Also compatible: PIC32MZ0512EFF144-I/PL (~$13)

U1A
PIC32MZ2048EFH144-I/PL

Bump1	1	AN23/RG15	
Bump2	2	EBIA5/AN34/PMA5/RA5	
Bump3	3	EBID5/AN17/RPE5/PMD5/RE5	
Bump4	4	EBID6/AN16/PMD6/RE6	
RE7	5	EBID7/AN15/PMD7/RE7	
IC3	6	EBIA6/AN22/RPC1/PMA6/RC1	
RJ8	7	AN35/ETXDO/RJ8	
MotorCurrent1	8	AN36/ETXD1/RJ9	
Fault1	9	EBIBS0/RJ12	
	10	EBIBS1/RJ10	
U2TX	11	EBIA12/AN21/RPC2/PMA12/RC2	
U6TX	12	EBIWE/AN20/RPC3/PMWR/RC3	
IC4	13	EBIOE/AN19/RPC4/PMRD/RC4	
SCK2	14	AN14/C1IND/RPG6/SCK2/RG6	
SDI2	15	AN13/C1INC/RPG7/SDA4/RG7	
SDO2	16	AN12/C2IND/RPG8/SCL4/RG8	
	17	VSS	
	18	VDD	
	19	EBIA16/RK0	
	20	MCLR	
SS2*	21	EBIA2/AN11/C2INC/RPG9/PMA2/RG9	
	22	TMS/AN24/RA0	
SDI6	23	AN25/RPE8/RE8	
SDO6	24	AN26/RPE9/RE9	
U5RX	25	AN45/C1INA/RPB5/RB5	
Refl3	26	AN4/C1INB/RB4	
Refl2	27	AN37/ERXCLK/EREFCLK/RJ11	
RJ13	28	EBIA13/PMA13/RJ13	
RJ14	29	EBIA11/PMA11/RJ14	
RJ15	30	EBIA0/PMA0/RJ15	
U5TX	31	AN3/C2INA/RPB3/RB3	
	32	VSS	
	33	VDD	
	34	AN2/C2INB/RPB2/RB2	
U6RX	35	PGEC1/AN1/RPB1/RB1	
	36	PGED1/AN0/RPB0/RB0	
	72	OSC2/CLKO/RC15	LED5
	71	OSC1/CLKI/RC12	LED6
	70	AN33/RPD15/SCK6/RD15	SCK6
	69	AN32/RPD14/RD14	SS6*
	68	EBIA4/PMA4/RH7	LED3
	67	AN42/ERXD2/RH6	LED4
	66	AN41/ERXD1/RH5	LED1
	65	AN40/ERXERR/RH4	LED2
	64	VDD	
	63	VSS	
	62	AN10/RPB15/OCFB/RB15	SS3*
	61	AN9/RPB14/SCK3/RB14	SCK3
	60	AN8/RB13	Hold*
	59	AN7/RB12	Write Protect*
	58	TDO/AN31/RPF12/RF12	SS5*
	57	TDI/AN30/RPF13/SCK5/RF13	SCK5
	56	TCK/AN29/RA1	MotorCurrent2
	55	VDD	
	54	VSS	
	53	EBIA17/RK3	RK3
	52	EBIA3/PMA3/RK2	RK2
	51	EBIA1/PMA1/RK1	RK1
	50	AN6/RB11	Refl1
	49	CVREFOUT/AN5/RPB10/RB10	RB10
	48	EBIA7/AN49/RPB9/PMA7/RB9	SDI3
	47	EBIA10/AN48/RPB8/PMA10/RB8	SDO3
	46	RH3	RH3
	45	EBIRP/RH2	RH2
	44	AN39/ETXD3/RH1	RH1
	43	AN38/ETXD2/RH0	RH0
	42	AVSS	
	41	AVDD	
	40	VREF+/CVREF+/AN28/RA10	RA10
	39	VREF-/CVREF-/AN27/RA9	RA9
	38	PGED2/AN47/RPB7/RB7	U4TX
	37	PGEC2/AN46/RPB6/RB6	U4RX

U1B
PIC32MZ2048EFH144-I/PL

	73	VBUS	
	74	VUSB3V3	
	75	VSS	
	76	D-	
	77	D+	
	78	RPF3/USBID/RF3	
OC1	79	SDA3/RPF2/RF2	
Dir1	80	SCL3/RPF8/RF8	
IC2	81	ERXDO/RH8	
Switch1	82	ERXD3/RH9	
Switch2	83	ECOL/RH10	
Switch3	84	EBIRDY2/RH11	
SCL2	85	SCL2/RA2	
SDA2	86	EBIRDY1/SDA2/RA3	
Fault2	87	EBIA14/PMCS1/PMA14/RA4	
	88	VDD	
	89	VSS	
	90	EBIA9/RPF4/SDA5/PMA9/RF4	
	91	EBIA8/RPF5/SCL5/PMA8/RF5	
U1RX	92	EBIA18/RK4	
U1TX	93	EBIA19/RK5	
USB_RST	94	EBIA20/RK6	
	95	RPA14/SCL1/RA14	
SDO4	96	RPA15/SDA1/RA15	
SS4*	97	EBIA15/RPD9/PMCS2/PMA15/RD9	
SCK4	98	RPD10/SCK4/RD10	
SDI4	99	EMDC/RPD11/RD11	
RH12	100	ECRS/RH12	
RH13	101	ERXDV/ECRSDV/RH13	
RH14	102	RH14	
RH15	103	EBIA23/RH15	
IC1	104	RPD0/RTCC/INT0/RD0	
	105	SOSCI/RPC13/RC13	
	106	SOSCO/RPC14/T1CK/RC14	
	107	VDD	
	108	VSS	
	144	EBID4/AN18/PMD4/RE4	RE4
	143	EBID3/RPE3/PMD3/RE3	U2RX
	142	EBID2/PMD2/RE2	GPS_Reset
	141	TRD0/SQID0/RG13	GPS_INT
	140	TRD1/SQID1/RG12	RG12
	139	TRD2/SQID2/RG14	RG14
	138	EBID1/PMD1/RE1	RE1
	137	VDD	
	136	VSS	
	135	EBID0/PMD0/RE0	
	134	EBICS3/RJ7	
	133	EBICS2/RJ6	
	132	EBICS1/RJ5	Status_Green
	131	EBICS0/RJ4	Status_Yellow
	130	TRD3/SQID3/RA7	
	129	TRCLK/SQICLK/RA6	
	128	EBID8/RPG0/PMD8/RG0	SDO5
	127	EBID9/RPG1/PMD9/RG1	SDI5
	126	EBIA21/RK7	
	125	EBID10/RPF1/PMD10/RF1	
	124	EBID11/RPF0/PMD11/RF0	
	123	VSS	
	122	VDD	
	121	ETXCLK/RPD7/RD7	U3RX
	120	ETXEN/RPD6/RD6	U3TX
	119	SQICS1/RPD5/RD5	OC2
	118	SQICS0/RPD4/RD4	SS1*
	117	EBIA22/RJ3	Dir2
	116	EBIRDY3/RJ2	
	115	EMDIO/RJ1	
	114	ETXERR/RJ0	
	113	EBID13/PMD13/RD13	IMU_INT2
	112	EBID12/RPD12/PMD12/RD12	IMU_INT1
	111	EBID15/RPD3/PMD15/RD3	SDO1
	110	EBID14/RPD2/PMD14/RD2	SDI1
	109	RPD1/SCK1/RD1	SCK1

OtherSensors
File: OtherSensors.kicad_sch

Bumper/ Cliff Sensors

BUMP1 Bump1, BUMP2 Bump2, BUMP3 Bump3, BUMP4 Bump4, Refl1 Refl1, Refl2 Refl2, Refl3 Refl3, 3V3 +3.3V, GND GND

Buttons
File: Buttons.kicad_sch

Buttons

Switch1 Switch1, Switch2 Switch2, Switch3 Switch3, 3V3 +3.3V, GND GND

IMU
File: IMU.kicad_sch

IMU

SCK1 SCK1, SDO1 SDO1, SS1* SS1*, SDI1 SDI1, IMU_INT1 IMU_INT1, IMU_INT2 IMU_INT2, 3V3 +3.3V, GND GND

USB
File: USB.kicad_sch

USB

U1TX U1TX, U1RX U1RX, USB Reset USB_RST, 3V3 +3.3V, GND GND

GPIO
File: GPIO.kicad_sch

GPIO

RE7 RE7, RJ8 RJ8, RJ13 RJ13, RJ14 RJ14, RJ15 RJ15, RK1 RK1, RK2 RK2, RK3 RK3, RA9 RA9, RA10 RA10

RH0 RH0, RH1 RH1, RH2 RH2, RH3 RH3, RH12 RH12, RH13 RH13, RH14 RH14, RH15 RH15, RB10 RB10, RE4 RE4, RG12 RG12, RG14 RG14, RE1 RE1

Power
File: Power.kicad_sch

Power

Vdrive Vdrive, 5VD +5V, 3V3 +3.3V, GND GND

SW1 Reset
R1 10k, R2 1k, C1 0.1 uF

SNAP Program J1
6 PGEC1, 5 PGED1, 1 MCLR

Decoupling
C2 0.1 uF, C3 0.1 uF, C4 0.1 uF, C5 0.1 uF, C6 0.1 uF, C7 0.1 uF, C8 0.1 uF, C9 0.1 uF, C10 0.1 uF

H1 MountingHole, H2 MountingHole, H3 MountingHole, H4 MountingHole

GPS
Figure out antenna

File: GPS.kicad_sch

GPS_Reset GPS_Reset, GPS_INT GPS_INT, U2TX U2TX, U2RX U2RX, 3V3 +3.3V, GND GND

LED
File: LED.kicad_sch

Status_Green Status_Green, Status_Yellow Status_Yellow, LED1 LED1, LED2 LED2, LED3 LED3, LED4 LED4, LED5 LED5, LED6 LED6, 3V3 +3.3V, GND GND

SPI_UART
File: SPI_UART.kicad_sch

SDA2 SDA2, SCL2 SCL2, U3TX U3TX, U4TX U4TX, U5TX U5TX, U6TX U6TX, SCK2 SCK2, SS2* SS2*, SDO2 SDO2, SCK3 SCK3, SS3* SS3*, SDO3 SDO3, SCK4 SCK4, SS4* SS4*, SDO4 SDO4

U3RXD U3RX, U4RXD U4RX, U5RXD U5RX, U6RXD U6RX, SDI2 SDI2, SDI3D SDI3, SDI4 SDI4, GND GND

Memory
File: Memory.kicad_sch

SCK6 SCK6, SS6* SS6*, SDO6 SDO6, SCK5 SCK5, SS5* SS5*, SDO5 SDO5, Hold* Hold*, Write Protect* Write Protect*, 3V3 +3.3V

SDI6D SDI6, SDI5D SDI5, GND GND

Motor
File: Motor.kicad_sch

OC1 OC1, OC2 OC2, Dir1 Dir1, Dir2 Dir2, Vdrive Vdrive, 3V3 +3.3V, GND GND

IC1D IC1, IC2D IC2, IC3D IC3, IC4D IC4, Fault1D Fault1, Fault2D Fault2, MotorCurrent1D MotorCurrent1, MotorCurrent2D MotorCurrent2

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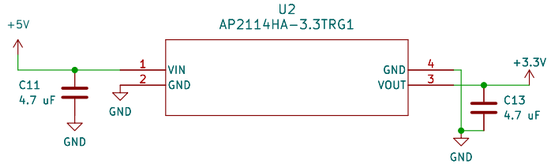
Sheet: /
File: MainBoard.kicad_sch

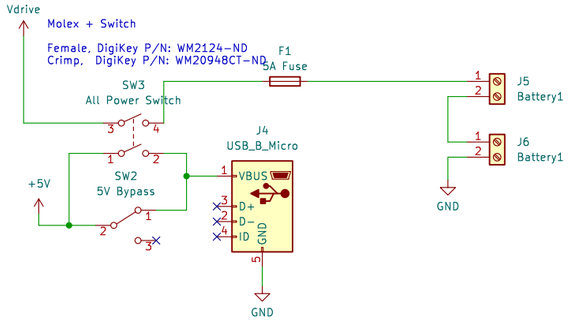
Title: MCU Controller

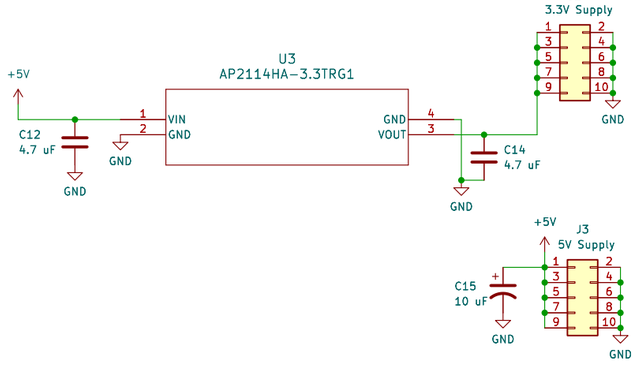
Size: B	Date: 2024-03-10	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 1/12

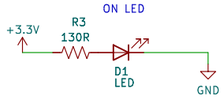
Inputs:
1) Motor Battery: 2x NiMH Battery, 7.2 V Each
2) Battery For Jetson: 12 V
3) Battery for MCU: 5 V

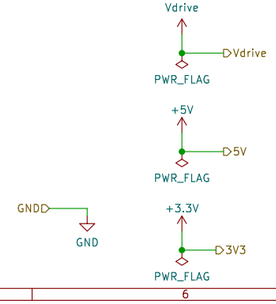
Allow MCU 3.3V/5V to be supplied by motor battery or external 5 V battery











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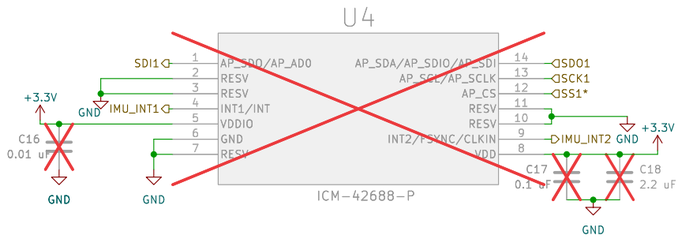
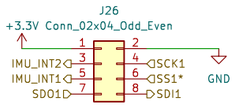
Sheet: /Power/
File: Power.kicad_sch

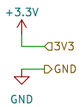
Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 2/12

6 Axis IMU: Accel + Gyro, Temperature







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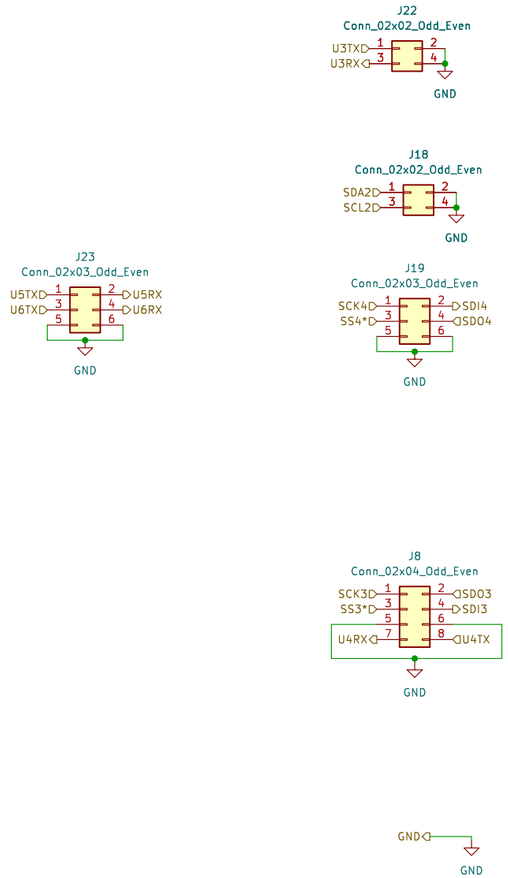
Sheet: /IMU/
File: IMU.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 3/12



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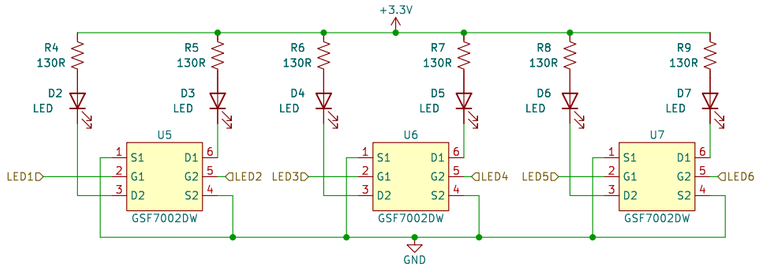
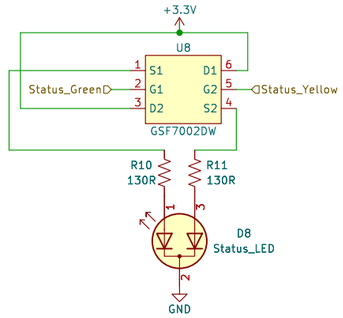
Sheet: /SPI_UART/
File: SPI_UART.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 4/12





2.54 mm Lead spacing

Corresponding Female: DigiKey PN 900-0022013037-ND
Corresponding Crimp : DigiKey PN WM2756CT-ND

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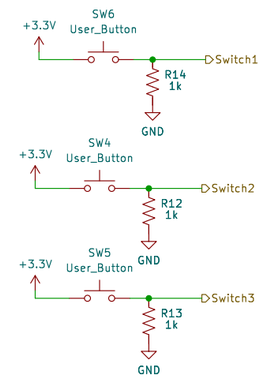
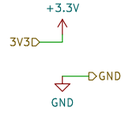
Sheet: /LED/
File: LED.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 5/12

Corresponding Female: DigiKey PN 900-0022013027-ND
Corresponding Crimp : DigiKey PN WM2756CT-ND
Button   : DigiKey PN EG2025-ND





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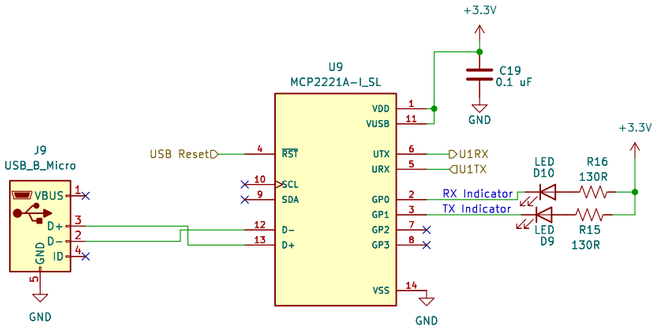
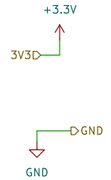
Sheet: /Buttons/
File: Buttons.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 6/12





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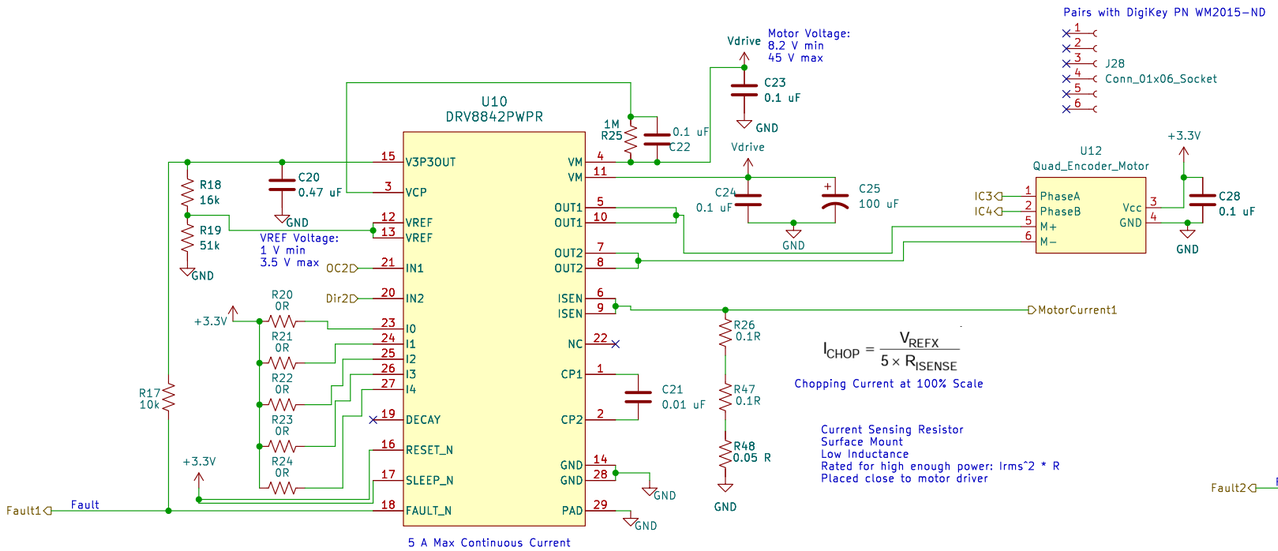
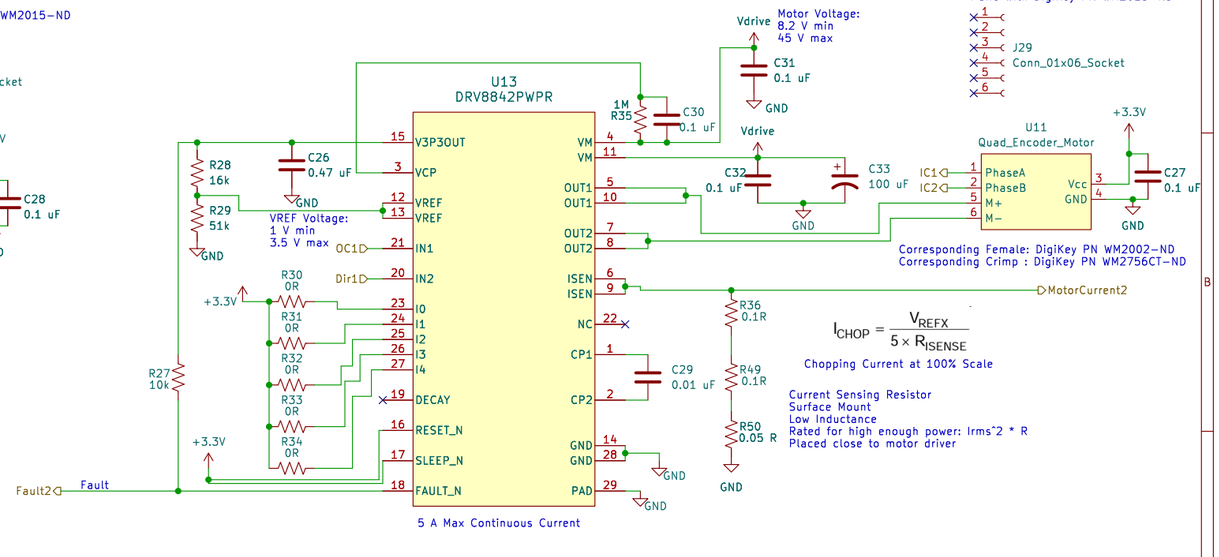
Sheet: /USB/
File: USB.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 7/12





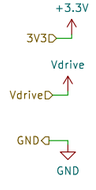
xIN1	xIN2	xOUT1	xOUT2
0	0	L	L
0	1	L	H
1	0	H	L
1	1	H	H

PWM Frequency:
100 kHz max

Slow Decay: Logic low
Mixed Decay: Open
Fast Decay: Logic high

I0 – I4 Function

I[4..0]	RELATIVE CURRENT (% FULL-SCALE CHOPPING CURRENT)
0x00h	0%
0x01h	5%
0x02h	10%
0x03h	15%
0x04h	20%
0x05h	24%
0x06h	29%
0x07h	34%
0x08h	38%
0x09h	43%
0x0Ah	47%
0x0Bh	51%
0x0Ch	56%
0x0Dh	60%
0x0Eh	63%
0x0Fh	67%
0x10h	71%
0x11h	74%
0x12h	77%
0x13h	80%
0x14h	83%
0x15h	86%
0x16h	88%
0x17h	90%
0x18h	92%
0x19h	94%
0x1Ah	96%
0x1Bh	97%
0x1Ch	98%
0x1Dh	99%
0x1Eh	100%
0x1Fh	100%



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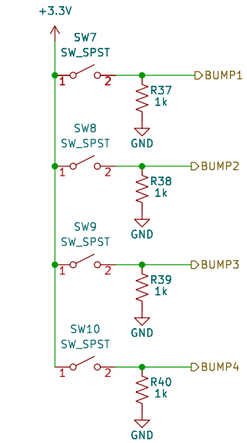
Sheet: /Motor/
File: Motor.kicad_sch

Title: MCU Controller

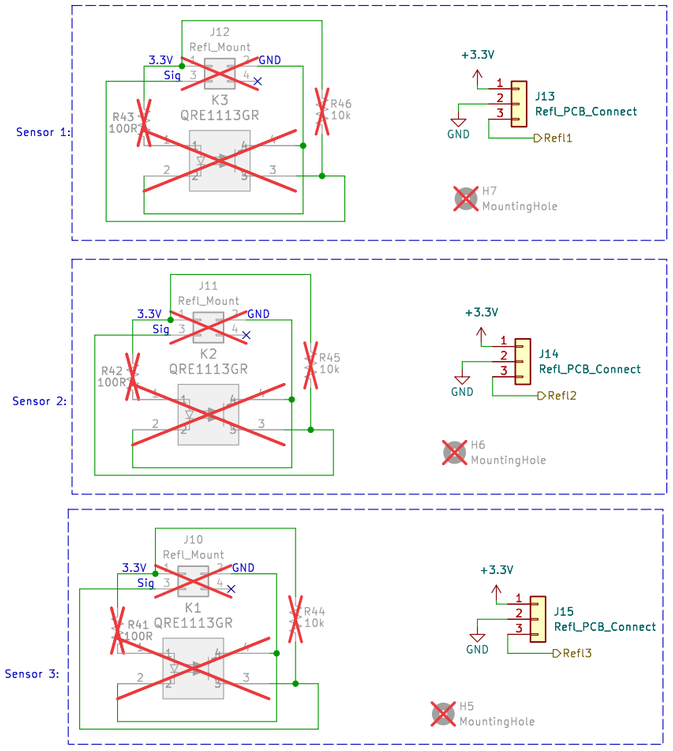
Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 8/12

Bumper Sensors



Corresponding Female: DigiKey PN 900-0022013027-ND
Corresponding Crimp : DigiKey PN WM2756CT-ND
Limit Switch : DigiKey PN _____

Reflective Optical Sensors (Cliff Sensor)



Corresponding Female: DigiKey PN 900-0022013037-ND
Corresponding Crimp : DigiKey PN WM2756CT-ND

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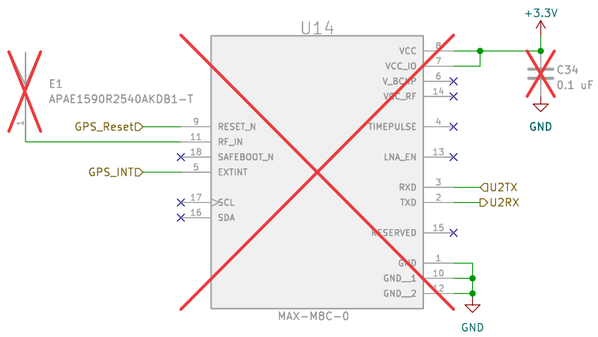
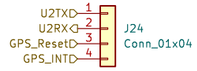
Sheet: /OtherSensors/
File: OtherSensors.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
KiCad E.D.A. kicad 7.0.6		Id: 9/12





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Sheet: /GPS/
File: GPS.kicad_sch

Title: MCU Controller

Size: B	Date:	**Rev: 0.2**
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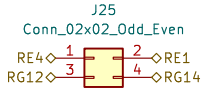

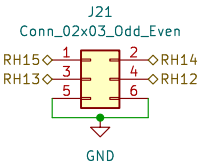

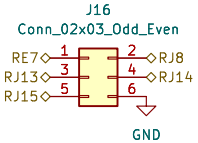

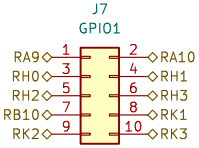

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Sheet: /GPIO/
File: GPIO.kicad_sch

Title: MCU Controller

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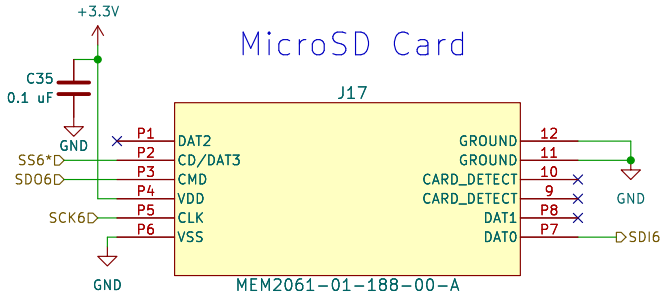
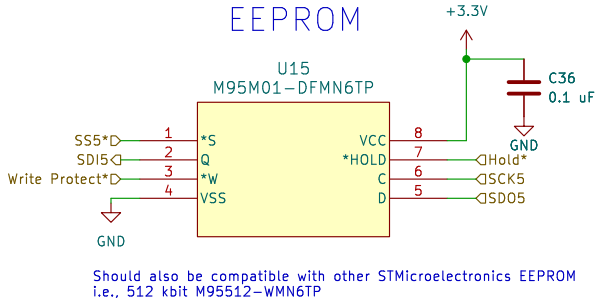
KiCad E.D.A. kicad 7.0.6		Id: 11/12





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Sheet: /Memory/
File: Memory.kicad_sch

Title: MCU Controller

Size: A4	Date:	**Rev: 0.2**
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