Tarangify
Waves of Innovation

T-LORA-RN-01

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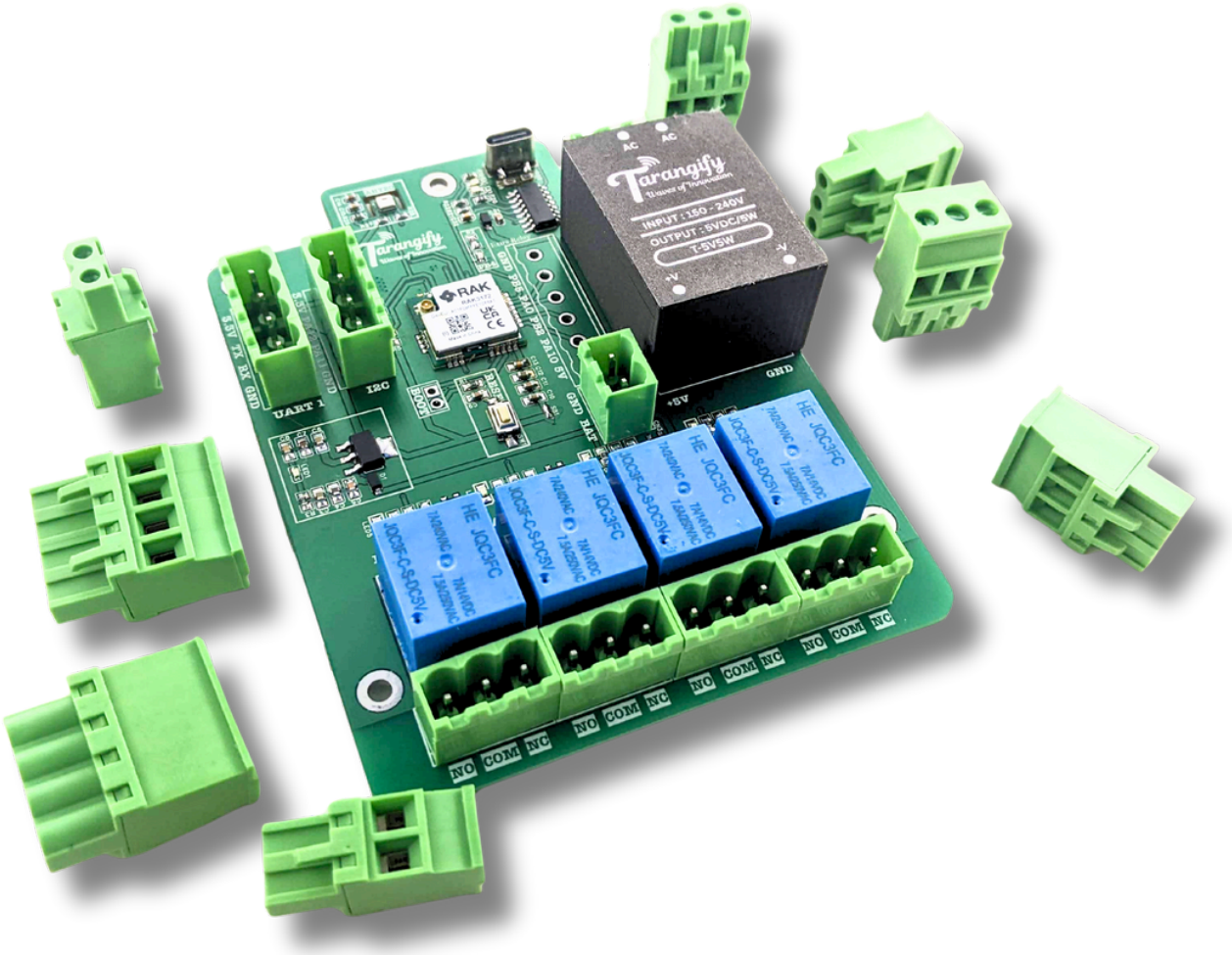

LoRa Relay Node Development Board

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1. Product Overview

Tarangify T-LoRa-RN-01 is a versatile relay node development board designed for remote switching and IoT automation applications. Built around the RAK3172 LoRaWAN module, it offers long-range (Up to 15km line of sight) wireless connectivity and low-power operation. The board features four independent relay outputs for controlling AC or DC loads, an onboard AHT20 temperature and humidity sensor, and supports both battery and AC power input. A provision for a compact onboard mini SMPS allows safe conversion from 240V AC to 5V DC for standalone field deployment. It includes I2C, UART1, and TTL-level interfaces for additional sensor and device integration, making it ideal for smart agriculture, industrial control, remote pump or valve automation, and other wireless control systems.

2. Features

- **Wireless Module:** RAK3172 (LoRaWAN, low-power)
- **Relays:** 4-channel relay outputs for AC/DC load control
- **Sensor:** Onboard AHT20 (temperature & humidity)
- **Power Supply:**
  - Battery input (Li-ion / $LiFePO_4$)
  - AC input support via onboard mini SMPS (240V AC to 5V DC)
- **Interfaces:**
  - I2C connector
  - UART1 connector
  - TTL-level serial interface
- **Use Cases:** Remote switching, smart irrigation, pump control, automation systems

3. Specifications

Category	Specification
Microcontroller	RAK3172 (LoRaWAN support)
Communication	LoRaWAN EU868/ IN865/ RU864 (via RAK3172) P2P (via RAK3172)
Relay Outputs	4 x SPDT mechanical 5v relays (up to 250V AC /7.5A or 14V DC / 7A each)
Onboard Sensor	AHT20 (Temperature range: -40°C to +85°C, Humidity: 0–100% RH)
Power Supply	- 240V AC input via onboard mini SMPS (converts to 5V DC) - Battery input (Li-ion / $LiFePO_4$ supported)
Connectors	- I2C header 5mm pitch - UART1 5mm pitch connector - TTL-level UART Type C Connector(debug/serial) - Battery 5mm pitch Connector - AC Power Supply 5mm pitch connector
IO Voltage	3.3V logic level (internally regulated)
Current Consumption	Ultra-low-power sleep supported by RAK3172 - Deep Sleep: ~2–5 mA - Active TX (LoRa): ~250–350 mA
Status Indicators	Relay status LEDs, LoRa TX/RX LEDs (UART2)
Operating Temperature	-20°C to +70°C
Mounting	M3 mounting holes for enclosure or panel integration
Dimensions	85.82mm x 112.42mm
Firmware Support	Arduino IDE (RUI3), STM32Cube (advanced), LoRaWAN compatible

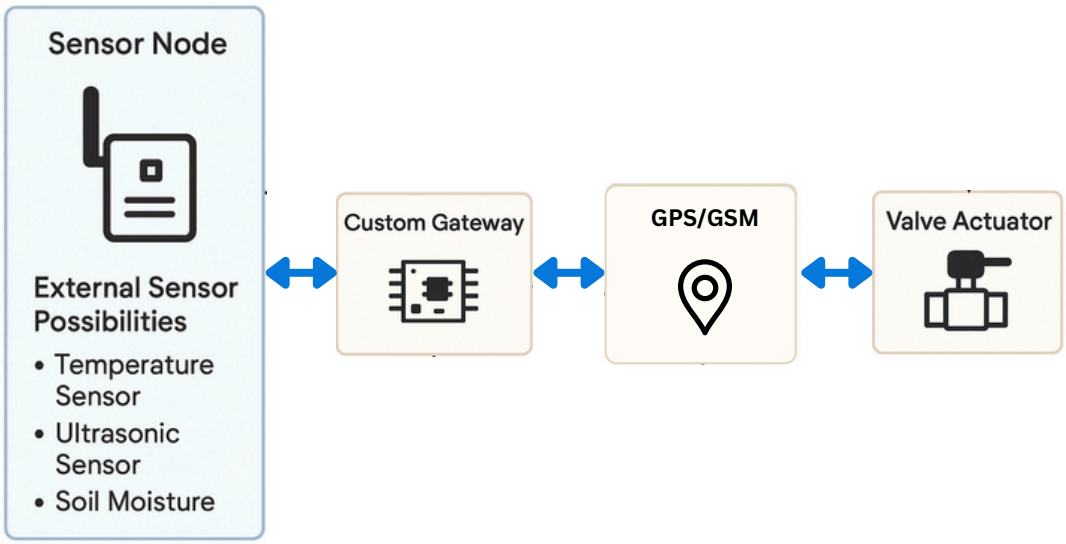
Interface	Description
Relays	Controlled via IO1, IO8, IO9, IO15 (RAK3172 GPIOs)
LED	Status LED connected to PB4
UART1	5mm pitch screw terminal, connected to RAK3172 UART1 for serial communication
I²C	5mm pitch screw terminal, shared with onboard AHT20 and available for external I²C sensors
Extra GPIOs	PB5, PA0, PB2, PA10 exposed via 5mm pitch screw terminal for user-defined functions or peripherals

Parameter	Description
Operating Voltage	3.3V (regulated from LiFePO4 / AC Power Supply)
Battery Support	LiFePO4 / LiPo /Li-ion (3s)
DC Supply *	5v to 40v (if step down module is connected)

Note: If the user requires a DC supply input (ranging from 5V to 40V), we offer a step-down module as an alternative to the onboard mini SMPS. This module can be used in place of the mini SMPS based on the application's requirements.

(Tarangify DC to DC 5v to 40v Buck converter)

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 Relay 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.

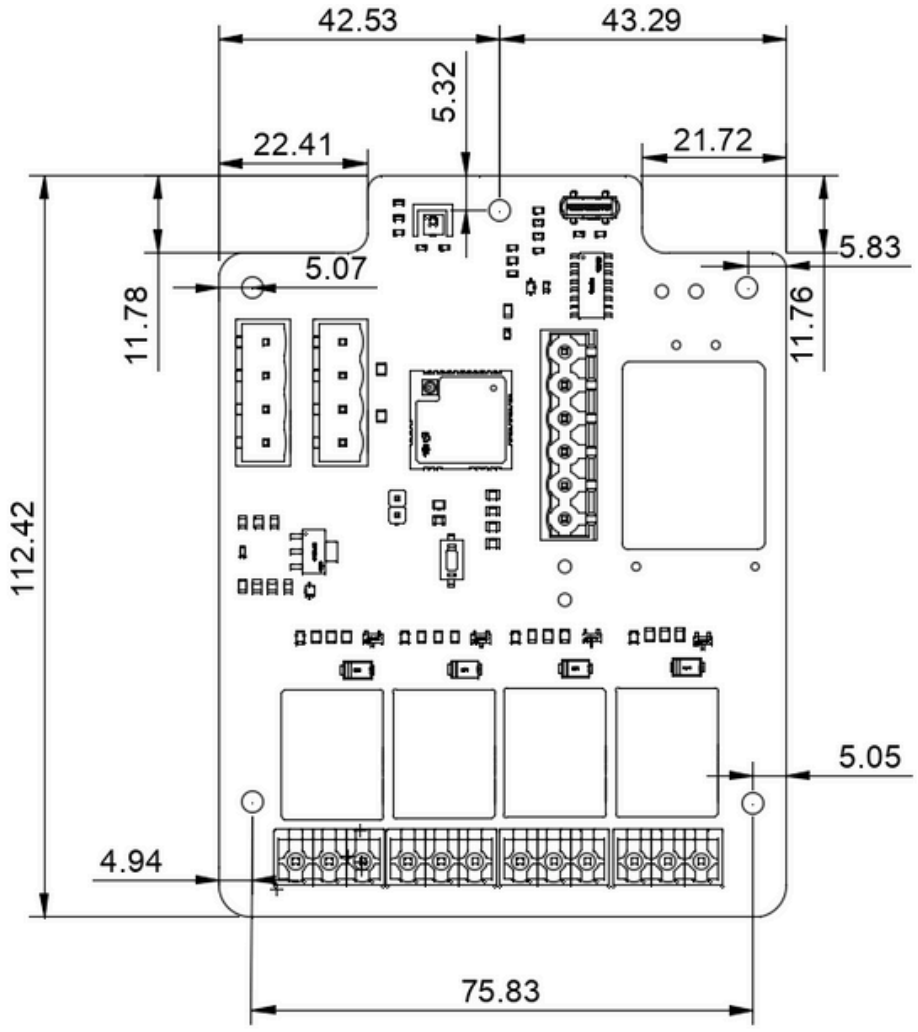
6. Environmental Ratings

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

7. Ordering Information

Product Code	Description	Color
T-Lora-RN-01	Lora Relay Node Development Board	Green

8. Mechanical Drawing

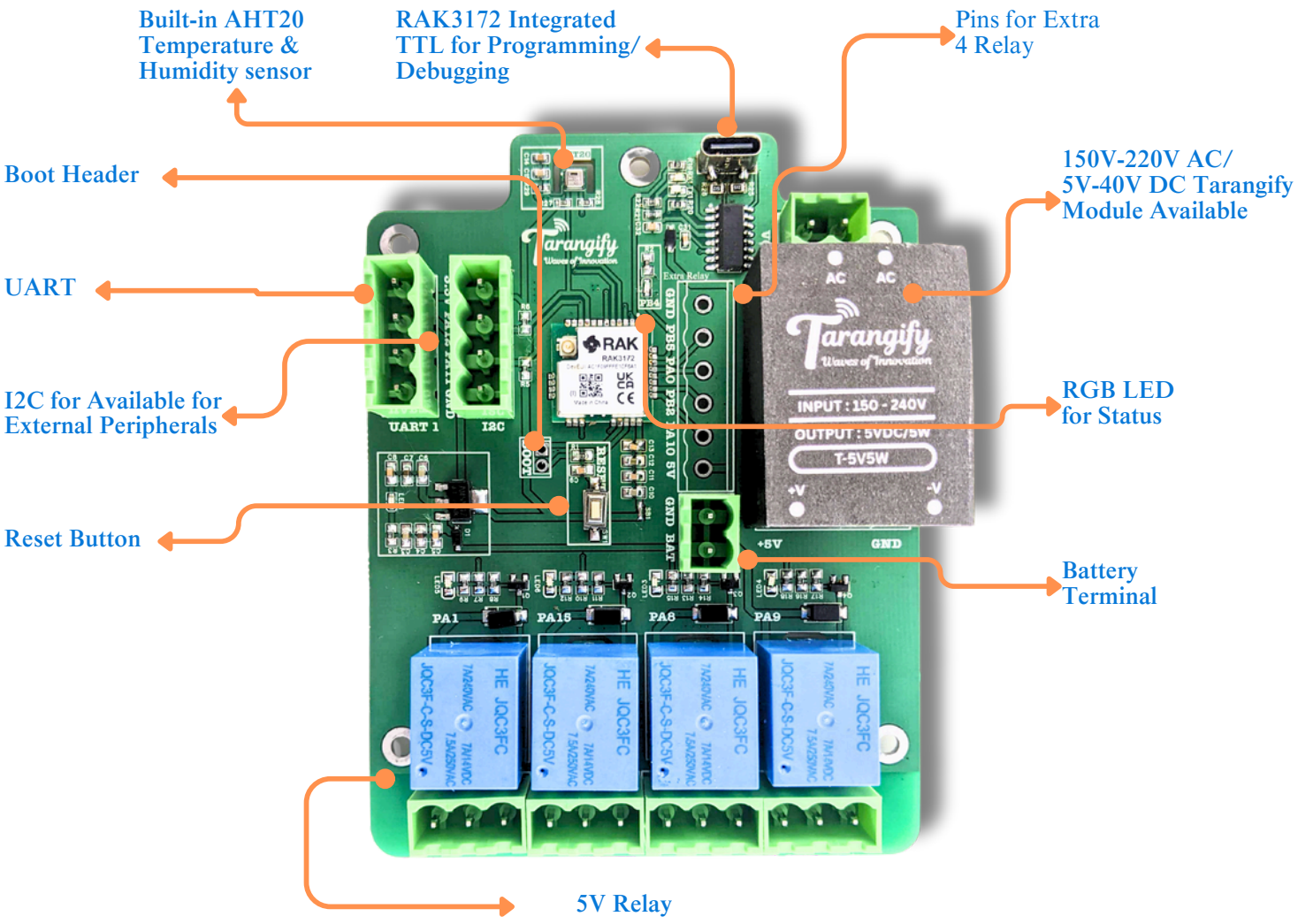


All Dimension are in mm

Dimensional error:

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

9. Relay Node PCB



10. Contact Information

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