Sheet: MCU

Sheet: PSU_logic

PB_1_MCU — PB_1_MCU
PB_2_MCU — PB_2_MCU

SDA_FG — SDA_FG
SCL_FG — SCL_FG

V_OUT_MUX

File: PSU_logic.sch

Sheet: DCDC&PB

DCDC_VIN

V3V3

PB_3_MCU — PB_3_MCU_N
PB_4_MCU — PB_4_MCU_N
V3V3 PB_5_MCU — PB_5_MCU_N
Enable_motor — Enable_motor

File: MCU.sch

File: DCDC&PB.sch

Decoupling caps

+3.3V

DEC4 DEC3 DEC2 DEC1

C2 10 uF C3 100 pF C5 100 pF C7 100 nF C9 10 uF C10 100 nF C12 100

48 pin   13,36 pins

GND

Power HL

+3.3V

V3V3 V3V3

https://product.tdk.com/en/search/rf/rf/antenna/simulation?pid=1432889562964

PB

P15 PB_1_MCU
P16 PB_2_MCU
P17 PB_3_MCU
P19 PB_4_MCU
P20 PB_5_MCU

Impedance matching

AE1 Antenna_Chip
Length

L 3.9nH1

C13 0.8 pF   C15 0.8 pF

GND

Crystal oscillators

X1
XC1 1 3 XC2
C1 10 pF   C4 10 pF
32 MHz
GND

X2
XL1 XL2
C8 10 pF   C11 10 pF
32.768 KHz
GND

The SWDCLK line has an internal pull-down resistor.
The SWDIO line has an internal pull-up resistor.

+3.3V
R1 10k R2 10k R3 10k
C6 10 uF
GND

HEART_SCL
HEART_SDA
HEART_INT
HEART_IRD
HEART_RD

J1
1
2
3
4
5
6
7

GND

MAX30102 Heartrate
Conn_01x07_Female

SWD programming interface

TP1 TP2 TP3 TP4

SWD_SWDIO
SWD_SWDCLK
SWD_RESET
SWD_SWO

U2 nRF52832-QFxx

DEC1
DEC2
DEC3
DEC4 +3.3V

DEC1 1
DEC2 32
DEC3 33
DEC4 46
VDD 13
DCC 47

P0.00/XL1 2 XL1
P0.01/XL2 3 XL2
P0.02/AIN0 4 Backlight_EN_DIM
P0.03/AIN1 5 FLASH_CS
P0.04/AIN2 6 FLASH_MISO
P0.05/AIN3 7 FLASH_SCK
P0.06 8 FLASH_MOSI
P0.07 9 MPU_SDA
P0.08 10 MPU_SCL
NFC1/P0.09 11 NFC1
NFC2/P0.10 12 NFC2
P0.11 14 MPU_INT
P0.12 15 nRST_BN
P0.13 16 nBL_pin
P0.14 17 Enable_motor
P0.15 18 P15
P0.16 19 P16
P0.17 20 P17
P0.18/SWO 21 SWD_SWO
P0.19 22 P19
P0.20 23 P20
P0.21/RESET
P0.22 27 HEART_INT
P0.23 28 HEART_SDA SDA_FG
P0.24 29 HEART_SCL SCL_FG
P0.25 37 HEART_IRD
P0.26 38 HEART_RD
P0.27 39 DISP_SDA
P0.28/AIN4 40 DISP_SCLK
P0.29/AIN5 41 DISP_DC
P0.30/AIN6 42 DISP_CS
P0.31/AIN7 43 DISP_RESET

ANT 30

XC1 34 XC1
XC2 35 XC2

SWD_RESET 24 P0.21/RESET
SWD_SWDCLK 25 SWDCLK
SWD_SWDIO 26 SWDIO

VSS 31
GND

NFC1
NFC2
C18 130 pF   C19 130 pF
GND

TP6 TP7 TP8 TP9 TP10

U1 BNO055

+3.3V
R4 10k R5 10k R6 10k R8 10k
C14 100 nF   C16 100 nF

nRST_BN GND 11
MPU_INT 14
nBL_pin 4
Bootloader mode
select pin (active low)
TP5 MPU_BL_IND 10

MPU_SDA 20
MPU_SCL 19
MPU_ADO 17
int PU
10k R7

nRESET
INT
nBOOT_LOAD_PIN
BL_IND
COM0
COM1
COM2
COM3
VDD 3
VDDIO 28
XOUT32 26
XIN32 27
PS0 6
PS1 9
CAP 8
GND 2
GNDIO 25

C17 100 nF   R9 10k   R10 10k
GND

PS1 PS0 Functionality
0 0 Standard/Fast I2C Interface
0 1 HID over I2C
1 0 UART Interface
1 1 Reserved

By default, the
internal clock is selected

I2C configuration COM3_state I2C address
Slave HIGH 0x29
Slave LOW 0x28
HID-I2C X 0x40

Gyroscope & Accelerometer & Magnetometer with I2C interface

SPI FLASH Memory

+3.3V
R11 10k
U4 MX25R1635F

FLASH_CS 1 /CS
FLASH_SCK 6 CLK
FLASH_MOSI 5 DI(IO0)
FLASH_MISO 2 DO(IO1)
VCC 8
/HOLD(IO3) 7
/WP(IO2) 3
GND 4

+3.3V
R12 10k   R13 10k   C22 100 nF
GND
GND

Display module without touch panel

+3.3V
C21 10 uF
GND

LEDK
LEDA

DISP_DC
DISP_CS
DISP_SCLK
DISP_SDA
DISP_RESET

U11 GC9A01
1 GND
2 LEDK
3 LEDA
4 VDD
5 GND
6 GND
7 D/C
8 CS
9 SCL
10 SDA
11 RESET
12 GND

Constant current led driver

+3.3V
LEDA
C20 10 uF
GND

Backlight_EN_DIM

U3 CAT4002ATD-GT3
3 VIN
2 GND
1 EN/DIM
6 LED1
4 LED2
5 RSET

LEDK

I_led is set 7.5 mA
R14 10k
GND

inernal pull-down
High level input min 1.3V

Sheet: /MCU/
File: MCU.sch

Title:

Size: A4   Date:
KiCad E.D.A. kicad (5.1.10)-1

Rev:
Id: 2/4

ON/OFF with two PB

+BATT
V_Battery_P
SW2
Sw_Push

+BATT
R25
10k

V_Battery_P

R15
330
PB_1_MCU

SW1
Sw_Push
R18
10k

3 2 1 VT1

U7
max16054azt+t

TP11

3 VT3
HX2301A
1
2

PWR_FLAG
+BATT

PWR_FLAG
+5V

PWR_FLAG

GND

R21   10k
3 CLEAR   *OUT 4
1 IN   OUT 5
Int 63KOhm PU
PB1 && PB2 => OUT=$\overline{OUT}$
+BATT

V_Battery_P_SW

PB_2_MCU
R16
330

R17
10k

C25
100 nF
C26
100 nF

3 2 1 VT2

GND

V_Battery_P 6 VCC   GND 2

C29
100 nF

GND

GND

PSU

J3

VBUS   A9
VBUS   B9

CC1   A5
CC2   B5

GND   A12
GND   B12
CASE   1

+5V
V_USB

D1
D_TVS

C24
10 uF

GND

USB for power
supply only

Battery charger

U5
BQ21040DBVT

+5V
V_USB
C28
10 uF
6 IN   OUT 2 V_Battery_P
5 VSS   TS 1
R20
4 ISET   CHG_N 3
10k
GND
Set fast charge
current to 54 mA

+BATT

R23
10k

GND

Power Mux

D1| D0 | VI(IN2) > VI(IN1) | OUT
0 |1 |No |IN1
0 |1 |Yes |IN2

U8
TPS2115APWR

+5V
V_USB
C30
100 nF

V_Battery_P_SW
C31
100 nF

R24
330
Rlim

GND

8 IN1   OUT 7   V_OUT_MUX
6 IN2   STAT 1

D0 2 Internal pull-up
D1 3

4 ILIM   GND 5

1.5A

TP12
V_OUT_MUX

GND

+BATT

BT1
Battery_Cell

C23
10 uF

GND

Fuel gauge

U6
STC3100IQT

V_Battery_P
V_Battery_N

7 VCC   IO0 1   R22
8 VIN   ROSC 2   200k 0.1%
6 CG   SDA 3   SDA_FG
5 GND   SCL 4   SCL_FG
9 EPAD

C27
10 uF
R19
0.15 Ohm

9 pin directly
to plan GND

PUs next to MCU

SDA_FG
SCL_FG

GND (pin 5) should be directly
connected to negedge resistor
pin that is connected to GND plane

GND

GND

DCDC converter 3.3V

U10
TPS62740DSST

V_OUT_MUX — 1 VIN | SW 2 — L_SW_O
12 EN | 2.2 uH 13.75 mOHM 1.2 A
11 VSEL1 | VOUT 5
10 VSEL2 | LOAD 6
9 VSEL3 | PG 7
8 VSEL4 |
Vout = 3.3V
| GND 3
| EPAD 13
4 CTRL

PWR_FLAG
+3.3V
TP15
V3V3
C35
10 uF

L1

Connect this pin(5) directly
to the output capacitor
with a short trace

C33
10 uF

GND

U9
MAX809STRG

DCDC_VIND V_OUT_MUX
3 VCC
2 RESET
1 GND

C32
100 nF

GND

TP14
DCDC_ENABLE
PP output

V_OUT_MUX always > 1.0
RESET Output Guaranteed to VCC = 1.0 V.
If V_OUT_MUX below 3.0V than DC/DC is off

LOAD(out)
GND is disabled

GND

GND

+3.3V
Place the capacitor and the diode as close as physically possible

M1
+ 1
CASE
CASE
2
GND

C34
100n X7R 16V

D2
1A 20V

R26
330
TP13
Enable_motor

VT4

R27
10k

GND

PB

+3.3V

SW3 SW_Push
SW4 SW_Push
SW5 SW_Push

PB_3_MCU_N R28 330
PB_4_MCU_N R29 330
PB_5_MCU_N R30 330

C36 100 nF   R31 10k
C37 100 nF   R32 10k
C38 100 nF   R33 10k

GND