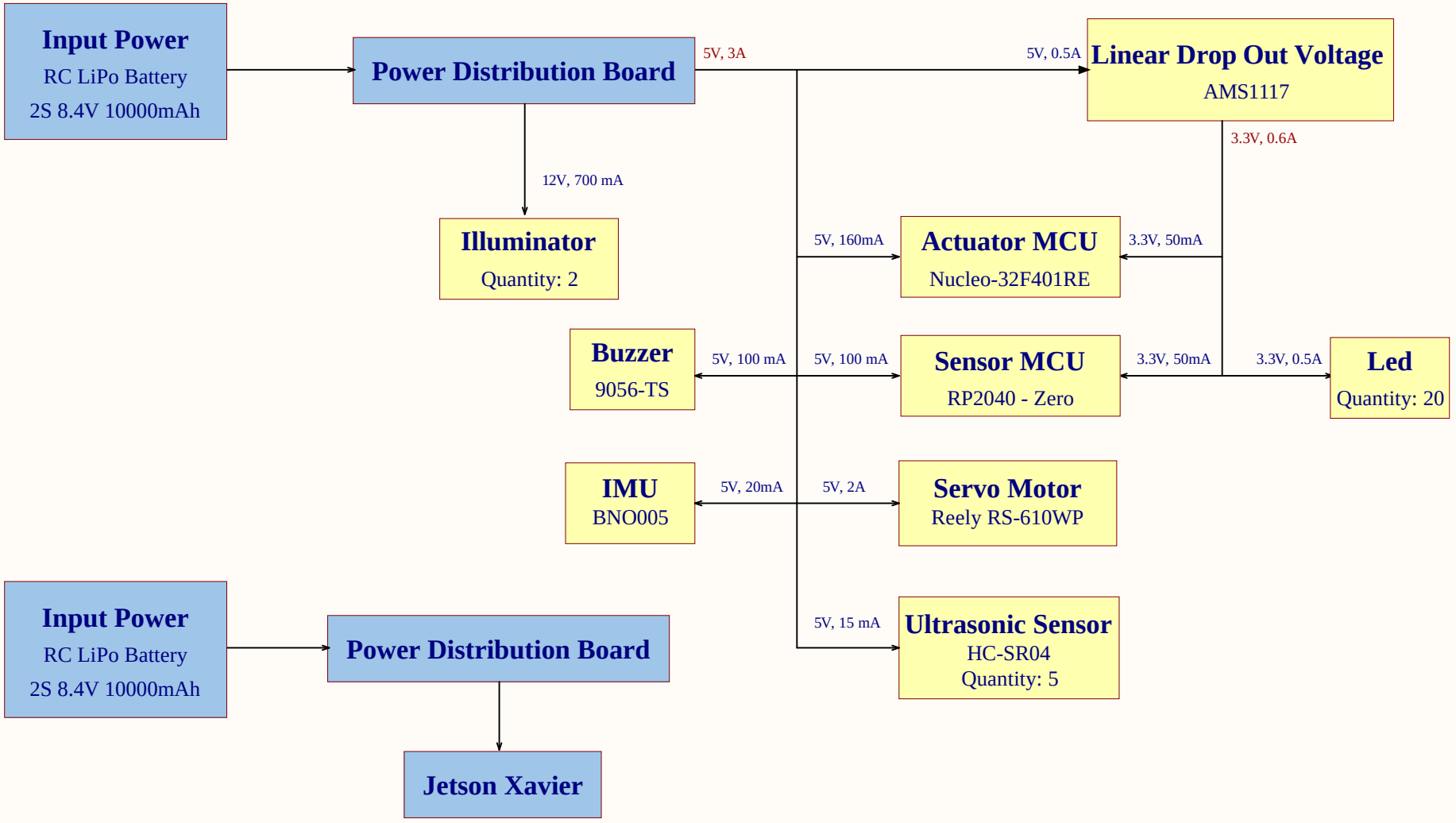
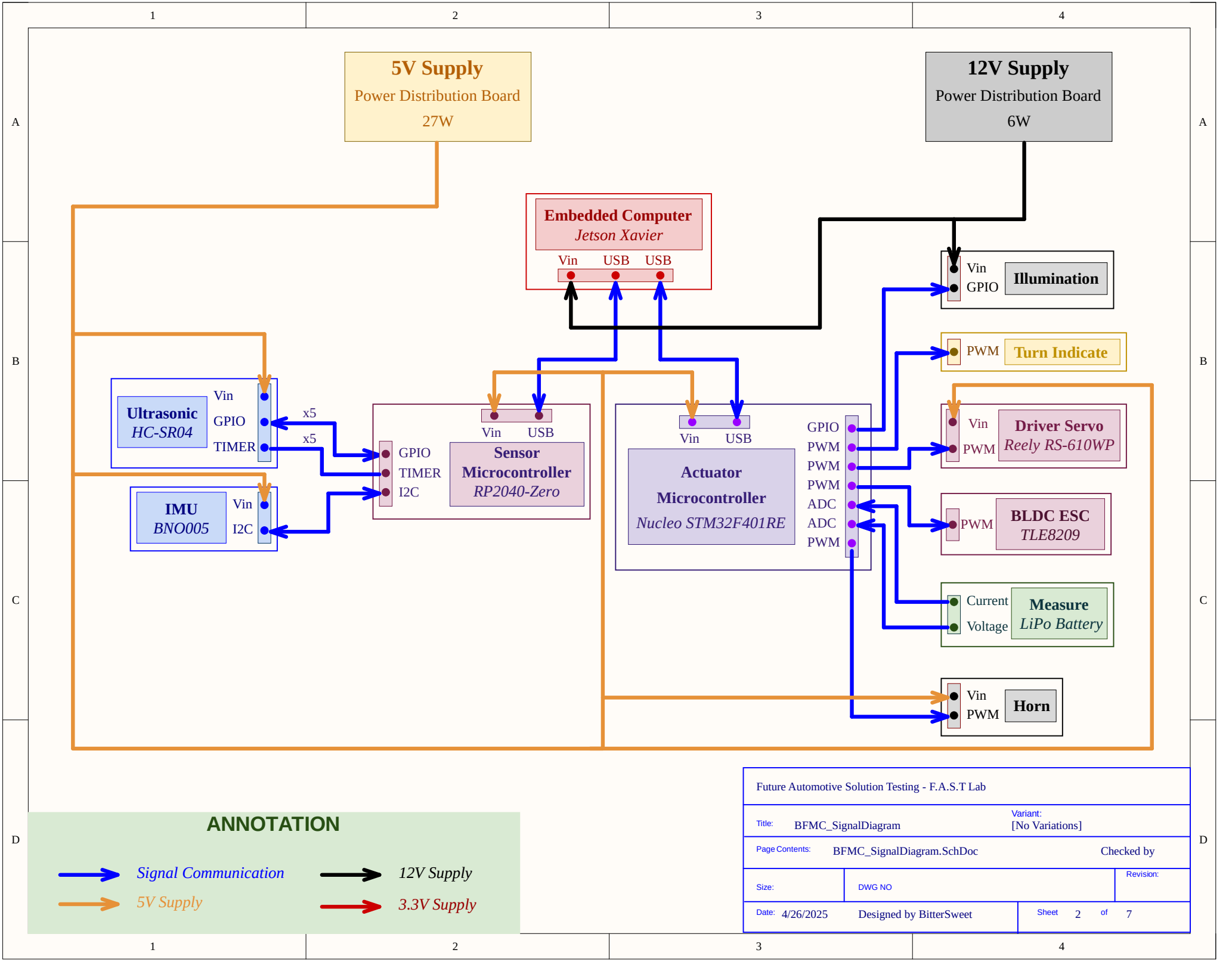


ANNOTATION

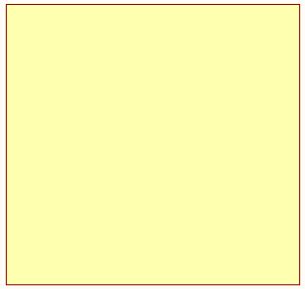
Not include in Board

Include in Board

Future Automotive Solution Testing - F.A.S.T Lab			
Title: BFMC_PowerDiagram		Variant: [No Variations]	
Page Contents: BFMC_PowerDiagram.SchDoc			Checked by
Size:	DWG NO		Revision:
Date: 4/26/2025	Designed by BitterSweet	Sheet 1 of 7	


5V Supply
Power Distribution Board
27W
12V Supply
Power Distribution Board
6W
Embedded Computer
Jetson Xavier
Vin
USB
USB
Vin
GPIO
Illumination
PWM
Turn Indicate
Ultrasonic
HC-SR04
Vin
GPIO
TIMER
x5
x5
IMU
BNO005
Vin
I2C
GPIO
TIMER
I2C
Sensor
Microcontroller
RP2040-Zero
Vin
USB
Actuator
Microcontroller
Nucleo STM32F401RE
Vin
USB
GPIO
PWM
PWM
PWM
ADC
ADC
PWM
Vin
PWM
Driver Servo
Reely RS-610WP
PWM
BLDC ESC
TLE8209
Current
Voltage
Measure
LiPo Battery
Vin
PWM
Horn
ANNOTATION
Signal Communication
12V Supply
5V Supply
3.3V Supply
Future Automotive Solution Testing - F.A.S.T Lab
Title: BFMC_SignalDiagram
Variant: [No Variations]
Page Contents: BFMC_SignalDiagram.SchDoc
Checked by
Size:
DWG NO
Revision:
Date: 4/26/2025
Designed by BitterSweet
Sheet 2 of 7

POWER DIAGRAM



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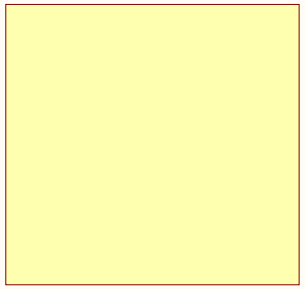
SIGNAL DIAGRAM



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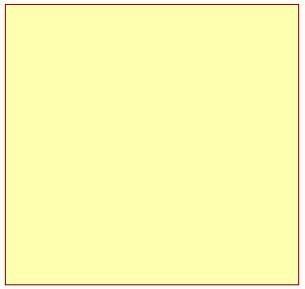
POWER DISTRIBUTION



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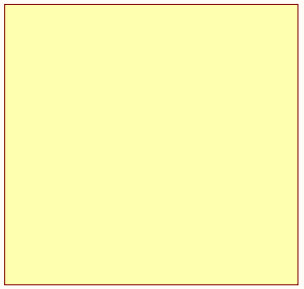
STM32 NUCLEO F401RE



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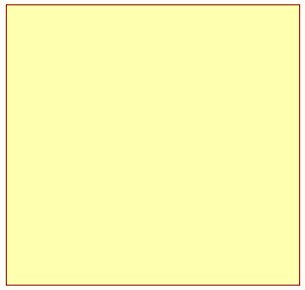
RP2040 ZERO



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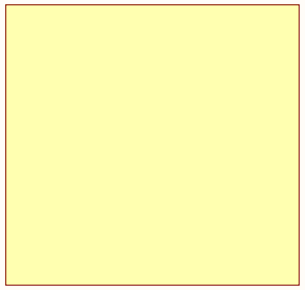
SENSOR PROCESSING



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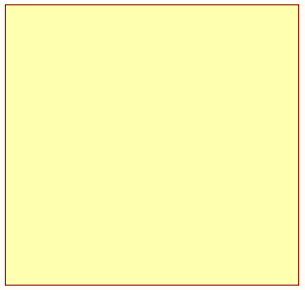
ACTUATOR SYSTEM



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Future Automotive Solution Testing - F.A.S.T Lab			
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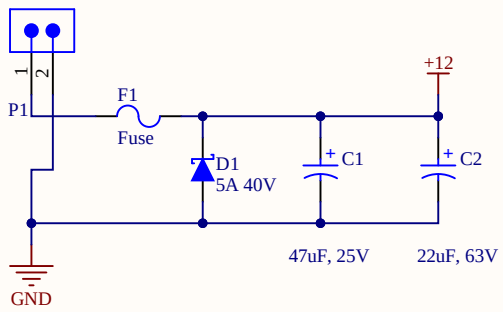
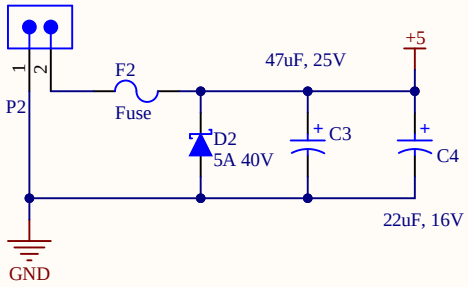
Page Contents: BFMC_FileInfo.SchDoc			Checked by
Size:	DWG NO		Revision:
Date: 4/26/2025	Designed by BitterSweet	Sheet 3 of 7	

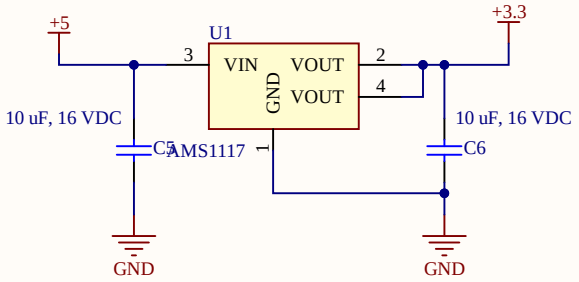
Power Supply 12V



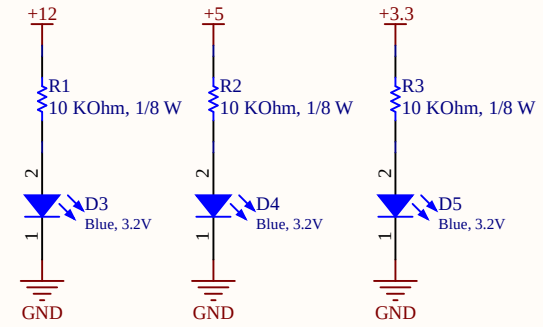
Power Suppy 5V



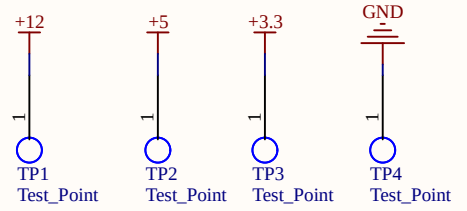
Linear Drop Out 3.3V



LED



Test Point



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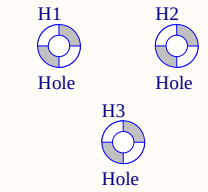
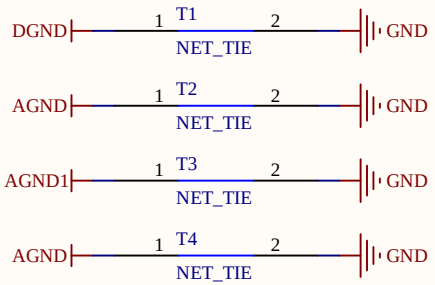


Net Tie



BFMC 2024 - The Newbie			
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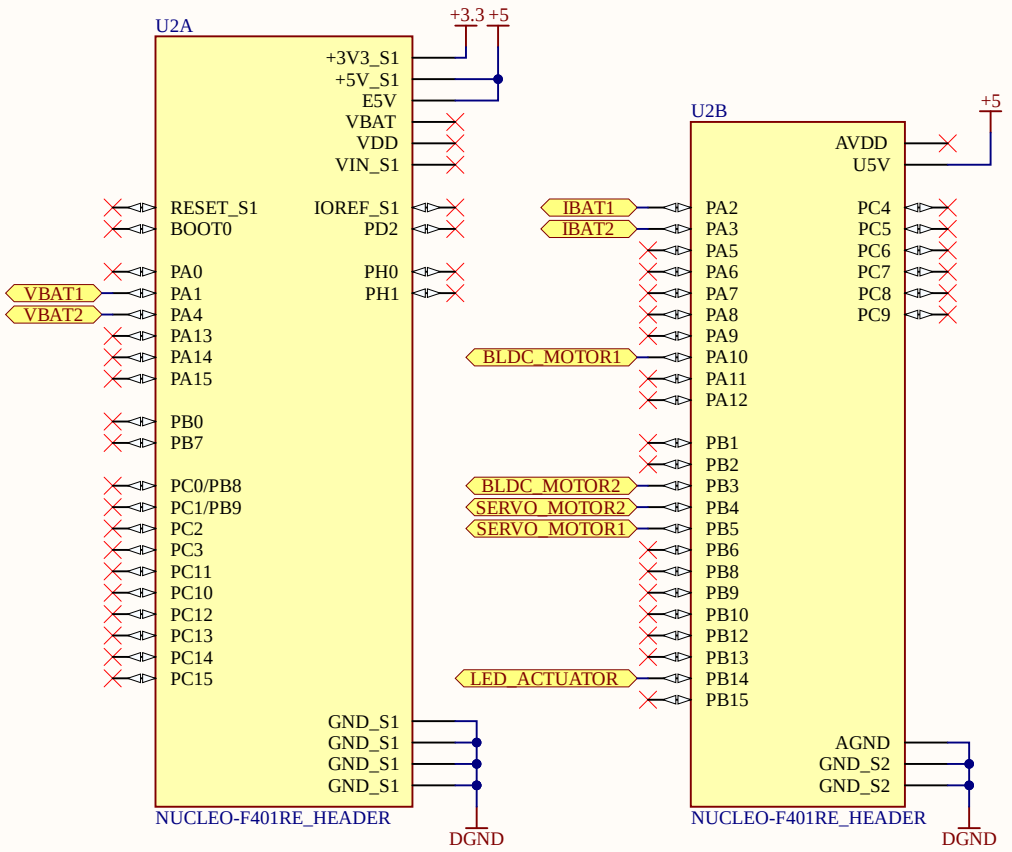
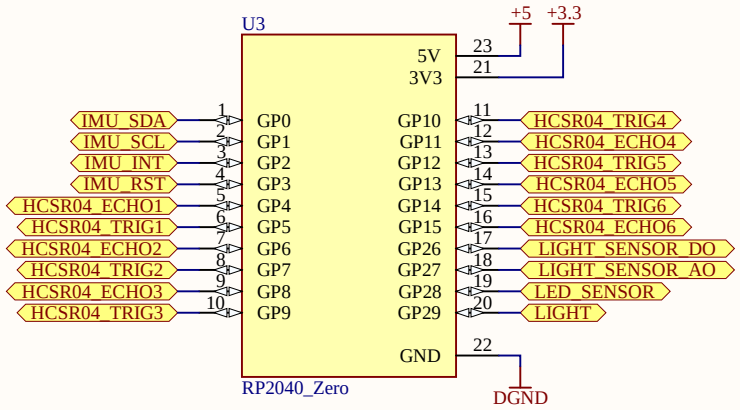
Page Contents: BFMC_PowerDistribution.SchDoc			Checked by
Size:	DWG NO		Revision:
Date: 4/26/2025	Designed by BitterSweet	Sheet 4 of 7	

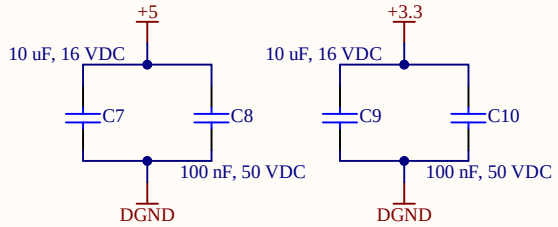
Actuator Processing MCU



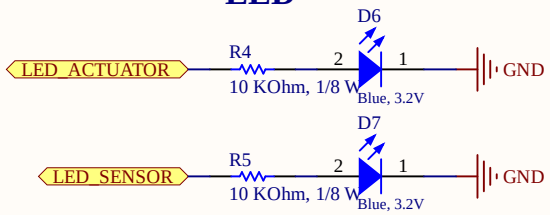
Sensor Reading MCU



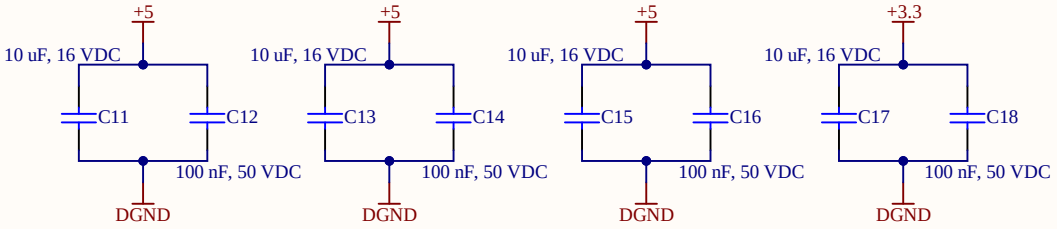
Power Supply Control MCU



LED



Power Supply MCU

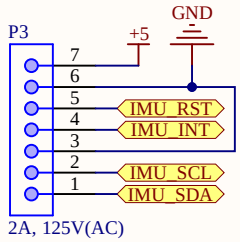


BFMC 2024 - The Newbie

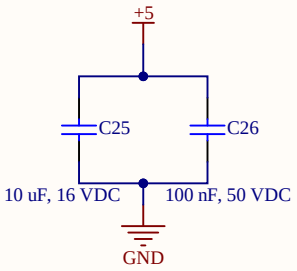
Title: BFMC_ProcessingAllBoard		Variant: [No Variations]	
Page Contents: BFMC_Microcontrollers.SchDoc			Checked by
Size:	DWG NO		Revision:
Date: 4/26/2025	Designed by BitterSweet	Sheet 5 of 7	

IMU - BNO055

IMU Connector



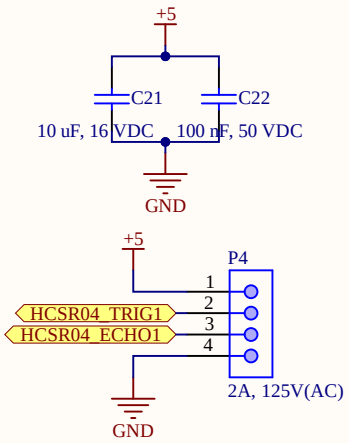
Filter Supply



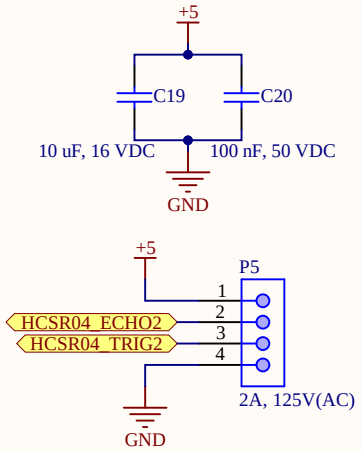
Important Note:

Try to keep high frequency lines/wires away from the BNO055!

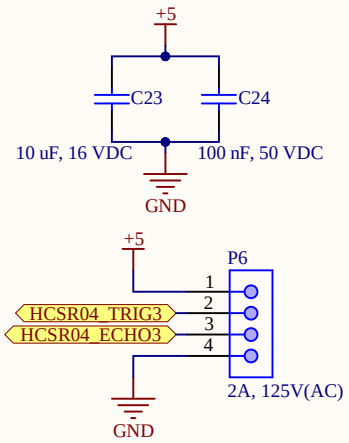
HC-SR04 - 1



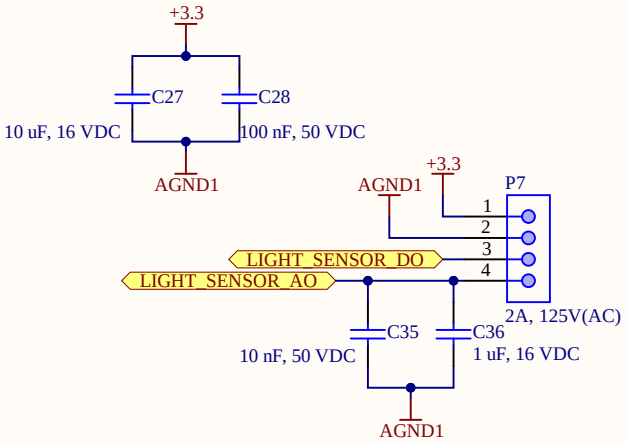
HC-SR04 - 2



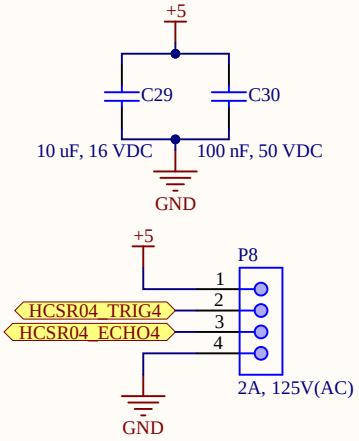
HC-SR04 - 3



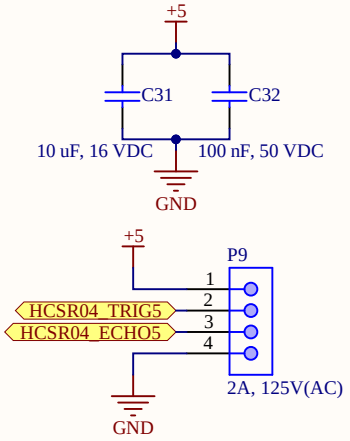
LM393 - Light Sensor



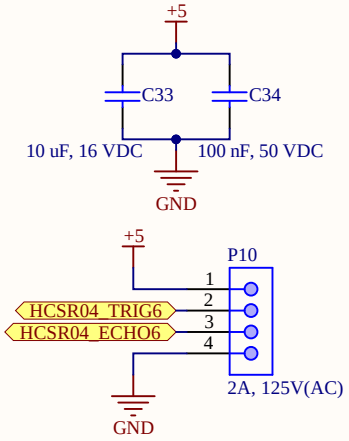
HC-SR04 - 4



HC-SR04 - 5



HC-SR04 - 6



BFMC 2024 - The Newbie		
Title: BFMC_ProcessingAllBoard		Variant: [No Variations]
Page Contents: BFMC_SensorProcessing.SchDoc		Checked by
Size:	DWG NO	Revision:
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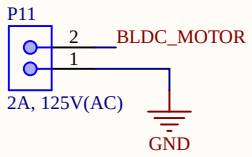
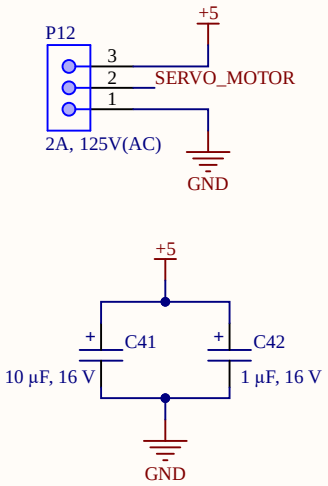
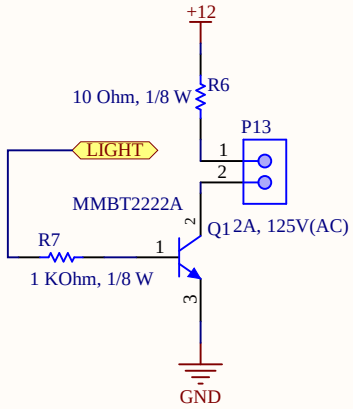
BLDC Motor



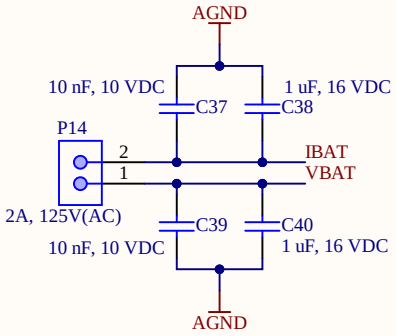
Servo Motor



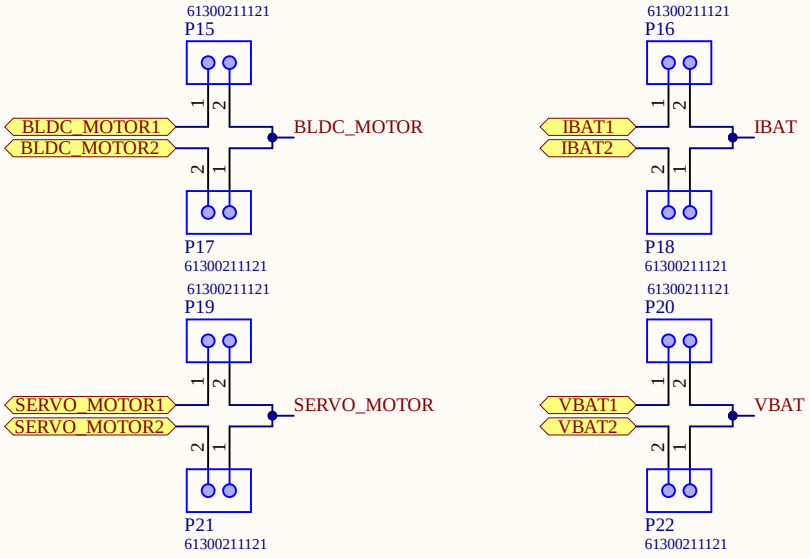
Light Control



Battery Tracking



Backup Pin



BFMC 2024 - The Newbie			
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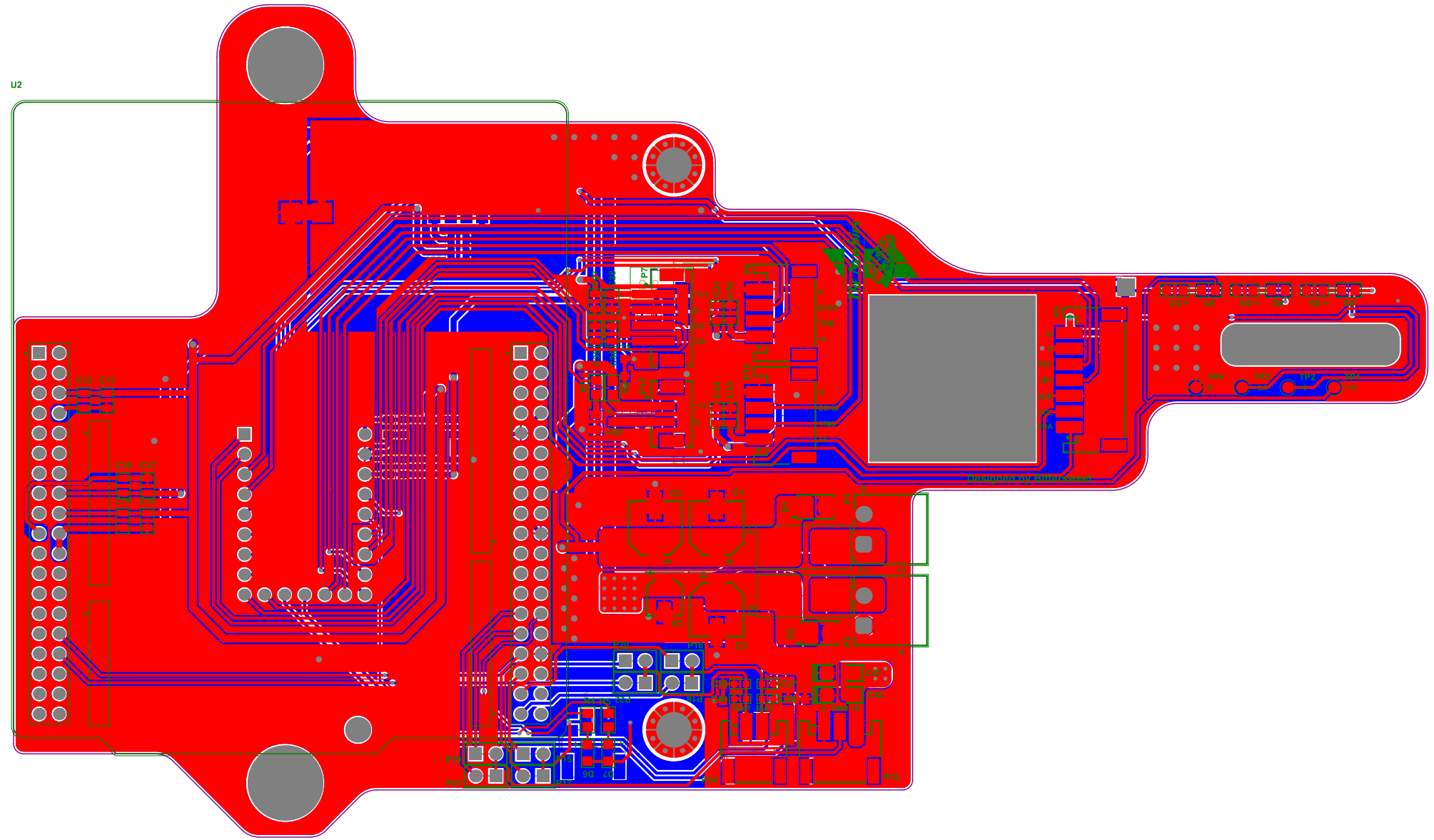
Size:	DWG NO		Revision:
Date: 4/26/2025	Designed by BitterSweet	Sheet 7 of 7	


U2
НЗ

Comment	Description	Designator	Footprint	LibRef	Quantity
47uF, 25V	V-Chip, D6.3 x H5.5mm, 47uF, 25V	C1, C3	WCAP-ASLI_D6.3H5.5	865080443007	2
22uF, 63V	V-Chip, D6.3 x H7.7mm, 22uF, 63V	C2	WCAP-ASLI_D6.3H7.7	865080745011	1
22uF, 16V	V-Chip, D4 x H5.5mm, 22uF, 16V	C4	WCAP-ASLI_D4H5.5	865080340003	1
10 uF, 16 VDC	CAP, size 0805, 10 uF, 16 VDC	C5, C6, C7, C9, C11, C13, C15, C17, C19, C21, C23, C25, C27, C29, C31, C33	CAP_0805	0108051061016	16
100 nF, 50 VDC	CAP, size 0805, 100 nF, 50 VDC	C8, C10, C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C34	CAP_0805	0108051031050	14
10 nF, 50 VDC	CAP, size 0805, 10 nF, 50 VDC	C35	CAP_0805	0108051031050	1
1 uF, 16 VDC	CAP, size 0805, 1 uF, 16 VDC	C36	CAP_0805	0108051051016	1
10 nF, 10 VDC	CAP, size 0603, 10 nF, 10 VDC	C37, C39	CAP_0603	0106031061010	2
1 uF, 16 VDC	CAP, size 0603, 1 uF, 16 VDC	C38, C40	CAP_0603	0106031051016	2
10 µF, 16 V	CAP TANT 10uF 10% 16V 1206	C41	TANTALUM SMD A	01120610610	1
1 µF, 16 V	CAP TANT 1uF 10% 16V 1206	C42	TANTALUM SMD A	01120610510	1
5A 40V	SS54 SMC Diode Schottky 5A 40V	D1, D2	DO-214AB, SMA	Diode_Schottky	2
Blue, 3.2V	WL-SMCW SMT Mono-color Chip LED Blur, size 0805, Blue, 3.2V, 140deg	D3, D4, D5, D6, D7	WL-SMCW_0805	160805BlueBlur	5
Fuse	Fuse	F1, F2	FuseHolder1808	Fuse	2
Hole	Hole	H1, H2	Hole_3.2mm	Hole	2
Hole	Hole	H3	HOLE_RECTANGLE	Hole	1
10A, 300V	WR-TBL Series 322 Horizontal PCB Header, THT, pitch 3.81mm, 2p	P1, P2	691322310002	691322310002	2
2A, 125V(AC)	WR-WTB SMT Male Horizontal Shrouded Header, pitch 2mm, 7p	P3	620107131822	620107131822	1
2A, 125V(AC)	WR-WTB SMT Male Horizontal Shrouded Header, pitch 2mm, 4p	P4, P5, P6, P8, P9, P10	620104131822	620104131822	6
2A, 125V(AC)	WR-WTB SMT Male Vertical Shrouded Header, pitch 2mm, 4p	P7	620304124022	620304124022	1
2A, 125V(AC)	WR-WTB SMT Male Horizontal Shrouded Header, pitch 2mm, 2p	P11, P14	620102131822	620102131822	2
2A, 125V(AC)	WR-WTB SMT Male Horizontal Shrouded Header, pitch 2mm, 3p	P12	620103131822	620103131822	1
2A, 125V(AC)	WR-WTB SMT Male Vertical Shrouded Header, pitch 2mm, 2p	P13	620302124022	620302124022	1
61300211121	WR-PHD Pin Header, THT, pitch 2.54mm, Single Row, Vertical, 2p	P15, P16, P17, P18, P19, P20, P21, P22	61300211121	61300211121	8
MMBT2222A	TRANS NPN, 40V, 600MA, SOT23-3	Q1	MMBT-SOT23	MMBT2222A	1
10 KOhm, 1/8 W	RES, size 0805, 10 KOhm, 1/8 W	R1, R2, R3, R4, R5	RESISTOR_0805	0008051035	5
10 Ohm, 1/8 W	RES, size 0805, 10 Ohm, 1/8 W	R6	RESISTOR_0805	0008051001	1
1 KOhm, 1/8 W	RES, size 0805, 1 KOhm, 1/8 W	R7	RESISTOR_0805	0008051025	1
NET_TIE	Straight Net Tie	T1	NET_TIE_2.0mm	NET_TIE	1
NET_TIE	Straight Net Tie	T2, T3, T4	NET_TIE_0.5MM	NET_TIE	3
Test_Point	Test_Point	TP1, TP2, TP3, TP4	TP_1_5mm_SMD	Test_Point	4
AMS1117	IC Linear Drop Out 3.3V 1A SOT-223	U1	AMS1117	AMS1117	1
NUCLEO-F401RE_HEADER	STM32 Nucleo-64 development board with STM32F401RET6 MCU, supports Arduino and ST morpho connectivity	U2	NUCLEO-F401RE-HEADER	NUCLEO-F401RE_HEADER	1
RP2040_Zero	RP2040-Zero, A Low-Cost, High-Performance Pico-Like MCU Board Based On Raspberry Pi Microcontroller RP2040	U3	RP2040_ZERO	RP2040_ZERO	1