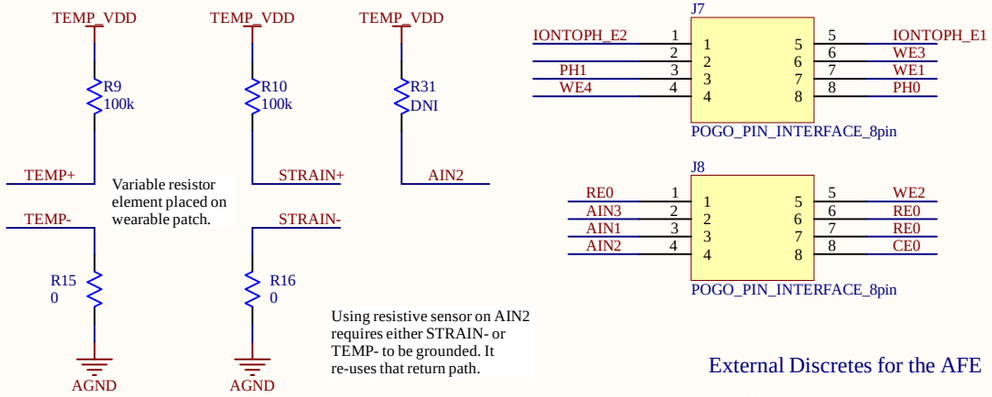
## Pogo Pin Exposed Pads

J7 and J8 pins contain the analog signals coming from external electrodes on the motherboard.

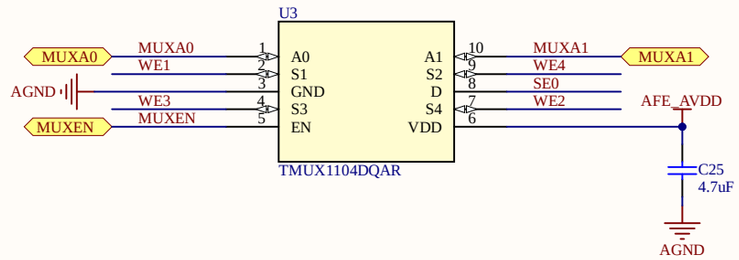
## Temperature/Strain Sensor



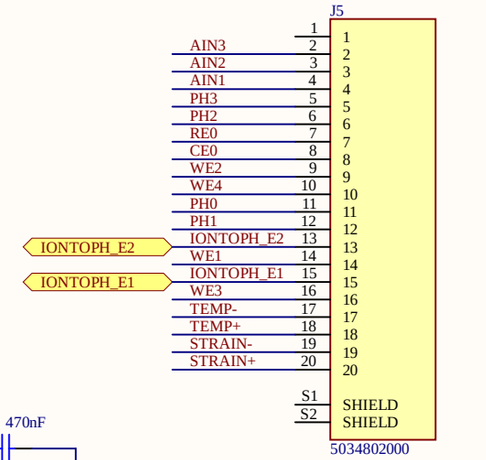




## Analog MUX 4:1

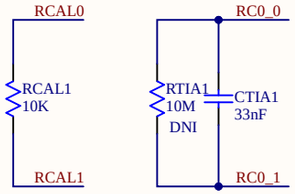



## ZIF connector

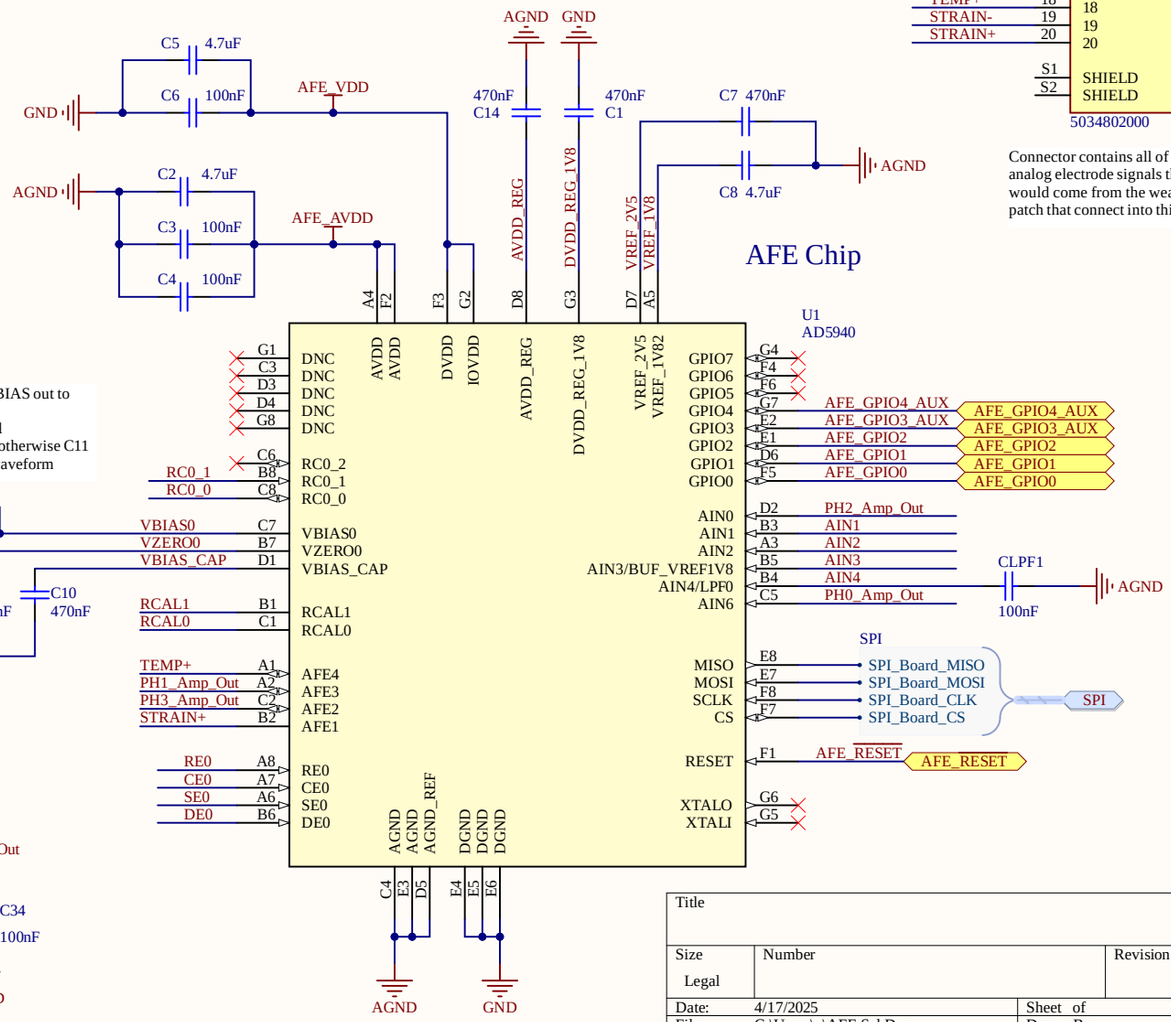



Connector contains all of the analog electrode signals that would come from the wearable patch that connect into this part.

## External Discretes for the AFE

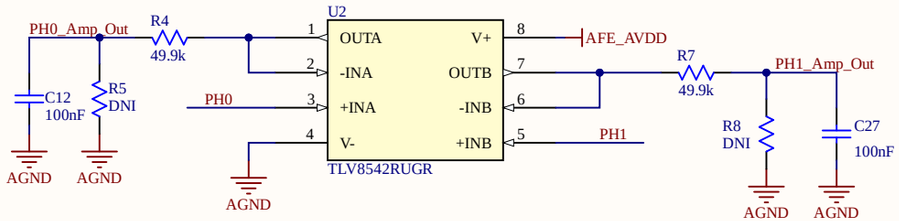



## AFE Chip

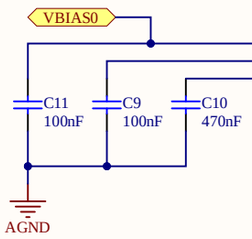



## Dual Channel OCP Sensor

High Z input opamp buffers for open-circuit potentiometry measurements.

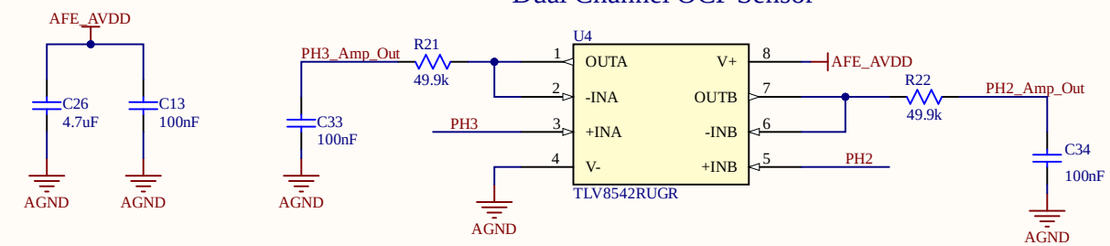



Do not send VBIAS out to this pin during electrochemical measurements otherwise C11 will filter the waveform




## Dual Channel OCP Sensor

Decoupling for OCP sensors.

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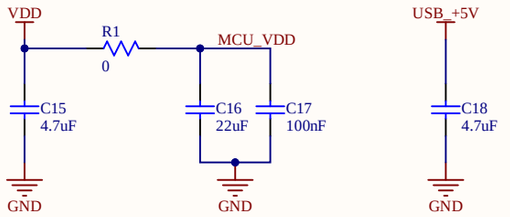
## Decoupling



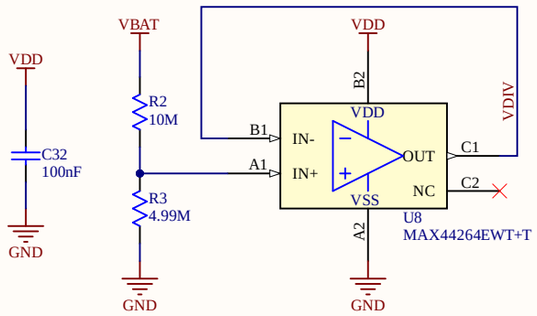

Place next to VDDH pin

Place next to VDD pin

Place next to VBUS pin

Module Power supplies are configured for Low Voltage Mode where VDD and VDDH are shorted through a 0ohm resistor. In this mode, the maximum allowed VDD is 3.6V. Remove the 0ohm to operate in High Voltage Mode if needed. Enabling normal voltage mode, with DC/DC Reg1 enabled should give the lowest power.

## Battery Monitor

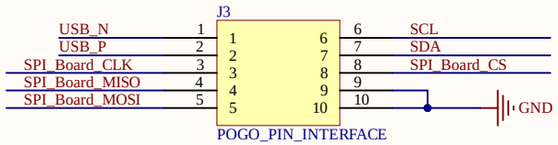


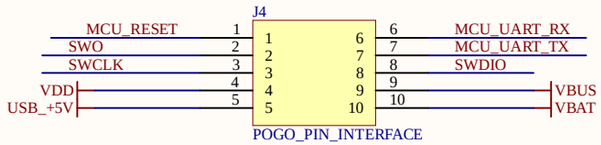

Voltage divider to measure battery voltage with ADC. Can calibrate out resistor tolerance errors. Choose resistor values that fit the voltage within the opamp common mode ranges.

Large resistors are used to minimize power draw. However, the MCU ADC has a low Rin (1Mohm) which loads the divider when using large R. Opamp buffer is added to easily drive the ADC.

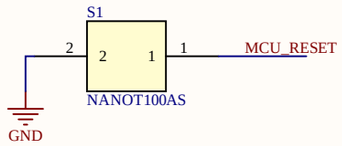
## Pogo Pin Exposed Pads

These two sets of pins contain the digital signals and power nets that are sent down to the motherboard/docking station PCB for debug, programming, charging, etc.




## MCU Reset Pushbutton




## MCU + BLE Module

External 32kHz crystal removed to save area

Connections between the AFE and MCU
- SPI CS to MCU A0 (P0.04/AIN2)
- SPI SCLK to MCU SCK (P0.14)
- SPI MOSI to MCU MOSI (P0.13)
- SPI MISO to MCU MISO (P0.15)
- AFE GPIO0 to MCU A1 (P0.05/AIN3)
- AFE GPIO1 to MCU A2 (P0.30/AIN6)
- AFE GPIO2 to MCU A3 (P0.28/AIN4)
- AFE Reset to MCU A4 (P0.02/AIN0)
- AFE GPIO3 and 4 connected as auxillary inputs to MCU

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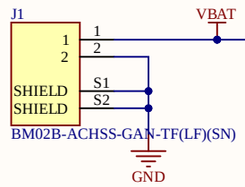
Intended to be used with the RJD2430C1ST1 battery. Polarity of the JST connector does not matter since the wires must be hand soldered regardless.

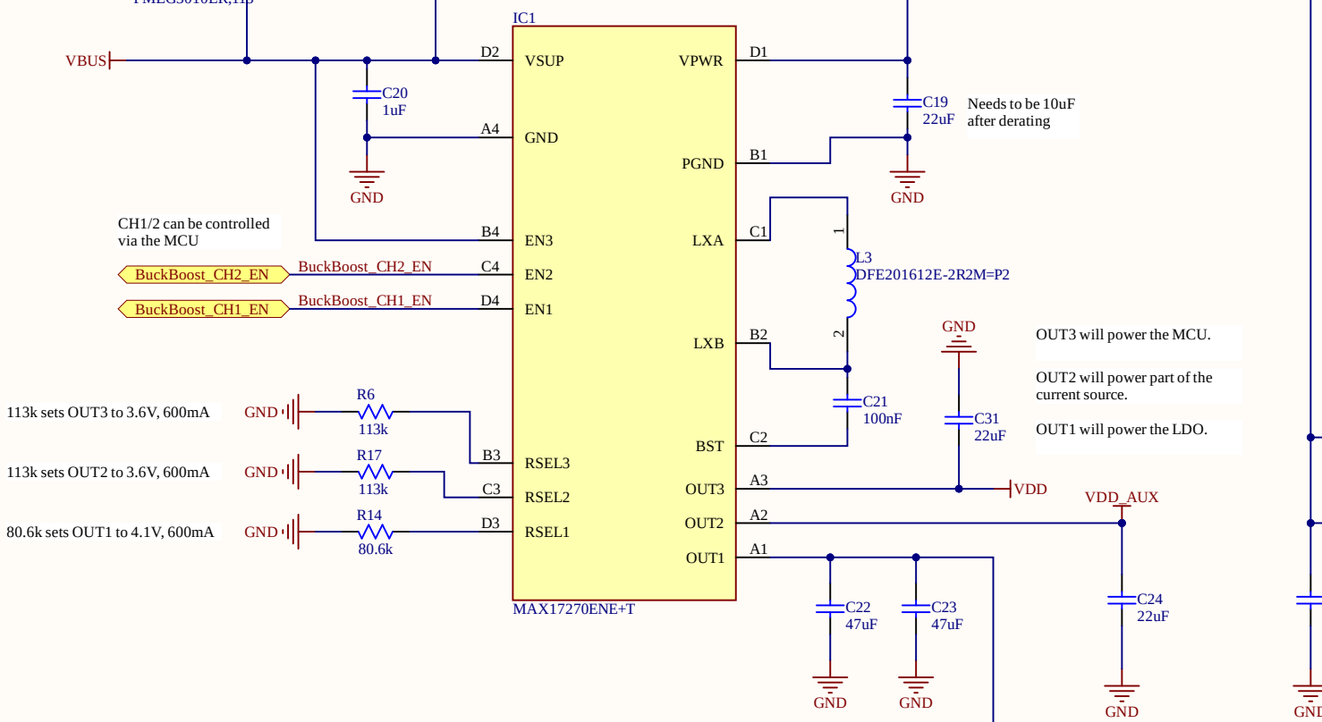
0402 R13 footprint that can be used for a fuse if needed depending on the application. Populated with a 0ohm jumper for now. Check wattage on the resistor.

Diode provides reverse voltage protection when USB and Battery are simultaenously connected

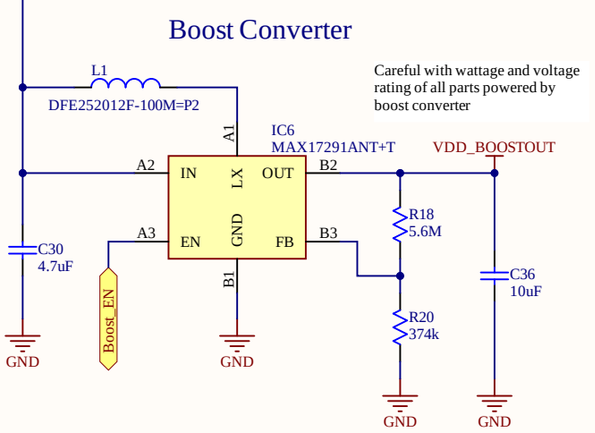
## Battery Connector




## Buck Boost Converter

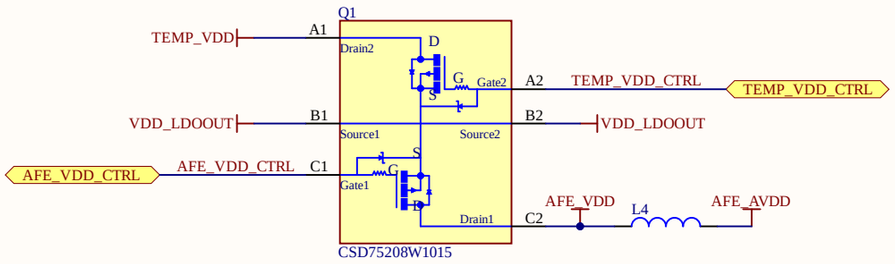



## Boost Converter

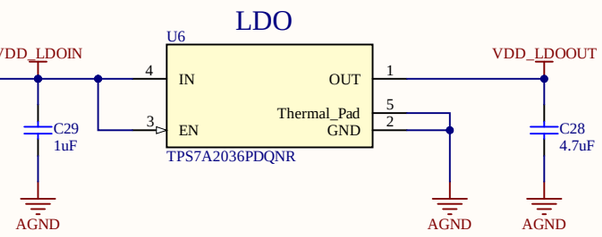



## Load Switches

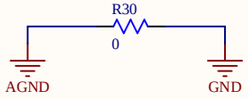
Power PMOS's that enable analog blocks to be power gated by the MCU




## LDO




Connection between analog and digital grounds

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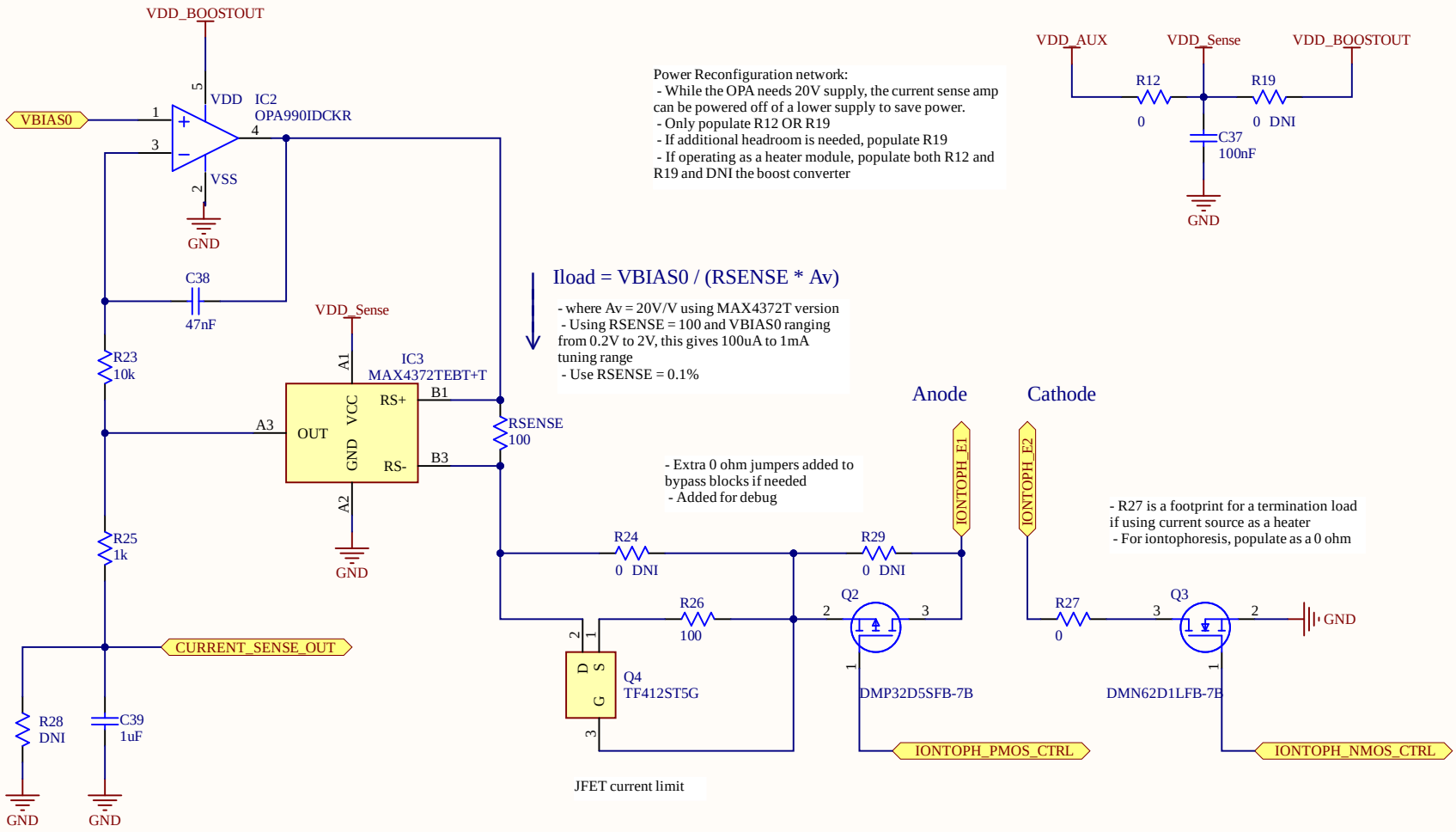
# Voltage Controlled Current Source




Power Reconfiguration network:
- While the OPA needs 20V supply, the current sense amp can be powered off of a lower supply to save power.
- Only populate R12 OR R19
- If additional headroom is needed, populate R19
- If operating as a heater module, populate both R12 and R19 and DNI the boost converter

Iload = VBIAS0 / (RSENSE * Av)

- where Av = 20V/V using MAX4372T version
- Using RSENSE = 100 and VBIAS0 ranging from 0.2V to 2V, this gives 100uA to 1mA tuning range
- Use RSENSE = 0.1%

- Extra 0 ohm jumpers added to bypass blocks if needed
- Added for debug

- R27 is a footprint for a termination load if using current source as a heater
- For iontophoresis, populate as a 0 ohm

JFET current limit

- LPF before going into MCU ADC for monitoring the current
- Note: Current sense amp has very low output impedance
- Footprint added for resistive divider in case the sense amp needs larger VDD (prevents MCU from seeing anything larger than 3.9V)

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