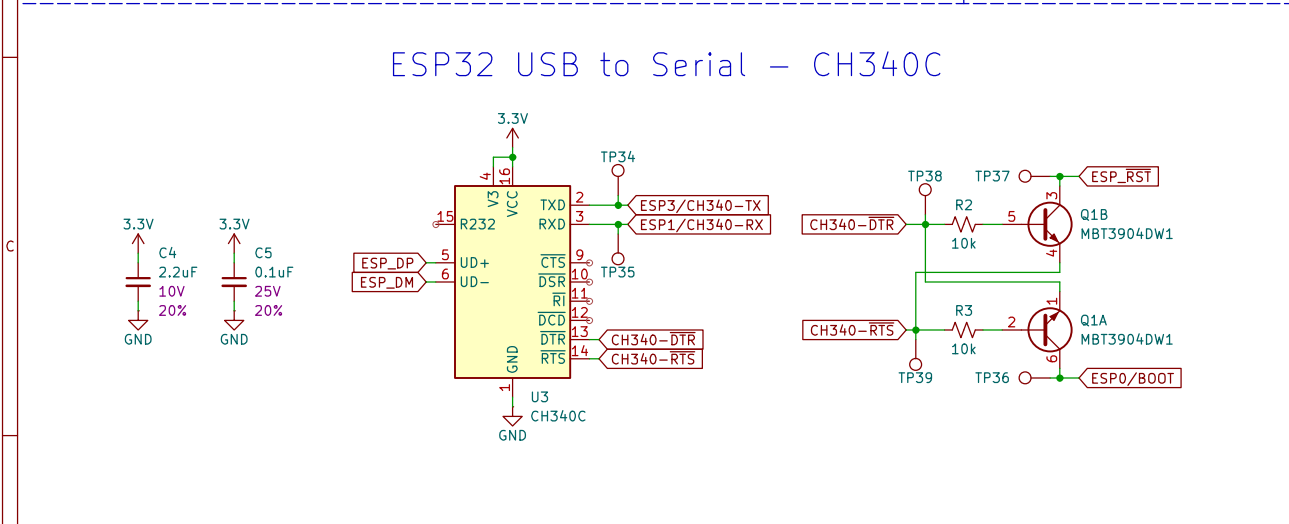
# ESP32 USB

The diagram illustrates the USB connection for an ESP32. A USB-C receptacle (J4) is connected to a USB-to-UART bridge (D3, DT1042-0450). The bridge's VBUS pin (1) is connected to the receptacle's VBUS pin (VBUS) and a 5V source (S) through a 5.1k resistor (R14). The bridge's GND pin (3) is connected to the receptacle's GND pin (GND) and ground (GND). The bridge's D+ pin (2) is connected to the receptacle's D+ pin (A6) and the ESP32's DP pin (ESP\_DP). The bridge's D- pin (4) is connected to the receptacle's D- pin (A7) and the ESP32's DM pin (ESP\_DM). The bridge's VUSB2 pin (6) is connected to a TP9 test point. The bridge's CC1 pin (5) is connected to the receptacle's CC1 pin (A5) and ground (GND) through a 5.1k resistor (R15). The bridge's CC2 pin (4) is connected to the receptacle's CC2 pin (B5) and ground (GND).



### ESP32 USB to Serial – CH340C

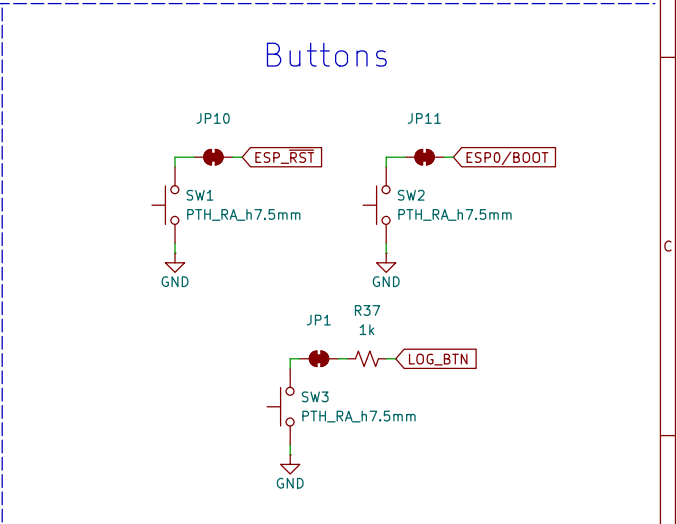
The diagram illustrates the wiring for an ESP32 USB to Serial module using a CH340C chip. The power supply section shows two 3.3V regulators (C4 and C5) connected to the CH340C chip. The CH340C chip is connected to the ESP32's VCC, GND, and various control pins (ESP\_DP, ESP\_DM, ESP\_RST, ESP0/BOOT). The serial interface is connected to the ESP32's TXD and RXD pins. The CH340C chip is also connected to the ESP32's DTR and RTS pins.



# Buttons

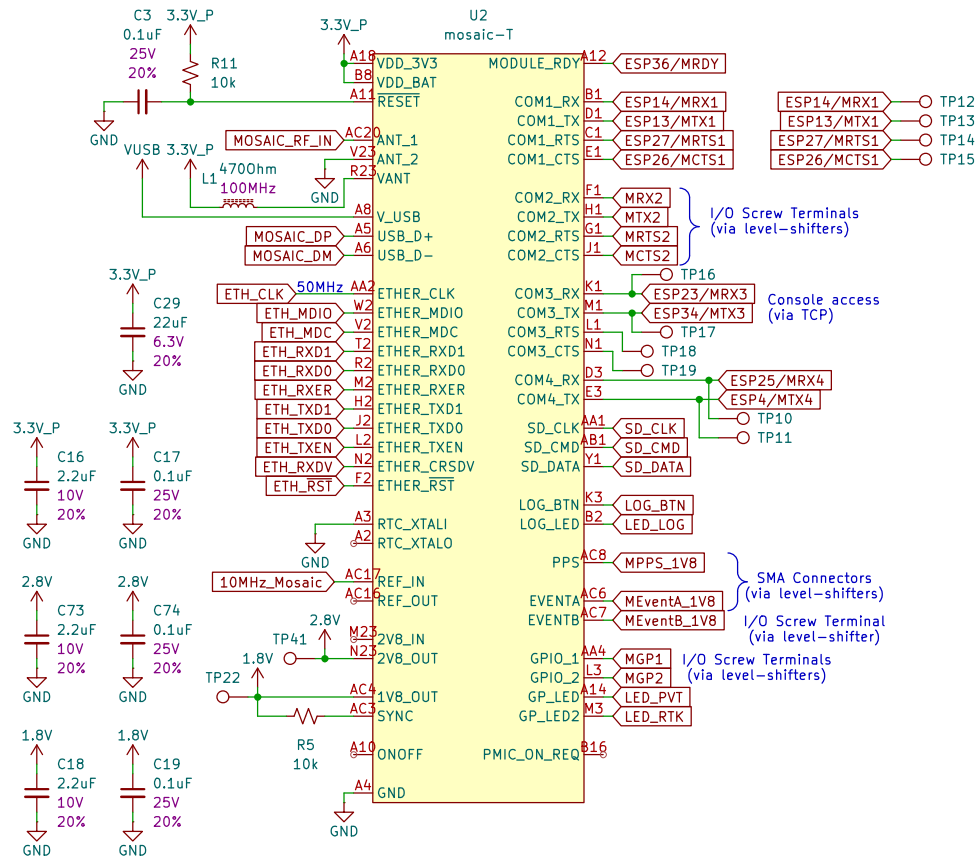
The image displays three separate circuit diagrams, each representing a different button connection. Each diagram features a green line representing a signal trace, a red switch symbol representing the button, and a red triangle symbol representing a ground connection.

- Top Left Diagram:** Labeled JP10, it shows a button SW1 (PTH\_RA\_h7.5mm) connected to a component labeled ESP\_RST. The other terminal of the button is connected to GND.
- Top Right Diagram:** Labeled JP11, it shows a button SW2 (PTH\_RA\_h7.5mm) connected to a component labeled ESP0/BOOT. The other terminal of the button is connected to GND.
- Bottom Diagram:** Labeled JP1, it shows a button SW3 (PTH\_RA\_h7.5mm) connected to a component labeled LOG\_BTN via a resistor R37 (1k). The other terminal of the button is connected to GND.

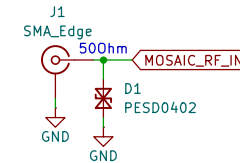


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## mosaic Tri-band GNSS

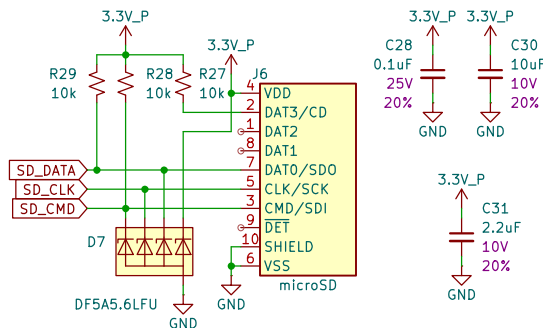


## GNSS Antenna



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>

## microSD



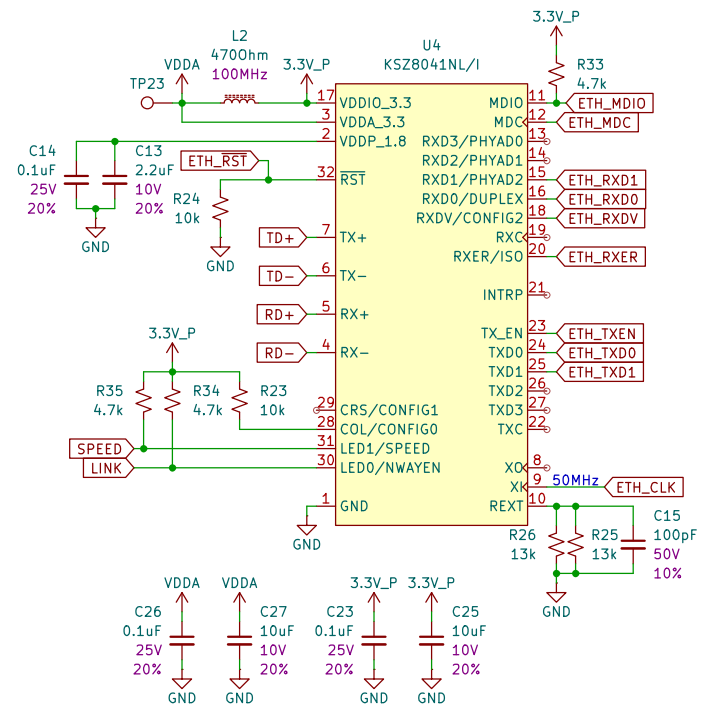
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**Title: GNSS**

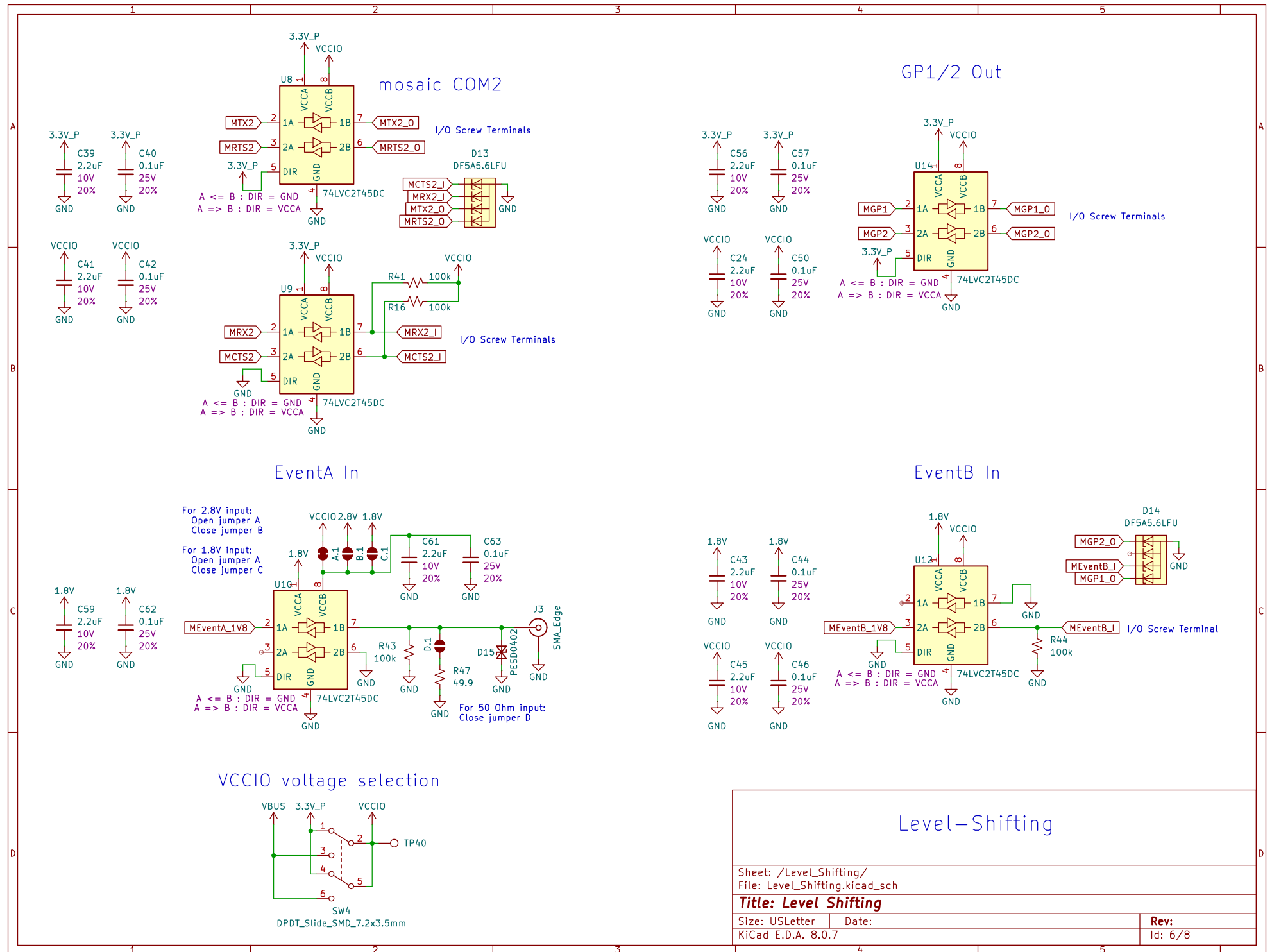
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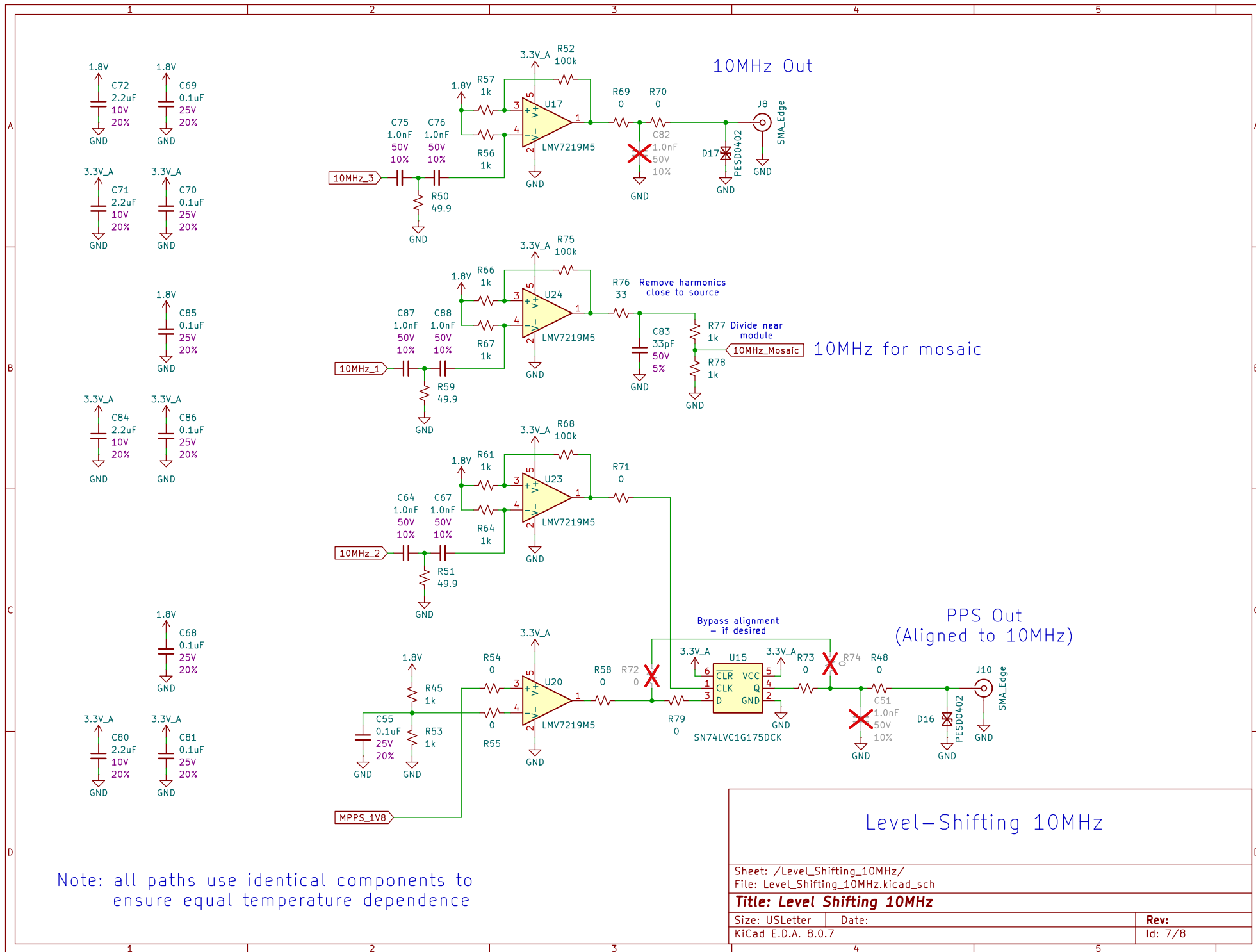
Rev:  
 Id: 4/8

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



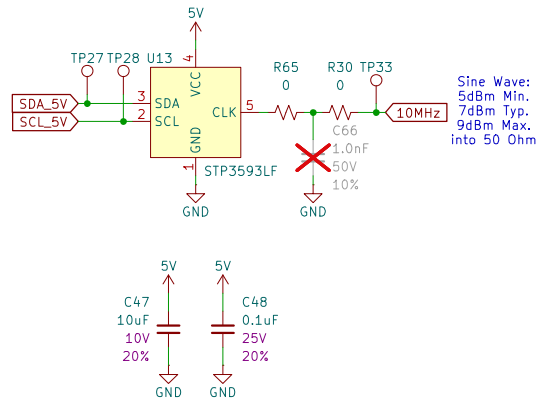
Rev:  
Id: 5/8





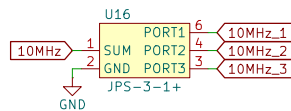
## 10MHz Oscillator – STP3593LF

Supply Voltage: 5.0V (4.75V Min., 5.25V Max.)  
Current Consumption: 1500mA (Warm Up), 600mA (Steady State)

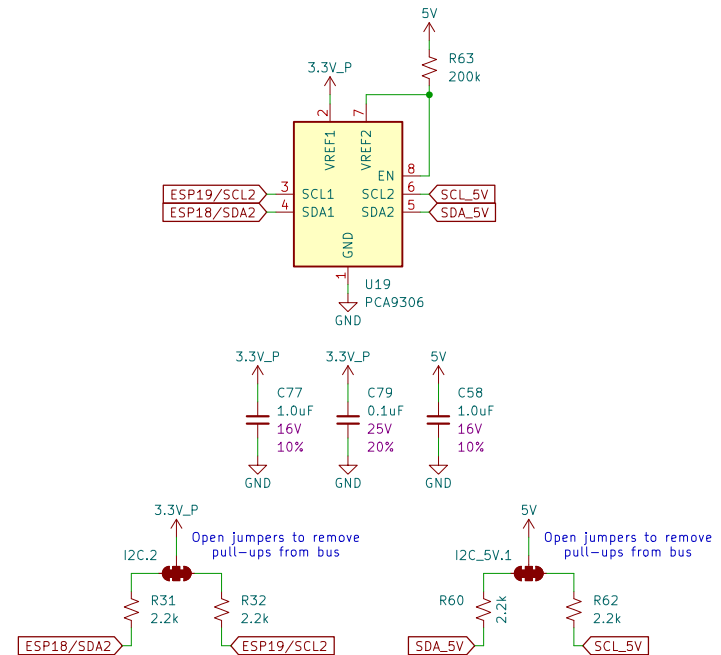


## 3-Way Splitter – JPS-3-1+

Typical Total Loss: 5.0dB at 10MHz



## I2C Level Shifting – PCA9306



Sheet: /Oscillator/  
File: Oscillator.kicad\_sch

**Title: Oscillator**

Size: A4  
KiCad E.D.A. 8.0.7

Date:

**Rev:**  
Id: 8/8