T-LORA-N01

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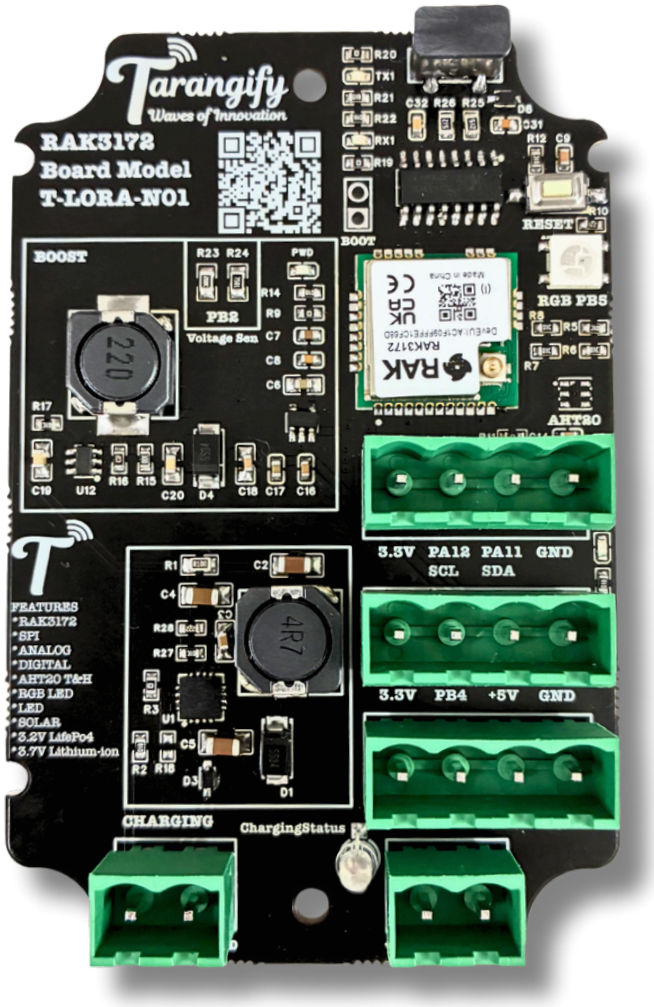

Node Development Board

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1. Product Overview

The Tarangify T-LORA-N01 is a versatile LoRaWAN development board designed for rapid prototyping and testing of low-power wireless sensor nodes. Built around the RAK3172 LoRa module, the T-LORA-N01 offers ultra-low power operation, integrated USB for programming and debugging, and accessible GPIO headers for connecting a wide range of digital, analog, and I²C-based sensors. It supports the Arduino (RUI3) development environment, making it ideal for engineers and developers building custom IoT solutions. With onboard voltage regulation, a Li-ion/$LiFePO_4$ battery connector, and a solar charging interface, the T-LORA-N01 enables seamless transition from prototyping to field deployment in applications such as environmental monitoring, smart agriculture, industrial automation, and remote telemetry.

2. Features

- **Smart Overheat Protection:** Auto cut-off based on enclosure temperature
- **LoRaWAN Connectivity:** Based on RAK3172 module. Range up to 15km.
- **USB to TTL Converter:** Integrated TTL for programming/debugging.
- **Solar Charging:** Inbuilt solar charging facilities.
- **Temperature & Humidity Sensing:** Onboard AHT20 digital temperature and humidity sensor.
- **Support Battery**
- **Voltage Monitoring:** Integrated voltage sensor for battery or supply voltage monitoring.
- **Multiple Communication Interfaces:** I2C, UART1
- **Flexible Sensor Input:** Dedicated PB4 pin for reading various sensor data.
- **Low Power Consumption:** Optimised for battery-powered applications.
- **Compact Form Factor:** Designed for easy integration into various projects.
- **Environment Factor:** Weather proof, UV proof, Waterproof Enclosure.

3. Specifications

- **3.1. RAK3172 LoRa Module**
  - **Supported LoRaWAN Regions:** EU868, IN865, RU864
  - **Operating Voltage:** Typically 2.9V 3.6V
  - **Operating Temperature:** −20∘C~+85∘C
  - **Communication:** UART (AT Commands), I2C

- **3.2. TTL Converter**
  - **Function:** USB to Serial (TTL) conversion
  - **Interface:** USB Type C , TTL serial pins
  - **Driver Support:** Windows, Linux, macOS

- **3.3. Solar Charging**
  - **Input Voltage:** 4.5V 6V (from solar panel)
  - **Charging Current:** Up to 1000mA
  - **Battery Support**: LiFePo4 (LFP)/ Li-ion/ Li-Po

- **3.4. AHT20 Temperature & Humidity Sensor**
  - **Sensor Type:** Digital Temperature & Humidity Sensor
  - **Interface:** I2C
  - **Temperature Range:** −40∘C~+80∘C
  - **Humidity Range:** 0 100%RH
  - **Accuracy:**
    - **Temperature:** ±0.3∘C
    - **Humidity:** ±2%RH

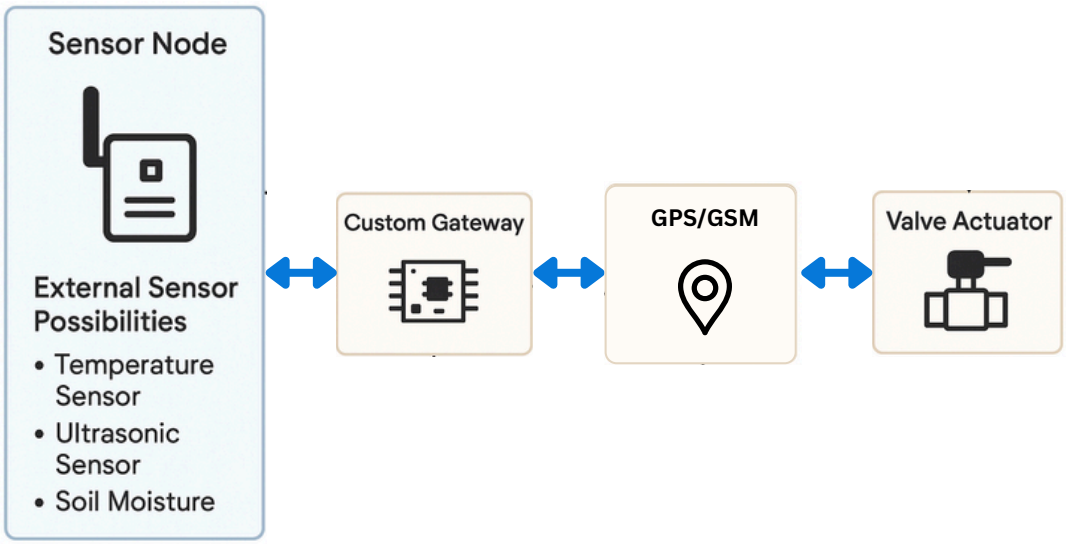
- **3.5. Voltage Sensor**
  - **Type:** Resistive Voltage Divider
  - **Pin :** PB2
  - **Output:** Analog voltage, connected to an ADC pin of the RAK3172
  - **Measurement Range:** typically designed for battery voltage monitoring

- **3.6. General I/O & Interfaces**
  - **I2C:** Shared bus for AHT20 and external I2C devices.
  - **UART1:** Dedicated for external serial communication.
  - **PB4 Pin:** Configurable General Purpose Input/Output (GPIO) for additional sensor input.
  - **PA15 Pin:** LED
  - **PB5 Pin:** Addressable RGB LED

- **3.7. Electrical Specifications**

Parameter	Value
Operating Voltage	3.3V (regulated from LiFePO4)
Battery Support	LiFePO4 / LiPo /Li-ion (1s)
Charging Input	~6V (via solar panel)

4. Workflow



It communicates wirelessly over roughly 15km line of sight using a custom LoRa P2P protocol to a custom gateway. This enables off-grid, real-time automation such as smart irrigation, and while it doesn't require internet, it can connect if desired.

- **RAK3172 Configuration for LoRaWAN or LoRa P2P:**

To enable the RAK3172 module as a LoRa P2P module or LoRaWAN end-device, it must be configured by sending AT commands. You can configure the RAK3172 in two ways:

- LoRaWAN End-Device - RAK3172 as LoRaWAN IoT device.
- LoRa P2P - Point-to-point communication between two RAK3172 modules.

- **Example:**
  - A LoRaWAN-based smart irrigation system uses solar-powered sensor nodes to monitor soil moisture in agricultural fields. These nodes send uplink data to a LoRaWAN gateway, which forwards it to a cloud server. When the application detects low moisture levels, it sends a downlink command to an actuator node—typically a device—that activates a relay or solenoid valve to start irrigation.

5. Applications of Sensor Node

- **Environmental Monitoring:** Remote temperature, humidity, and general environmental data collection.
- **Smart Agriculture:** Soil moisture, weather station, and irrigation control.
- **Asset Tracking:** Low-power, long-range tracking of assets.
- **Industrial IoT:** Monitoring sensor data in industrial environments.
- **Smart City Applications:** Air quality, street light control, waste management.
- **Remote Sensing:** Data collection from isolated or hard-to-reach locations using solar power.

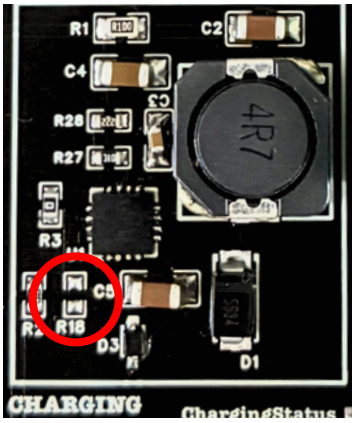
6. Connectivity Interfaces

Interface	Description
UART1	External modules
UART2	Connected to TTL for USB serial
I²C	Used by AHT20; exposed for other sensors
GPIO	PB4 exposed (Analog capable)

7. Onboard Sensors

Sensor	Type	Interface	Notes
AHT20	Temperature + Humidity	I²C	for internal measure
Voltage	Resistor Divider	Analog pin PB2	Battery voltage monitoring

8. Power Management



- **Solar Panel Input:** 6V max
- **Battery Charging:** Supports 3.6V / 4.2V (LiFePO4 /LiPo /Li-ion) (Short or mount 0Ω resistor to R18 Pad for 4.2V based batteries)
- **Low Power Modes:** Supported sleep functions
- **Power Consumption:**
  - **Deep Sleep:** ~2–5 mA
  - **Active TX (LoRa):** ~250–350 mA

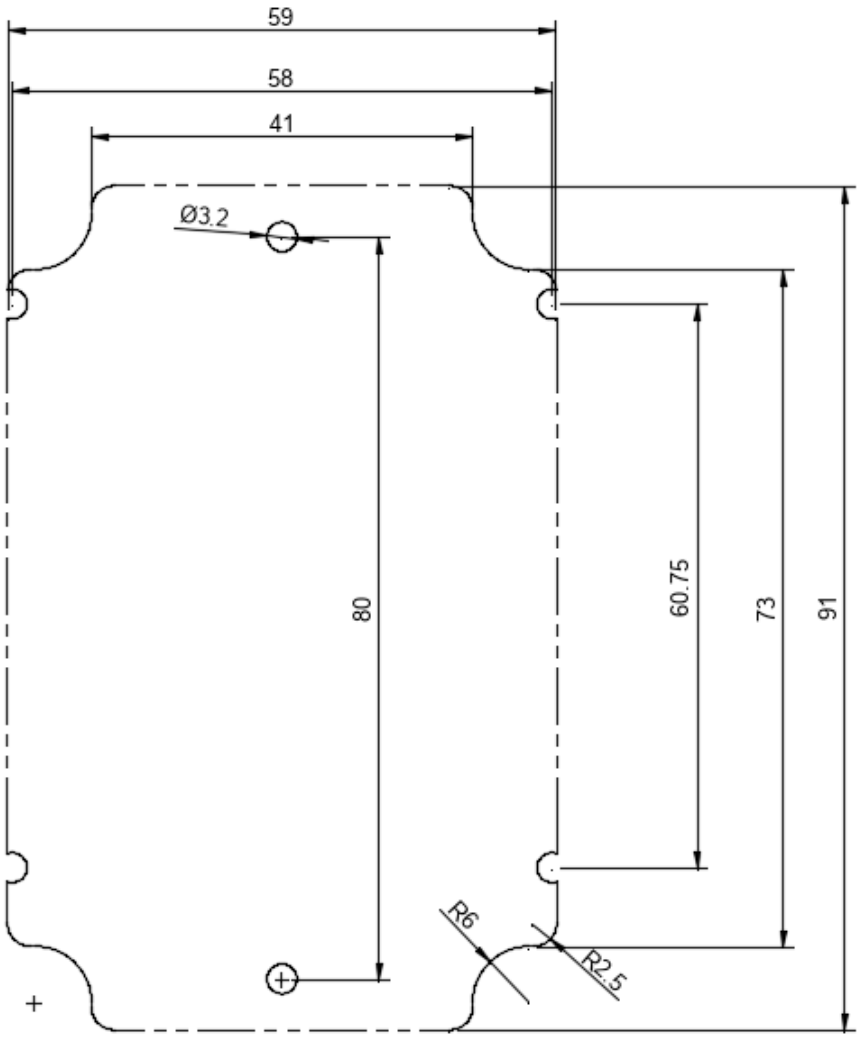
9. Environmental Ratings

Parameter	Value
Operating Temp.	-20∘C~+85∘C
Storage Temp.	-20°C to +75°C
Humidity (non-cond.)	10% to 90% RH
Cooling	Natural convection

10. Ordering Information

Product Code	Description	Color
T-LORA-N01	Node Development Board	Black

11. Mechanical Drawing

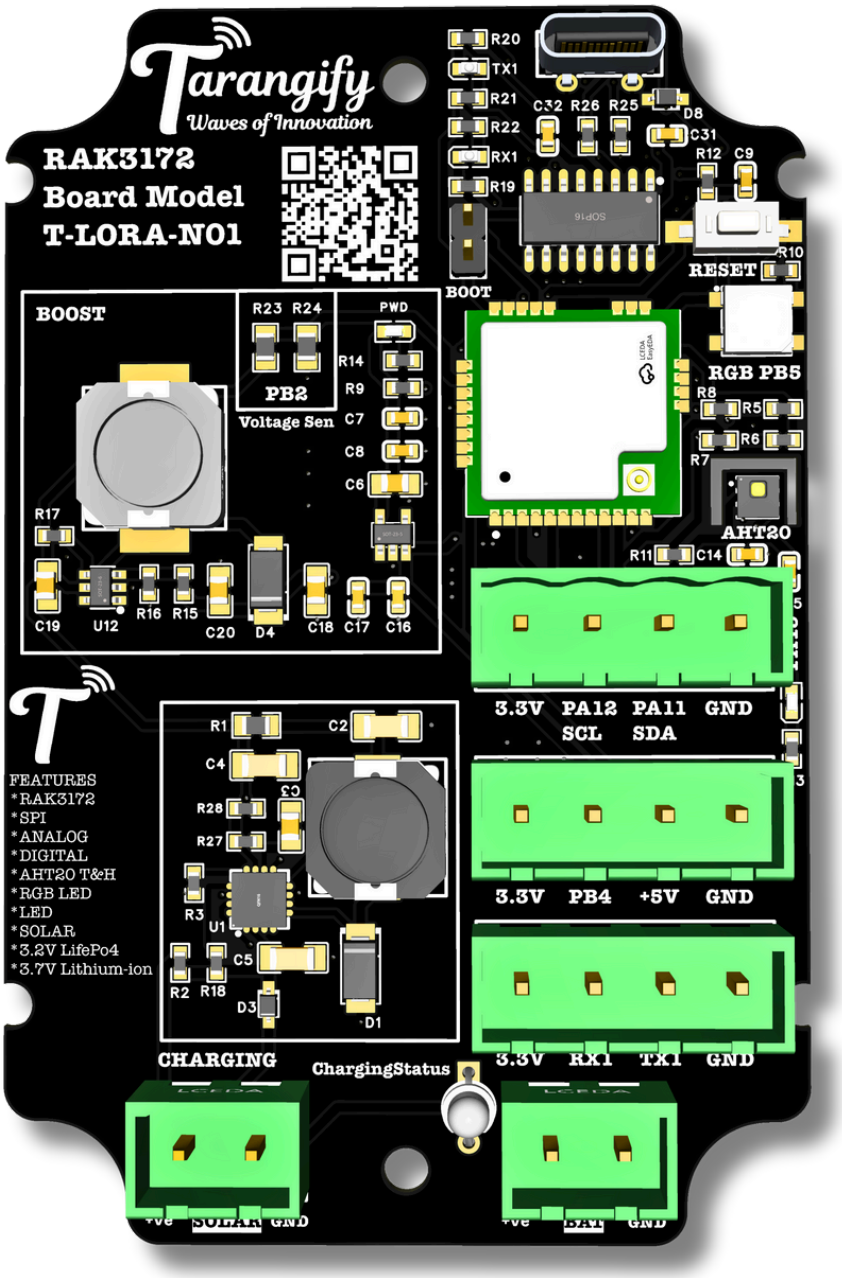


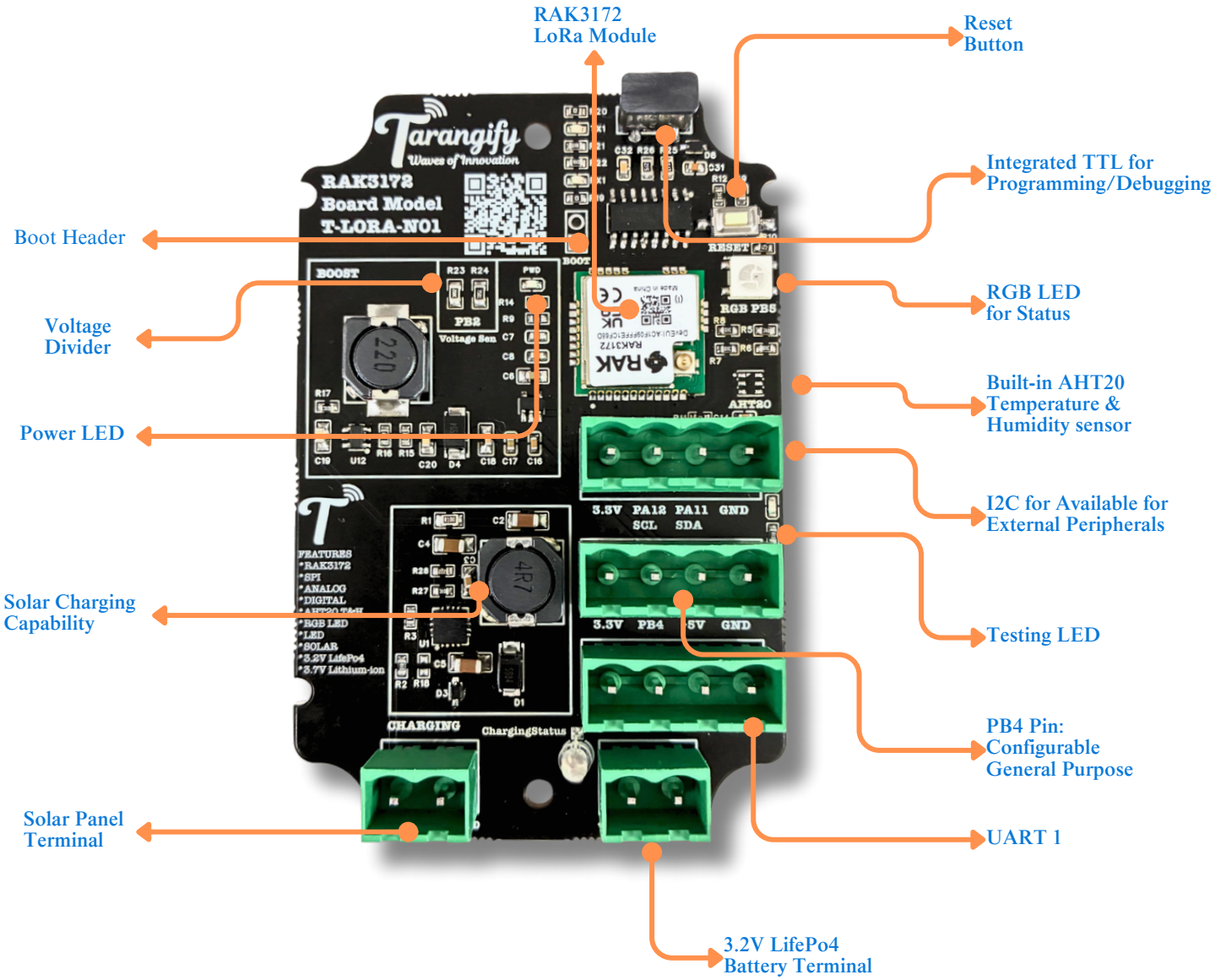
All Dimension are in mm

Dimensional error:

1. Length, width, height and pin pitch error ± 8%
2. Pin length error ±1mm
3. Pin diameter error -0.2mm

12. Node PCB


Tarangify
Waves of Innovation
RAK3172
Board Model
T-LORA-N01
BOOST
PB2
Voltage Sen
PWD
RESET
BOOT
RGB PB5
AHT20
3.3V PA12 PA11 GND
SCL SDA
3.3V PB4 +5V GND
3.3V RX1 TX1 GND
CHARGING
ChargingStatus
FEATURES
*RAK3172
*SPI
*ANALOG
*DIGITAL
*AHT20 T&H
*RGB LED
*LED
*SOLAR
*3.2V LifePo4
*3.7V Lithium-ion



13. Contact Information

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