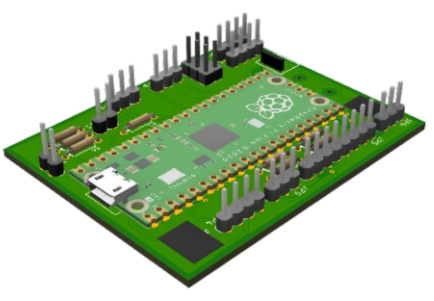
Supercluster Motherboard Guide v1.0

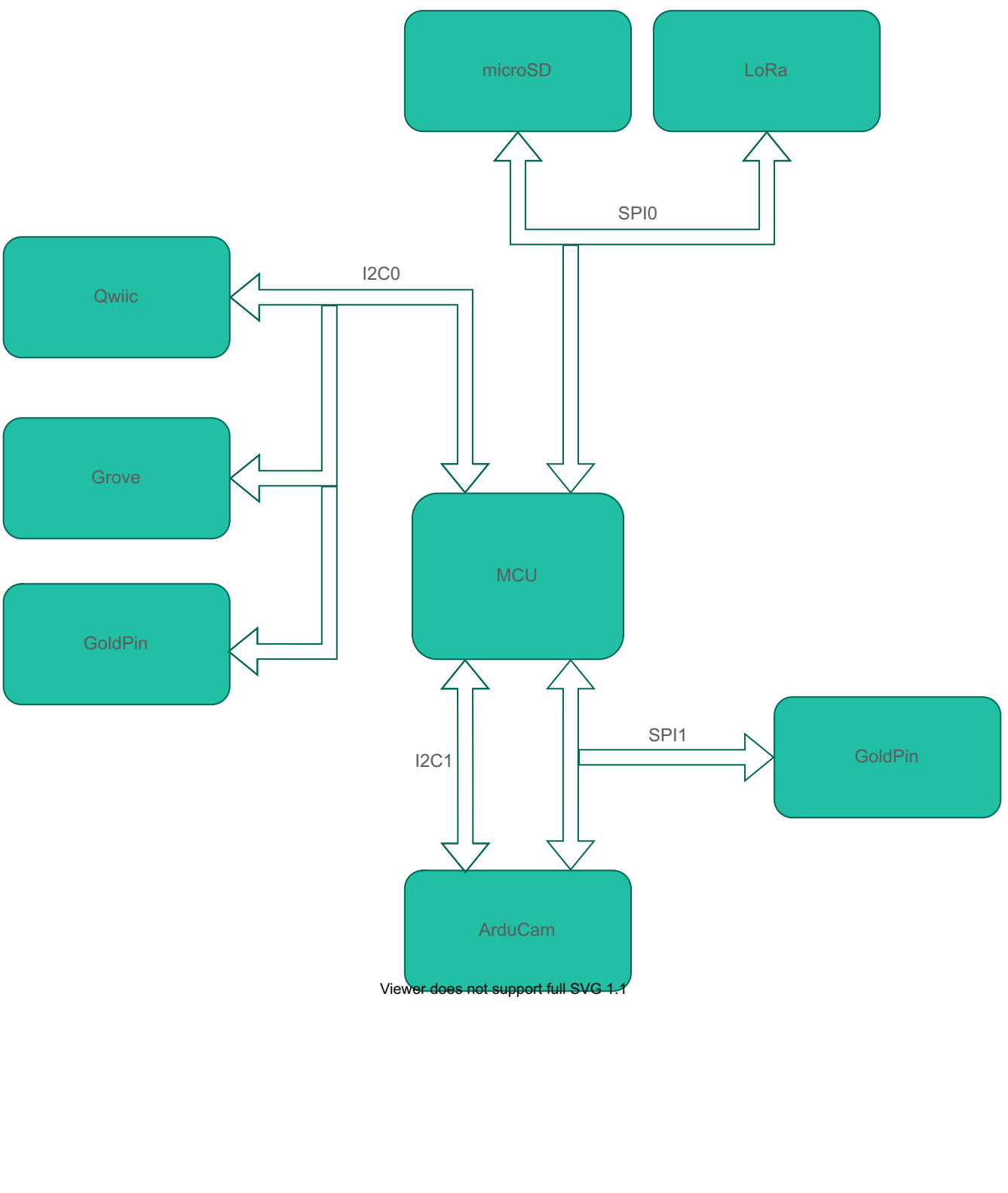


We made our motherboard with passion and put our hearts into it. We used our experience to accelerate the learning process of young engineers. You can use it as a base for more demanding projects.
The module contains a microSD card reader and a Lora RA-02 radio, based on the SX1278 IC. Both components are located on the SPI_0 bus. The bus is intentionally isolated: we have prevented sensors from connecting to it - this architecture protects against damage to important modules in case of a short circuit or a puncture on the bus and increases the data transfer rate. The RP2040 microcontroller module has a duplicated SPI bus and our idea was to use the SPI_1 bus to connect sensors running on it using JP9 connector or a camera (ex. ArduCam) having a dedicated JP5 connector. The camera additionally uses the I2C_1 bus, which is used for configuration only by it. The project assumes the GPS module to be connected to the UART0 bus, output on JP4 connector - this is one of the modules required to correctly determine the position. The second sensor required by the project is an electronic barometer, for example a BMP280 chip, which should be plugged into the I2C_0 bus. The I2C_0 data bus is the main bus for connecting the sensors to the main board: it is brought out on the X1, J1, JP1 and JP2 connectors. The X1 and J1 connectors are constructed according to the qwiic and grove standard. Main board allows to measure battery voltage using voltage divider connected to ADC2 pin via JP11 jumper. Analog pins are also connected to jumper JP7. Free gpio lines are connected to JP6 and JP8. Power source (3 AA sticks) is connected to JP3, pay attention to polarity.

Connections

lp.	Module	Description
1	JP1, JP2, J1, X1	1:GND 2:3V3 3:SDA_0 4:SCL_0
2	JP3	1:BAT+ 2:GND
3	JP4	1:3V3 2:TX_0 3:RX_0 4:GND
4	JP5	1:SCL_1 2:SDA_1 3:3V3 4:GND 5:SPI1_SCK 6:SPI1_MISO 7:SPI1_MOSI 8:GPIO9
5	JP6	1:GPIO15 2:GPIO14 3:GPIO13
6	JP7	1:ADC2 2:ADC1 3:ADC0
7	JP8	1:GPIO22 2:GPIO21 3:GPIO20
8	JP9	1:SPI1_MISO 2:SPI1_MOSI 3:SPI1_SCK
9	U1	1:NC 2:GND 3:3V3 4:GPIO6 5:GPIO7 6:NC 7:NC 8:NC 9:GND 10:NC 11:NC 12:SPI0_SCK 13:SPI0_MISO 14:SPI0_MOSI 15:GPIO5 16:GND
10	J2	VCC:3V3 DAT3/CS:GPIO8 DAT2:NC DAT1:NC DAT0/SDO:SPI0_MISO CLK/SCK:SPI0_SCK CMD/SDI:SPI0_MOSI DET:NC GND:GND

System breakdown structure



Mother board project