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
VIN, VOUT, EN, GND, ADJ
SPX5205M5–L/TR
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

U5
L1 4.7uH
D1 SS24
IN, SW, N/C, EN, ON/OFF, FB, GND
SX1308
C21 4.7uF, C22 100nF, C24 10nF, C25 1uF, C29 10nF
R24 10k, R14 20k, R15 3k2
BOOST_EN
! 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

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

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
– Max VDD: 3.6V

U1 BME280
C1 100nF, C2 100nF
SCL, SDA, 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
C23 1uF, R20 10k
J7
AN_E_HUM
C26 10nF
Probe power is delivered from MCU pin [max. IO current – 25mA] [max. meassured current on probe – 6mA]

MCU:
– STM32L151C8T6

U3 STM32L151C8T6
SW1 NRST, C3 0.1uF, R1 10k BOOT0
Y1 12MHz, C4 22pF, C5 22pF
Y2 32.768kHz, C13 22pF, C14 22pF
C6 4.7uF, C7 100nF, C8 100nF, C9 100nF, C10 100nF
R16 10k, CS_EX
C11 1uF, C12 10nF
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
PA0 BOOST_EN, PA1 AN_BAT, PA2 AN_E_HUM, PA3 EHUM_PWR, PA4 SCK_EX, PA5 MISO_EX, PA6 MOSI_EX, PA7 RESET, PA8 SIM_RX, PA9 SIM_TX, PA10 DIO2, PA11 SIM_ISR, PA12 SIM_SLP, PA13 SWDIO, PA14 SWDCLK, PA15 DIO1
PB0 D_VBAT_EN, PB1 DIO5, PB2 DIO0, PB3 DIO4, PB4 DIO3, PB5 SCL_EX, PB6 SDA_EX, PB7 SIM_ISR, PB8 SIM_SLP, PB9 SCL, PB10 SDA, PB11 NSS, PB12 SCK, PB13 MISO, PB14 MOSI, PB15

– JTAG 10pin (Seager J–Link & adapter)
J4 2x5_2.00mm
J2
R2 100, R4 100, R5 100
NRST, SWDIO, SWDCLK

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