Battery

– 18650 cell – LiIon

+Vbat, JP2, +3.3V

With bridging this pad you enable direct connection from battery to entire pcb

BT1 18650 Battery holder

Cut all three plastic pins (supports) on battery holder. Battery is fixed in case and are unused

GND

LDO: Battery >> 3.3V

– SPX5205M5–L/TR

Vout = 1.235V * (1 + R1/R2)
22kOhm < R2 <47kOhm (R2>10kOhm)
R1 = R6, R2 = R7

If you use fixed output voltage version do not populate ADJ voltage divider (R6, R7)

IC1 SPX5205M5–L/TR

VIN, VOUT, EN, GND, ADJ

C16 4.7uF, C15 100nF, C17 1uF, C18 10nF, R6 20k, R7 12k

! If bridge JP2 is used do not place LDO circuit !

Step–up converter: Battery >> 4V

– SX1308–B628

Vout = Vref * (1 + R1/R2)
Vref = 0.6V (typical)
R1 = R14, R2 = R15

L1 4.7uH, U5 SX1308, D1 SS24

C21 4.7uF, C22 100nF, C24 10nF, C25 1uF, C29 10nF, R14 20k, R15 3k2, R24 10k

BOOST_EN, ON/OFF

! Place only if you use SIM module instead of LoRa !

– Battery voltage measurement

Q1 AO3401A, R23 1k, R8 100, R9 100, C20 10nF

D_VBAT_EN, AN_BAT

Resistors must be set to propertly load the battery

MCU:

– STM32L151C8T6

U3 STM32L151C8T6

SW1 NRST, C3 0.1uF, R1 10k

Y1 12MHz, C4 22pF, C5 22pF

Y2 32.768kHz, C13 22pF, C14 22pF

C6 4.7uF, C7 100nF, C8 100nF, C9 100nF, C10 100nF

C11 1uF, C12 10nF, R16 10k

Vdda–Vssa (pin 9, 8)

Do not use PC13 (pin 2) – RTC_OUT

Do not use PB2 (pin 20) – BOOT1!

R21 4k7, R22 4k7, R13 10k, R12 4k7, R3 4k7

– JTAG 10pin (Seager J–Link & adapter)

J4 2x5_2.00mm, J2, R2 100, R4 100, R5 100

LoRa module

– *RFM95W / SX1276
*: used (868MHz)
– PWR range: 1.8V–3.7V

U2 RFM95W–868S2

C19 1uF

– 50Ohm Impedance
– Critical lenght:
Lcrit = (c/f) * (1/sqrt(eff)) * (1/12)
– Width: 1.2842mm
– Spacing: 0.3mm

J3 UF.L

SCK, MOSI, MISO, NSS, RESET, ANT, DIO5, DIO4, DIO3, DIO2, DIO1, DIO0

R17 0R, R18 0R, R19 0R

SIM module:

– SIM800L
* optional

Cap on Vcc is allready on module

U4 SIM800L–CORE

NET, VCC, RST, RXD, TXD, GND, RING, DTR, MIC+, MIC–, SPK+, SPK–

SIM_ISR, SIM_SLP, SIM_RST, SIM_RX, SIM_TX

Poka–Yoke placement

R10 0R, R11 0R

TEMP/HUM/PRESS:

– BME280

!MUST BE TESTED!
MAX Voltage 3.6V

U1 BME280, C1 100nF, C2 100nF

SCL, SDA, SCK, SDI, SDO, CSB, VDDIO, VDD, GND

JP1 I2C address

SDO –> GND (2:1): 0x60* (0b0110 0000)
SDO –> VDD (2:3): 0x61 (0b0110 0001)
*: used in software

Ground HUM sensor:

EHUM_PWR, AN_E_HUM

C23 1uF, R20 10k, C26 10nF, J7

Probe power is delivered from MCU pin
[max. IO current – 25mA]
[max. meassured current on probe – 6mA]

Mounting holes:

– 2.5mm

H1 MountingHole

H2 MountingHole

I2C expansion:

J1, C27 1uF, SCL_EX, SDA_EX

SPI expansion:

J6, C28 1uF, CS_EX, SCK_EX, MISO_EX, MOSI_EX

Tinta T.

Sheet: /
File: LoRa_Node.kicad_sch

Title: Greenhouse LoRa node (SIM)

Size: A4	Date: 2025–07–20	**Rev: 4.1**
KiCad E.D.A. 9.0.1		Id: 1/1