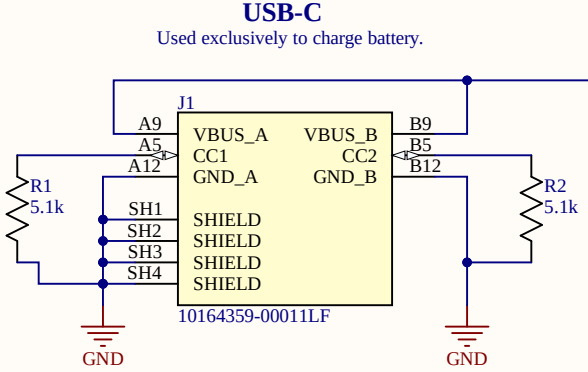
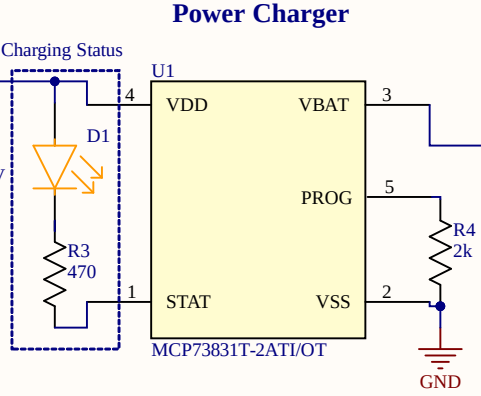
USB-C

Used exclusively to charge battery.



USB-C plug will be placed on edge of the PCB for access through housing.

Power Charger

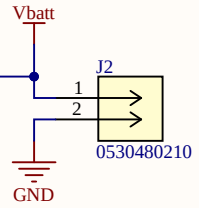


For best thermal performance, add vias from land area of EP to copper layer on opposite side of PCB

Power charger should be placed close to battery connector.

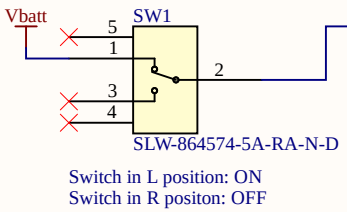
Li Ion Battery

LP384260JU+PCM+MOLEX 51021-0200 35MM



Connector will be placed on edge of the PCB to connect to battery located underneath.

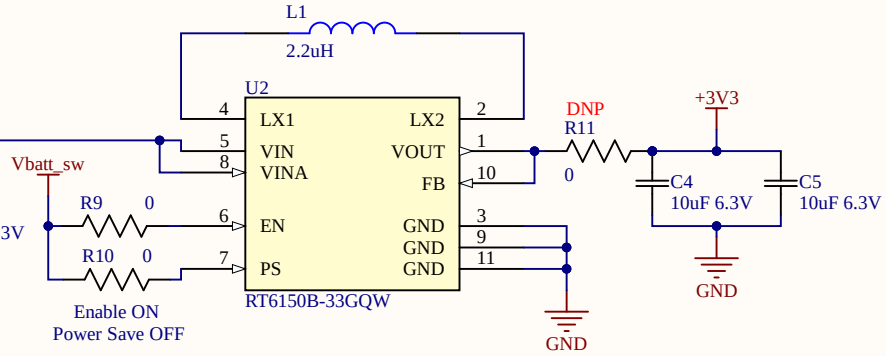
Power Switch



Switch in L position: ON
Switch in R positon: OFF

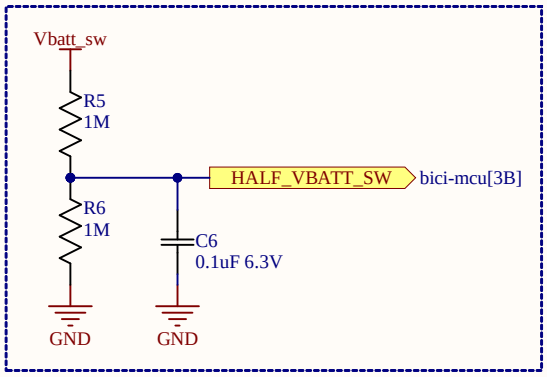
Switch will be placed on edge of the PCB for access through housing.

Buck-Boost

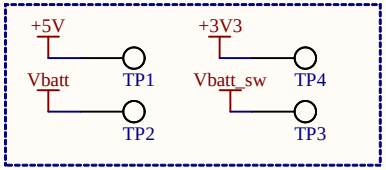


C3 should be placed as close as possible to Vin.
C4 and C5 should be placed as close as possible to Vout.
L1 should be connected to inductor by wide and short trace.

Low Power Detection



Test Points



Title	**Bici: Power Management** Circuitry related to system power and charging.	
Size A	Number	Revision V4
Date:	12/11/2025	Sheet1 of 5
File:	C:\Users\..\bici-power.SchDoc	Drawn By: Team Bici

Test Points

Test points should be placed close to IMU.

TP101
TP102
TP103
TP104

IMU

U101

FSYNC
INT1/INT
INT2
VDD
VDDIO
GND
AP_CS
AP_SCL/AP_SCLK
AP_SDA/AP_SDIO/AP_SDI
AP_SDO/AP_AD0
RESV
RESV
RESV
RESV

ICM-42670-P

bici-mcu[3C] IMU_INT1

TP105

SPI_CS bici-mcu[3B]
SPI_CLK bici-mcu[3B]
SPI_MOSI bici-mcu[3B]
SPI_MISO bici-mcu[3B]

+3V3

GND

C103 should be placed as close as possible to VDDIO pin.

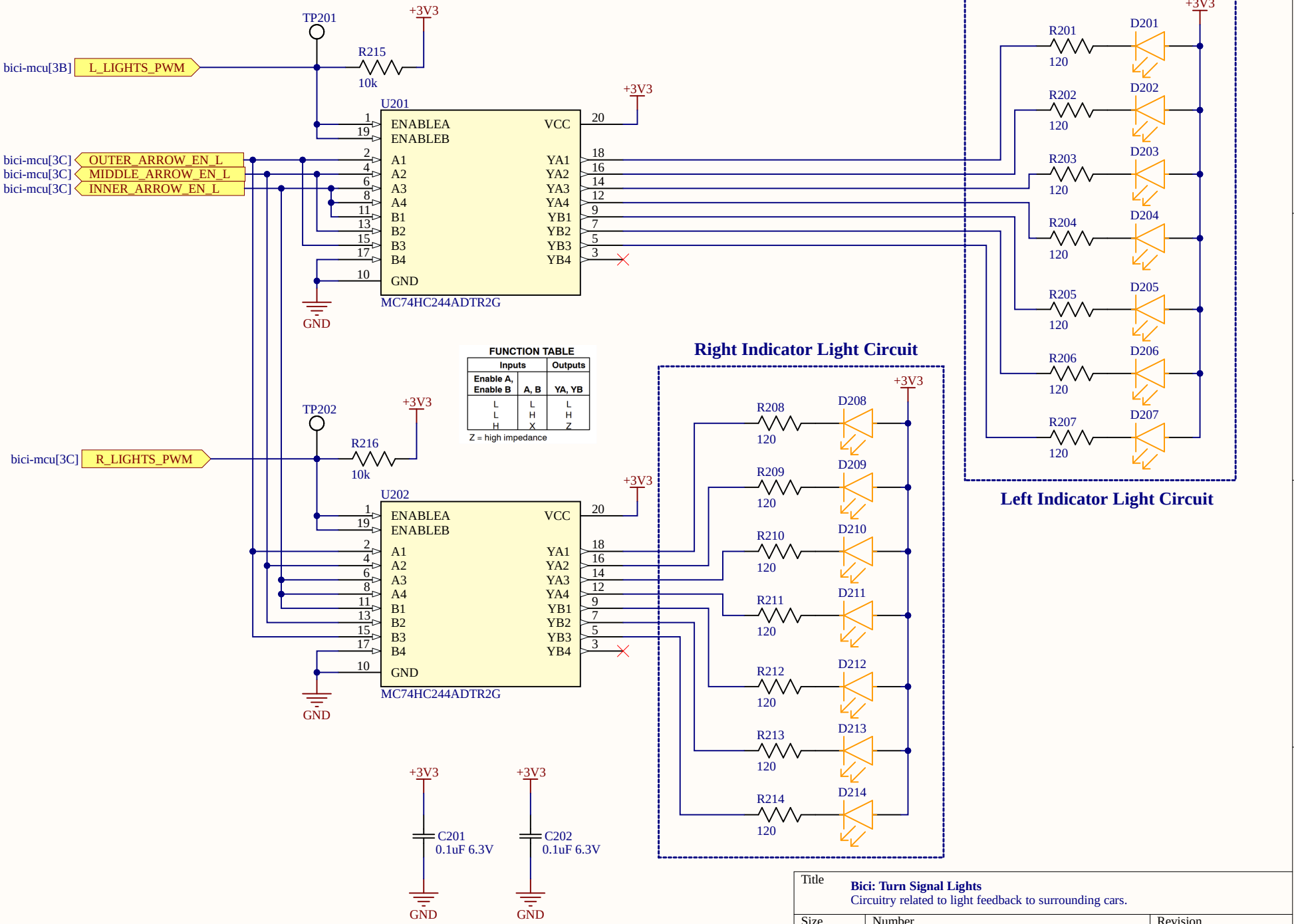
C103
10 nF 50V

C101
0.1uF 6.3V

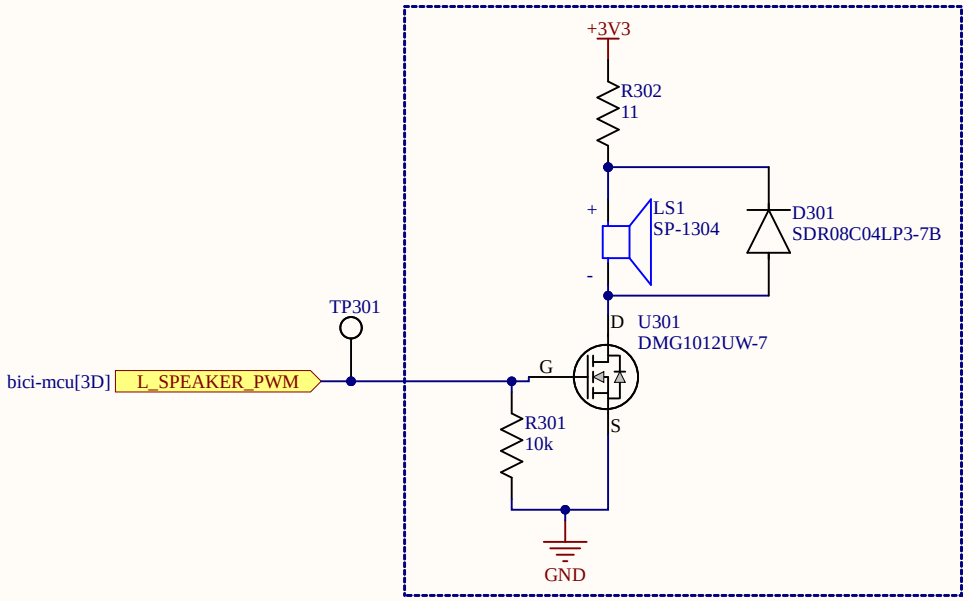
C102
2.2 uF 25 V

C101 and C102 should be placed as close as possible to VDD pin, with C101 closest to pin.

Title	**Bici: IMU** Circuitry related to IMU.	
Size A	Number	Revision V4
Date: 12/11/2025		Sheet2 of 5
File: C:\Users\..\bici-imu.SchDoc		Drawn By: Team Bici

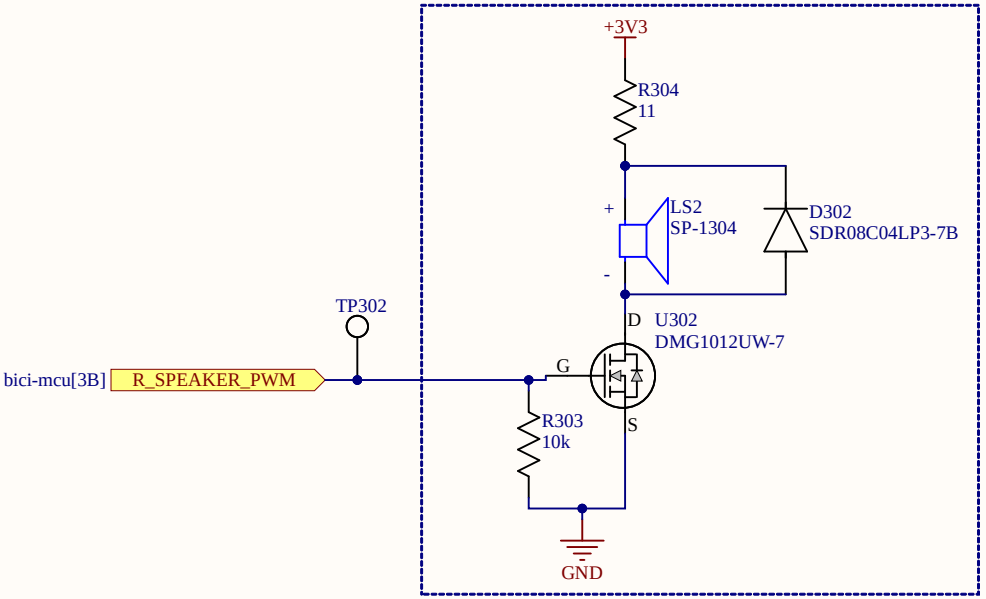

TP201
+3V3
R215
10k
bici-mcu[3B]
L_LIGHTS_PWM
U201
ENABLEA
ENABLEB
VCC
A1
A2
A3
A4
B1
B2
B3
B4
GND
YA1
YA2
YA3
YA4
YB1
YB2
YB3
YB4
MC74HC244ADTR2G
bici-mcu[3C]
OUTER_ARROW_EN_L
MIDDLE_ARROW_EN_L
INNER_ARROW_EN_L
R201
R202
R203
R204
R205
R206
R207
120
D201
D202
D203
D204
D205
D206
D207
Left Indicator Light Circuit
FUNCTION TABLE
Inputs
Outputs
Enable A, Enable B
A, B
YA, YB
Z = high impedance
TP202
R216
10k
bici-mcu[3C]
R_LIGHTS_PWM
U202
Right Indicator Light Circuit
R208
R209
R210
R211
R212
R213
R214
D208
D209
D210
D211
D212
D213
D214
C201
0.1uF 6.3V
C202
0.1uF 6.3V
C202 should be placed as close as possible to U202 VCC pin.
C201 should be placed as close as possible to U201 VCC pin.
Title
Bici: Turn Signal Lights
Circuitry related to light feedback to surrounding cars.
Size
A
Number
Revision
V4
Date:
12/11/2025
Sheet3 of 5
File:
C:\Users\..\bici-turn-lights.SchDoc
Drawn By:
Team Bici

Left Indicator Audio Feedback Circuit



LS1 should be placed at the edge of the PCB on the left arrow point (to accomodate speaker placement in housing).

Right Indicator Audio Feedback Circuit



LS2 should be placed at the edge of the PCB on the right arrow point (to accomodate speaker placement in housing).

Title	**Bici: Turn Signal Audio** Circuitry related to audio feedback to user.	
Size A	Number	Revision V4
Date: 12/11/2025		Sheet4 of 5
File: C:\Users\..\bici-turn-audio.SchDoc		Drawn By: Team Bici

STM Power

U401B
2 of 2
1 VBAT
35 VSS
47 VSS
8 VSSA/VREF-
23 VSSA/VREF-
48 VDD
9 VDDA/VREF+
24 VDDA/VREF+
36 VDDUSB
STM32L412C8T6
+3V3
GND

C401 4.7uF 10V
C402 0.1uF 6.3V
C403 0.1uF 6.3V
C404 0.1uF 6.3V
C405 0.1uF 6.3V

Decoupling caps C402, C403, C404, and C405 should be placed 1 each per pair of VCC/VSS pins on MCU, close to these pins.

Programming/Debugging Connector

J401
14 STLINK_TX
13 STLINK_RX
12 NRST
11
10
9
8
7
6 SWDCLK
5
4 SWDIO
3
2
1
+3V3
3220-14-0100-00
GND

STM I/O

U401A:
- PA0 is ADC in (for low battery detection)
- PA8 is active-low output to actuate low battery light
- PB14 and PA3 are associated with TIM15 for PWM (Audio)
- PA5 and PB3 are associated with TIM2 for PWM (Lights)
- PB0 configured as EXTI0 (external interrupt input) for IMU_INT1
- PA9 is STM USART1 TX
- PA10 is STM USART1 RX
- PA2 is RCC_LSCO for STM clock output
- PB4, PB5, PB6, PB7, PB8, PB9 are active-low enable signals to individually enable the 3 sections of each arrow light
- PB11 and PB12 are spare GPIOs

+3V3
R403 10k
Low Battery Light
TP401
R401 470
D401 AP3216ID
+3V3

TP402
STM-CLOCK-OUT

U401A
bici-power[2D] HALF_VBATT_SW 10 PA0
bici-imu[3B] SPI_CLK 11 PA1
12 PA2
bici-turn-audio[1C] R_SPEAKER_PWM 13 PA3
bici-imu[3B] SPI_CS 14 PA4
bici-turn-lights[1A] L_LIGHTS_PWM 15 PA5
bici-imu[3B] SPI_MISO 16 PA6
bici-imu[3B] SPI_MOSI 17 PA7
LOW_BATT_L 29 PA8
STLINK_RX 30 PA9
STLINK_TX 31 PA10
32 PA11
33 PA12
SWDIO 34 PA13
SWDCLK 37 PA14
38 PA15

bici-imu[1B] IMU_INT1 18 PB0
19 PB1
20 PB2
bici-turn-lights[1B] R_LIGHTS_PWM 39 PB3
bici-turn-lights[1A] OUTER_ARROW_EN_L 40 PB4
bici-turn-lights[1A] MIDDLE_ARROW_EN_L 41 PB5
bici-turn-lights[1A] INNER_ARROW_EN_L 42 PB6
43 PB7
45 PB8
46 PB9
21 PB10
TP403 SPARE_GPIO_1 22 PB11
TP404 SPARE_GPIO_2 25 PB12
26 PB13
bici-turn-audio[1B] L_SPEAKER_PWM 27 PB14
28 PB15

2 PC13
3 PC14-OSC32_IN
4 PC15-OSC32_OUT
5 PH0-OSC_IN
6 PH1-OSC_IN
44 PH3-BOOT0
7 NRST

+3V3
Jumper
J402
R404 10k
GND
+3V3
R402 10k
NRST
DNP
C406 0.1uF 6.3V
GND

STM32L412C8T6 Running at 16 MHz

R402 and R401 should be placed close to their respective pins.

Title: **Bici: MCU** Circuitry related to embedded MCU.		
Size: A	Number:	Revision: V4
Date: 12/11/2025		Sheet 5 of 5
File: C:\Users\..\bici-mcu.SchDoc		Drawn By: Team Bici