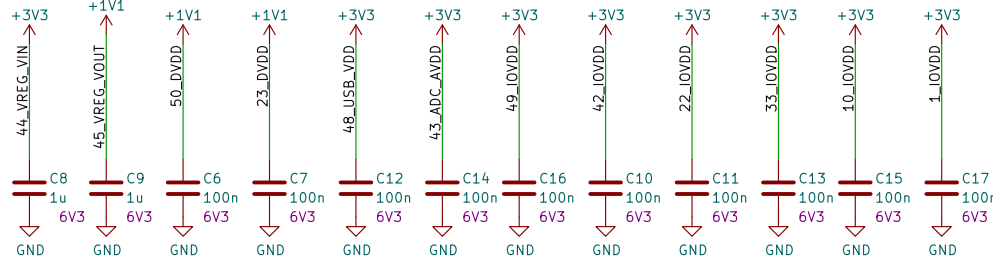
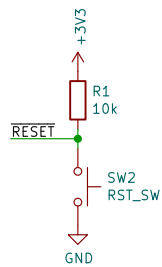


MCU Filters

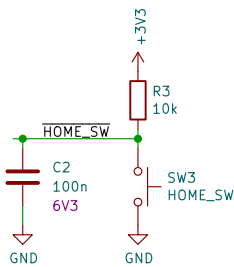
Make sure to place all capacitors close to their respective pins



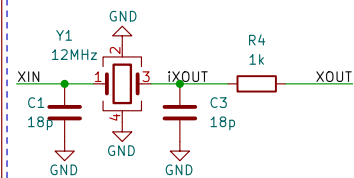
Reset Switch



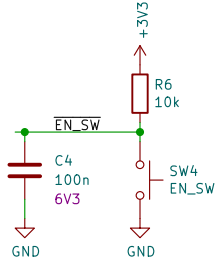
Home Switch



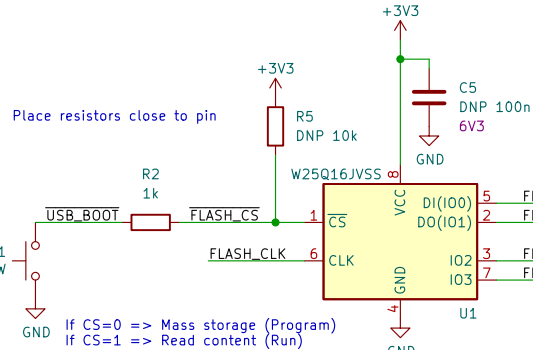
Crystal



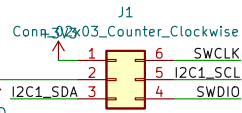
Motor Enable Switch



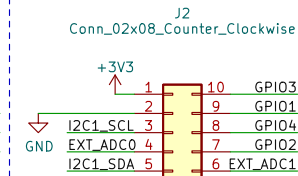
Flash



Debug

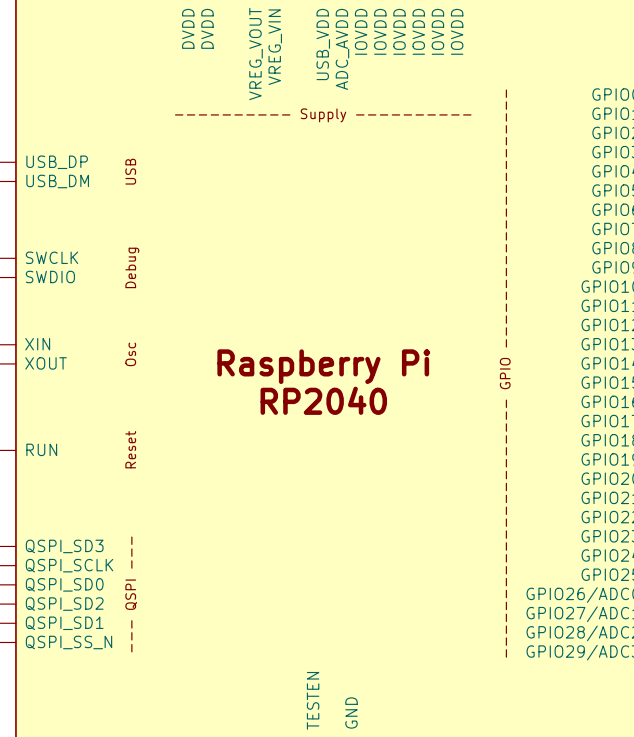


Expansion



Pin positions are optimized for layout

RP2040



Raspberry Pi
RP2040

| | | | |
|-------------|----|----------|---------------|
| GPIO0 | 2 | BUZZ_EN | Buzzer |
| GPIO1 | 3 | GPIO1 | |
| GPIO2 | 4 | GPIO2 | |
| GPIO3 | 5 | GPIO3 | |
| GPIO4 | 6 | GPIO4 | |
| GPIO5 | 7 | EN_SW | |
| GPIO6 | 8 | HOME_SW | |
| GPIO7 | 9 | LED_G | LED_G |
| GPIO8 | 11 | LED_R | LED_R |
| GPIO9 | 12 | LED_B | LED_B |
| GPIO10 | 13 | M2_W11 | M2_W11 |
| GPIO11 | 14 | M2_W12 | M2_W12 |
| GPIO12 | 15 | M2_W21 | M2_W21 |
| GPIO13 | 16 | M2_W22 | M2_W22 |
| GPIO14 | 17 | M1_W11 | M1_W11 |
| GPIO15 | 18 | M1_W12 | M1_W12 |
| GPIO16 | 27 | M1_W21 | M1_W21 |
| GPIO17 | 28 | M1_W22 | M1_W22 |
| GPIO18 | 29 | I2C1_SDA | I2C1_SDA |
| GPIO19 | 30 | I2C1_SCL | I2C1_SCL |
| GPIO20 | 31 | CMP_DRDY | CMP_DRDY |
| GPIO21 | 32 | ACC_INT | ACC_INT |
| GPIO22 | 34 | GPS_EN | GPS_EN |
| GPIO23 | 35 | GPS_TP | GPS_TIMEPULSE |
| GPIO24 | 36 | UART1_TX | UART1_TX |
| GPIO25 | 37 | UART1_RX | UART1_RX |
| GPIO26/ADC0 | 38 | V_PANEL | PANEL |
| GPIO27/ADC1 | 39 | I_PANEL | PANEL |
| GPIO28/ADC2 | 40 | EXT_ADC0 | |
| GPIO29/ADC3 | 41 | EXT_ADC1 | |

Group members:

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Tommaso Canova - 209270
Simone Tollardo - 209002
Lisa Santarossa - 209386
Gabriele Berretta - 209466

Sheet: /Control/
File: control.kicad_sch

Title: Control

Size: A4 Date: 2022-04-13
KiCad E.D.A. kicad (6.0.5)

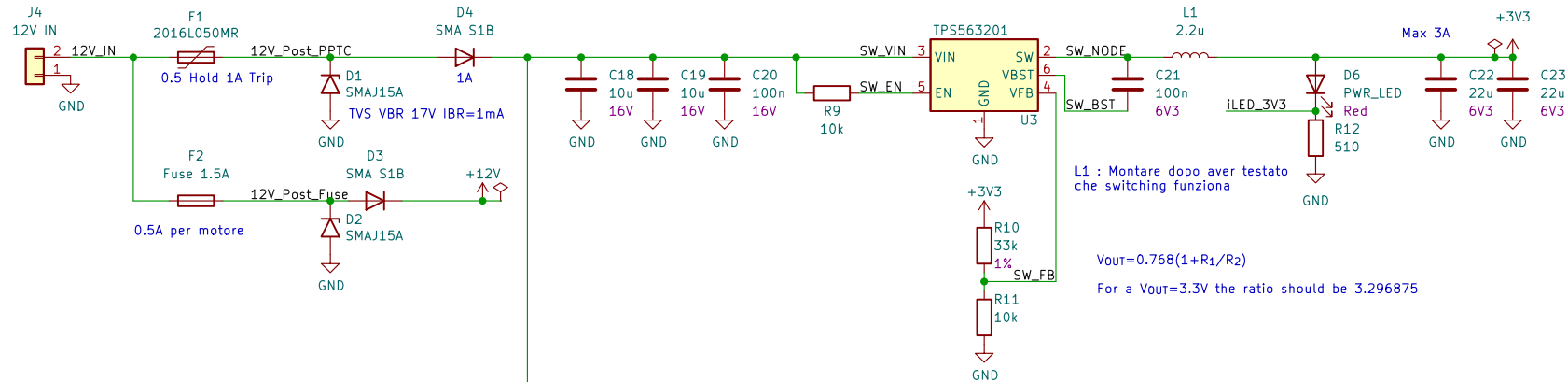
Rev: 1.0
Id: 2/6



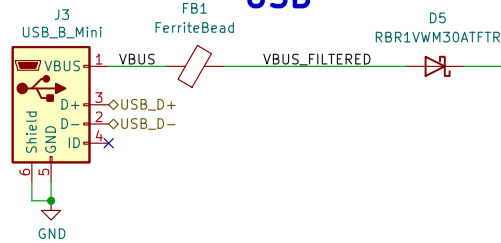
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3V3 Switching

Make the switching node as small as possible in layout



USB



+12V TestPoint TP1

SW_VIN TestPoint TP2

+3V3 TestPoint TP3

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Sheet: /Power/
File: power.kicad_sch

Title: Power

Size: A4 Date: 2022-04-13
KiCad E.D.A. kicad (6.0.5)

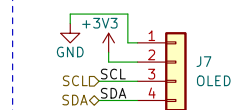
Rev: 1.0
Id: 3/6



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GPS

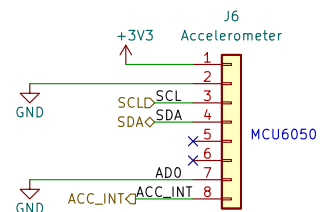
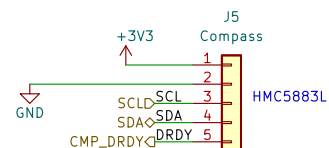
The diagram illustrates the power and signal connections for a GPS module (PAM-7Q-0) connected to an Arduino Uno. The power supply section shows a 3.3V regulator (Q1, 3LP01M) connected to the +3V3 pin of the GPS module. A 10k resistor (R13) is connected between the +3V3 pin and the GPS_EN pin. The GPS module is powered by GPS_VCC (pin 4) and ground (pin 5). Two 100nF capacitors (C24, C25) are connected to GPS_VCC and ground. The module's pins are connected to an Arduino Uno: GPS_RX to RXD (pin 1), GPS_TX to TXD (pin 2), SDA to SCL (pins 7 and 8), and GPS_TP to TIMEPULSE (pin 6). The module also has pins for MP1, MP2, and MP3 connected to ground.



RGB LED

occhio ai pin nel footprint del led RGB

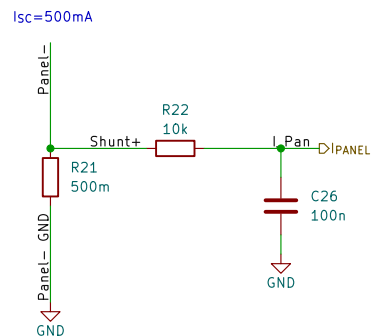
The diagram illustrates a circuit for driving an RGB LED. It consists of three BC846A NPN transistors (Q3, Q4, Q5) used as drivers. Each transistor's emitter is connected to ground, and its collector is connected to a +12V supply through a 33k resistor (R15, R17, R19). The base of each transistor is connected to a 470R resistor (R16, R18, R20) which is in turn connected to the corresponding LED pin (ILED_R, ILED_G, ILED_B). The LED module (D7) has four pins: 1 (R), 2 (G), 3 (B), and 4 (GND).



Rev: 1.0
Id: 4/6

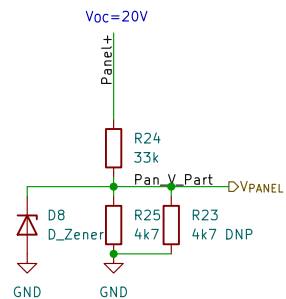
Current sensing

Values need to be determined when the solar panel is defined
OpAmp model needs to be defined



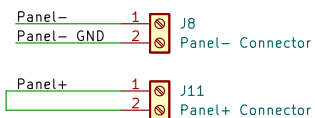
Voltage sensing

Values need to be determined when the solar panel is defined
OpAmp model needs to be defined

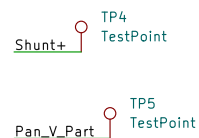


Second resistor is in case we want to increase the sensitivity

Panel connector



Depending on panel power, might need more suitable connector



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Sheet: /Sensing/

File: sensing.kicad_sch

Title: Sensing

Size: A4 Date: 2022-04-13

KiCad E.D.A. kicad (6.0.5)

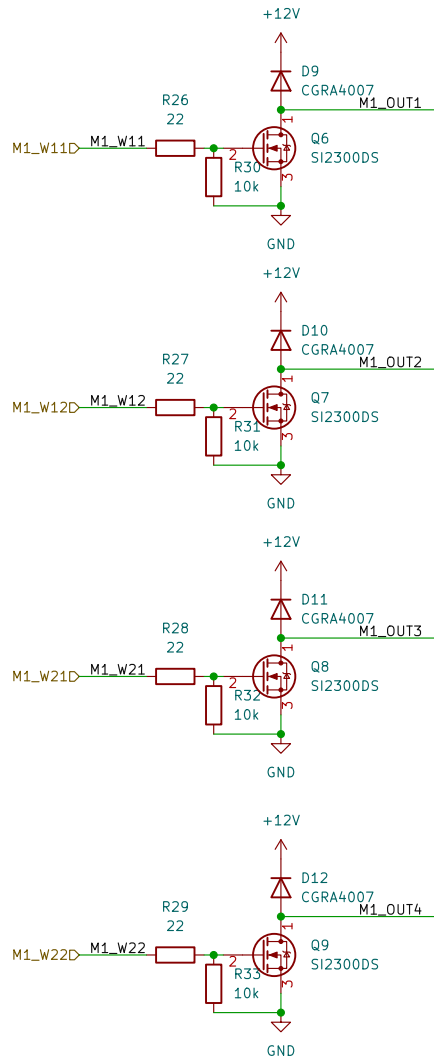
Rev: 1.0

Id: 5/6

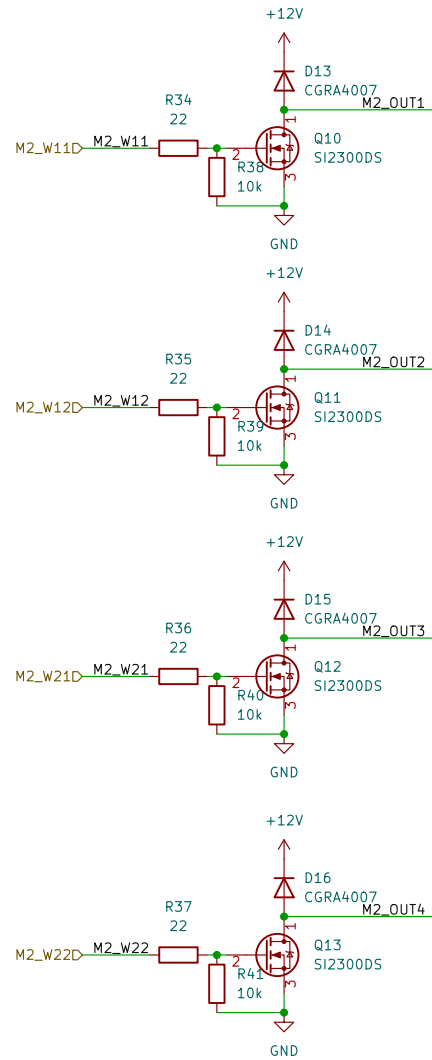


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Stepper Driver 1

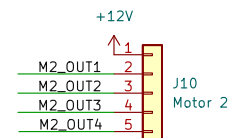
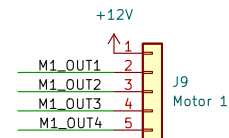


Stepper Driver 2



Stepper Motors

Unipolar stepper motor
28BYJ (ADAFRUIT 918) 12V version



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Sheet: /Actuation/
File: actuation.kicad_sch

Title: Actuation

Size: A4 Date: 2022-04-13
KiCad E.D.A. kicad (6.0.5)

Rev: 1.0
Id: 6/6



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