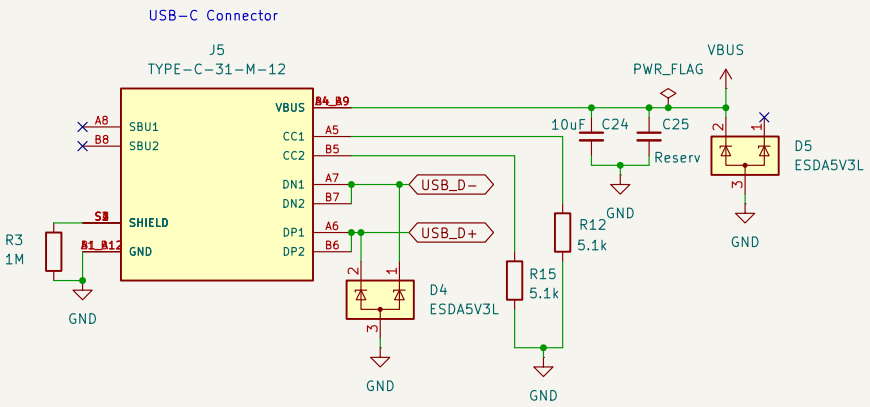
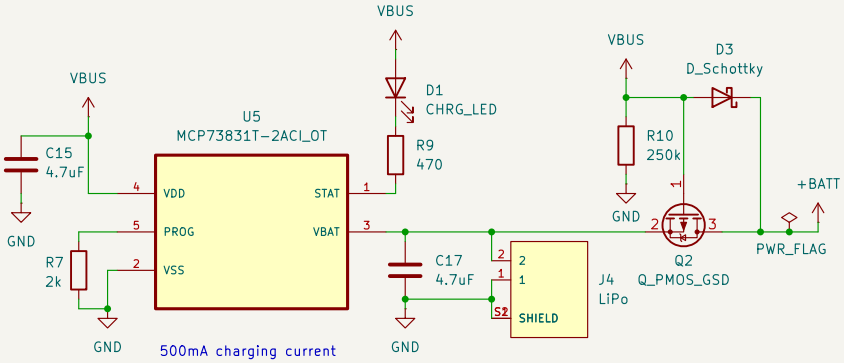
Mad Bot Schematics Tree

Power

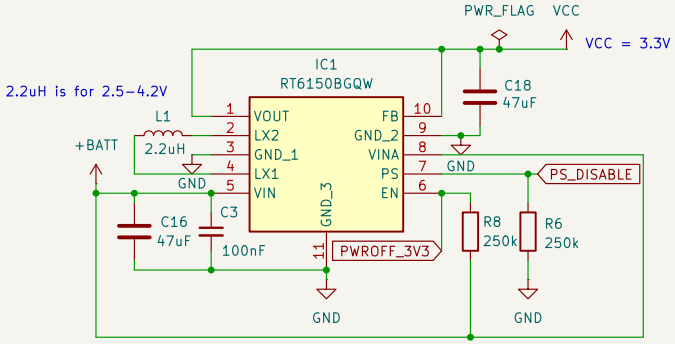


https://electronics.stackexchange.com/questions/644680/is-this-usb-circuit-with-esd-done-correctly

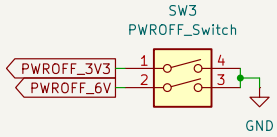
+BATT could be coming from battery or USB 5V



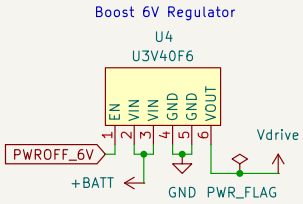
Buck-Boost 3.3V Regulator



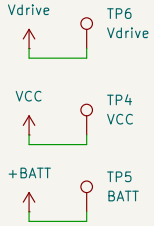
Imax = 800mA
Input Voltage Range: 1.8V to 5.5V



Boost 6V Regulator



Max Vin: 1.3V to 6V



Referenced: https://datasheets.raspberrypi.com/pico/pico-datasheet.pdf
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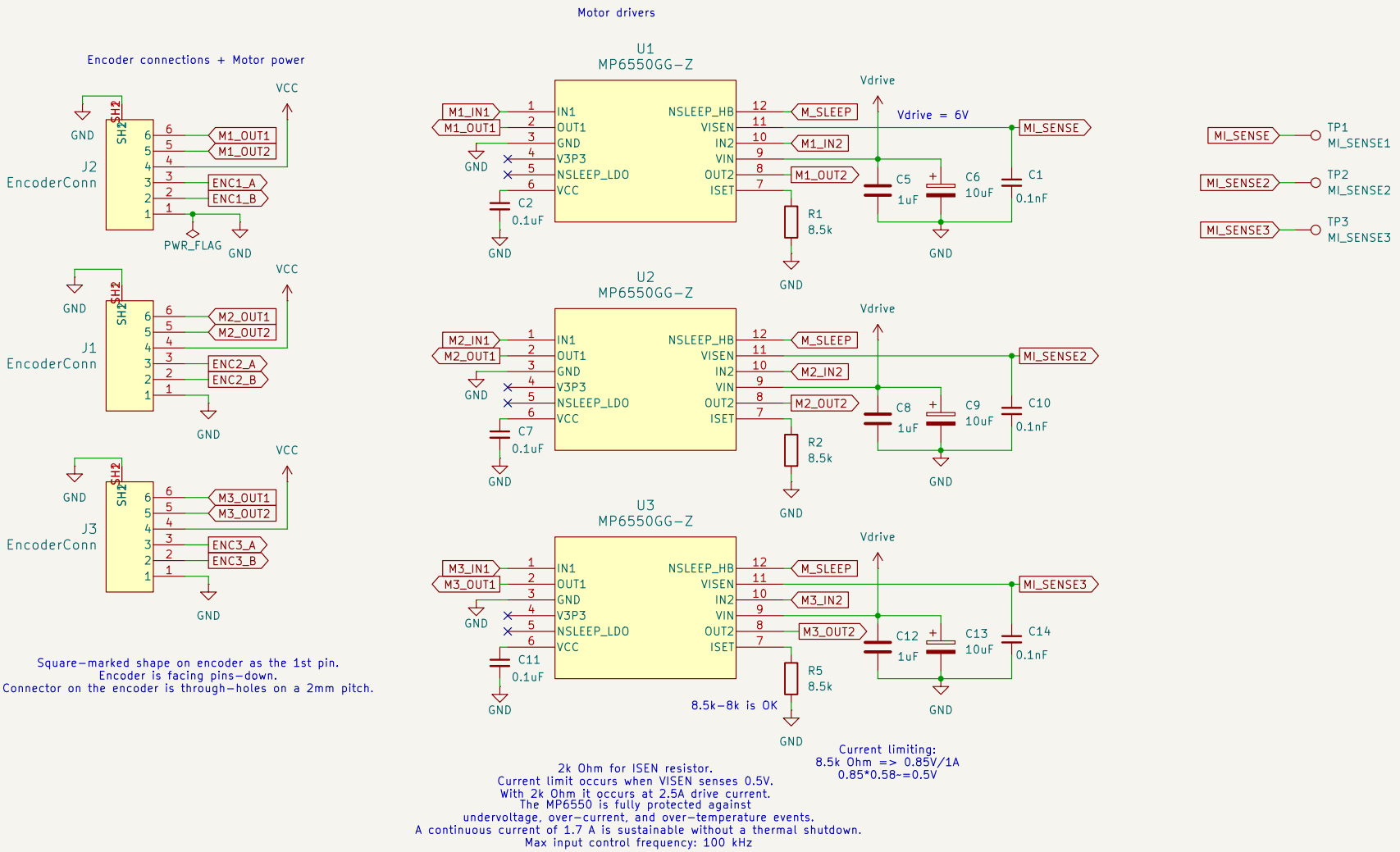
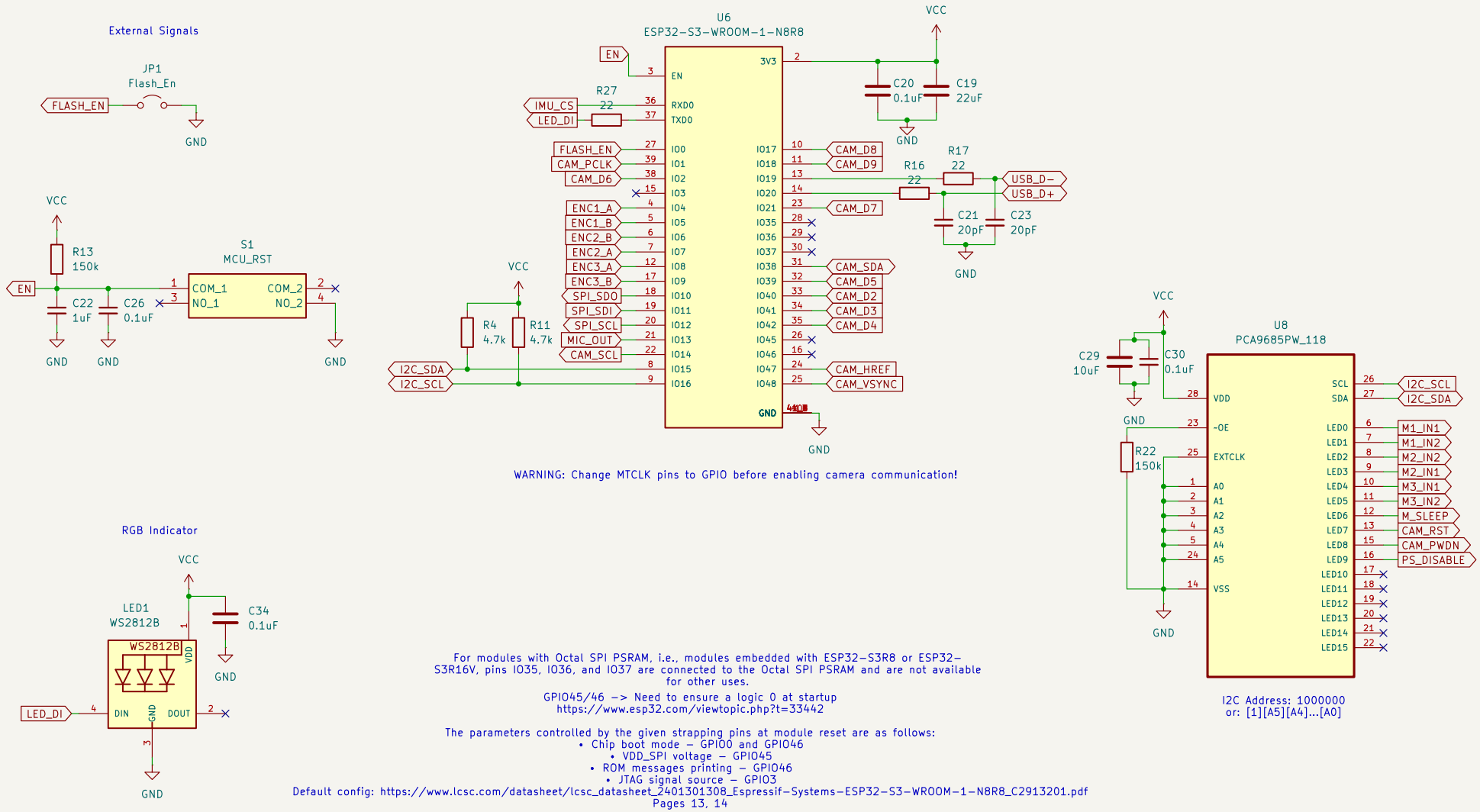
To ensure stability and excellent transient response, it is recommended to use a minimum of 10µF/X7R/1206 capacitors at the output. For surface mount applications, Taiyo Yuden or TDK ceramic capacitors, X7R series Multilayer Ceramic Capacitor is recommended. At least a 10µF input capacitor is recommended to improve transient behavior of the regulator and EMI behavior of the total power supply circuit. A ceramic capacitor placed as close as possible to the VIN and GND pins of the IC is recommended.


Encoder connections + Motor power
J2
EncoderConn
J1
EncoderConn
J3
EncoderConn
SH2
GND
VCC
M1_OUT1
M1_OUT2
ENC1_A
ENC1_B
PWR_FLAG
M2_OUT1
M2_OUT2
ENC2_A
ENC2_B
M3_OUT1
M3_OUT2
ENC3_A
ENC3_B
Square-marked shape on encoder as the 1st pin.
Encoder is facing pins-down.
Connector on the encoder is through-holes on a 2mm pitch.
Motor drivers
U1
MP6550GG-Z
U2
MP6550GG-Z
U3
MP6550GG-Z
IN1
OUT1
GND
V3P3
NSLEEP_LDO
VCC
NSLEEP_HB
VISEN
IN2
VIN
OUT2
ISET
M_SLEEP
M1_IN1
M1_IN2
M2_IN1
M2_IN2
M3_IN1
M3_IN2
Vdrive
Vdrive = 6V
MI_SENSE
MI_SENSE2
MI_SENSE3
C1
C2
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
0.1uF
1uF
10uF
R1
R2
R5
8.5k
8.5k-8k is OK
Current limiting:
8.5k Ohm => 0.85V/1A
0.85*0.58-=0.5V
TP1
MI_SENSE1
TP2
MI_SENSE2
TP3
MI_SENSE3
2k Ohm for ISEN resistor.
Current limit occurs when VISEN senses 0.5V.
With 2k Ohm it occurs at 2.5A drive current.
The MP6550 is fully protected against
undervoltage, over-current, and over-temperature events.
A continuous current of 1.7 A is sustainable without a thermal shutdown.
Max input control frequency: 100 kHz



For modules with Octal SPI PSRAM, i.e., modules embedded with ESP32-S3R8 or ESP32-S3R16V, pins IO35, IO36, and IO37 are connected to the Octal SPI PSRAM and are not available for other uses.

GPIO45/46 -> Need to ensure a logic 0 at startup
https://www.esp32.com/viewtopic.php?t=33442

The parameters controlled by the given strapping pins at module reset are as follows:
- Chip boot mode - GPIO0 and GPIO46
- VDD_SPI voltage - GPIO45
- ROM messages printing - GPIO46
- JTAG signal source - GPIO3

Default config: https://www.lcsc.com/datasheet/lcsc_datasheet_2401301308_Espressif-Systems-ESP32-S3-WROOM-1-N8R8_C2913201.pdf
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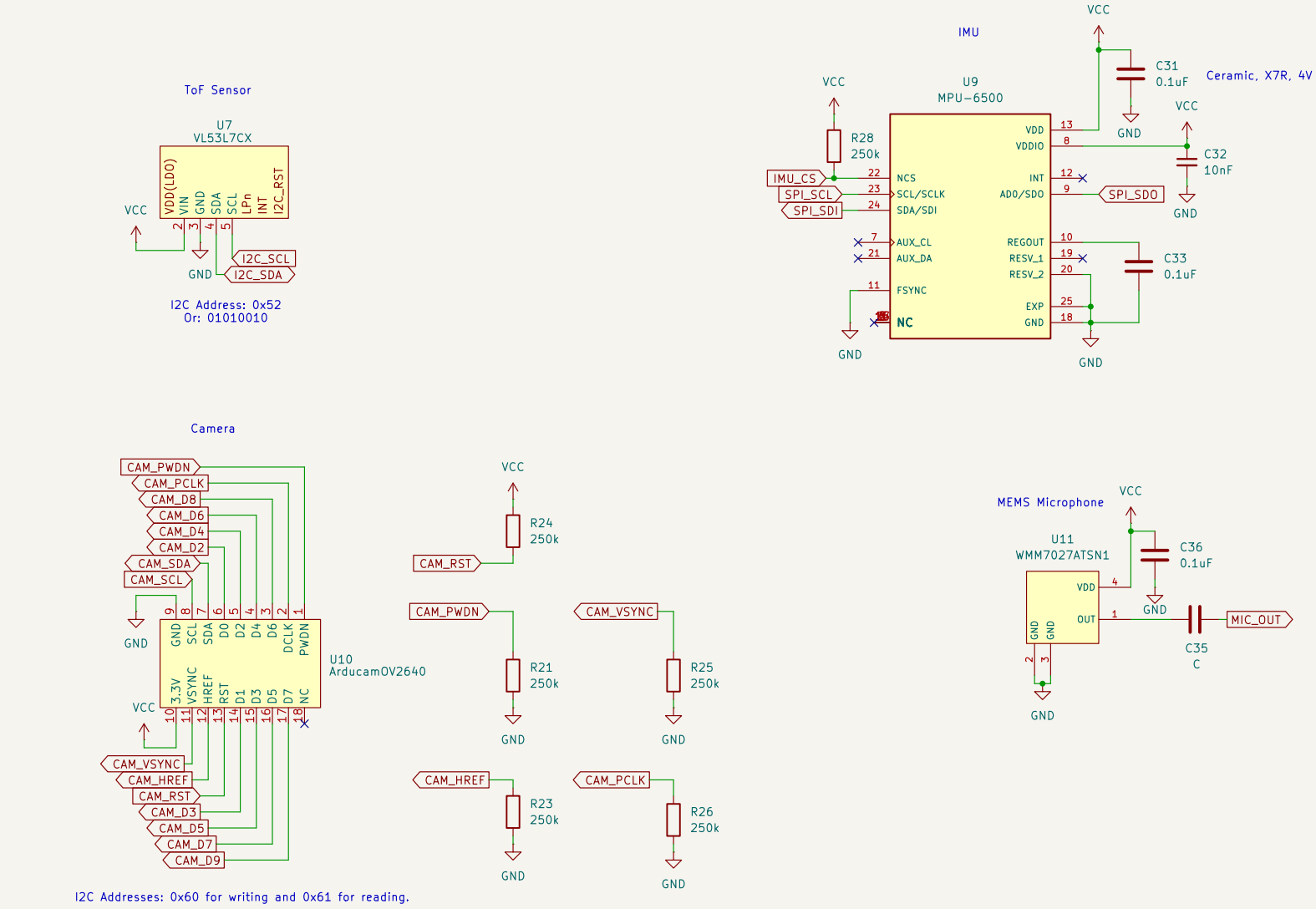
on using UART0 as a normal peripheral
it can be reconfigured to act as other peripherals
https://www.esp32.com/viewtopic.php?t=38137

TODO:
check schematics
go through schematic checklist: https://docs.espressif.com/projects/esp-hardware-design-guidelines/en/latest/esp32s3/esp-hardware-design-guidelines-en-master-esp32s3.pdf


ToF Sensor
U7
VL53L7CX
VDD(LDO)
VIN
GND
SDA
SCL
LPn
INT
I2C_RST
VCC
GND
I2C_SCL
I2C_SDA
I2C Address: 0x52
Or: 01010010
IMU
U9
MPU-6500
VCC
R28
250k
IMU_CS
SPI_SCL
SPI_SDI
NCS
SCL/SCLK
SDA/SDI
AUX_CL
AUX_DA
FSYNC
NC
VDD
VDDIO
INT
AD0/SDO
REGOUT
RESV_1
RESV_2
EXP
GND
SPI_SDO
C31
0.1uF
Ceramic, X7R, 4V
C32
10nF
C33
0.1uF
Camera
CAM_PWDN
CAM_PCLK
CAM_D8
CAM_D6
CAM_D4
CAM_D2
CAM_SDA
CAM_SCL
U10
ArducamOV2640
GND
SCL
SDA
D0
D2
D4
D6
DCLK
PWDN
3.3V
VSYNC
HREF
RST
D1
D3
D5
D7
NC
CAM_VSYNC
CAM_HREF
CAM_RST
CAM_D3
CAM_D5
CAM_D7
CAM_D9
R24
250k
R21
250k
R25
250k
R23
250k
R26
250k
I2C Addresses: 0x60 for writing and 0x61 for reading.
MEMS Microphone
U11
WMM7027ATSN1
VDD
OUT
MIC_OUT
C36
0.1uF
C35
C
TODO: see if any extra pins like interrupts can be connected to gpio expander
check SPI circuit
check I2C circuit