ELECROW

ThinkNode-G1 Indoor

LoRaWAN Gateway

Datasheet

V1.0

Table of Contents

1 Product Information

1.1 Product Overview

ThinkNode G1 is an advanced LoRaWAN indoor gateway designed to connect to various network servers. This gateway supports multiple connection methods such as WiFi, Bluetooth, and Ethernet, supports 8-channel transmission, and utilizes LoRa wireless technology to achieve long-distance data transmission at extremely low data rates, providing users with an efficient and reliable communication solution.

The ThinkNode-G1 indoor gateway supports global ISM frequency bands, with a frequency range from 815 MHz to 960 MHz. It also comes preset with LoRaWAN frequency bands that comply with European and American standards. With its robust signal coverage, it offers a LoRaWAN signal range of 5 to 10 kilometers, making it suitable for a variety of wireless application scenarios.

1.2 Application Fields

- **Smart Cities:** Smart City Solutions, encompassing intelligent lighting systems, traffic management, public safety surveillance, and environmental monitoring.
- **Smart Agriculture:** Precision Farming Solutions, where LoRaWAN gateways interface with LoRa nodes to collect data from soil moisture sensors, weather stations, and livestock tracking devices.
- **Industrial Internet of Things (IIoT):** Industrial IoT Solutions, utilizing LoRaWAN gateways for remote monitoring and

management of industrial machinery and equipment.

- **Smart Buildings and Home Automation:** Intelligent Building and Home Automation Solutions, integrating LoRaWAN gateways into smart home systems for lighting control, security systems, and energy management.
- **Logistics and Supply Chain Management:** Logistics and Supply Chain Solutions, employing LoRaWAN gateways for tracking goods and assets throughout the supply chain.
- **Smart Metering:** Advanced Metering Solutions, using LoRaWAN gateways for remote reading of utility meters, including electricity, water, and gas meters, to enable more accurate billing.
- **Environmental Monitoring:** Environmental Monitoring Solutions, where LoRaWAN gateways collect data on air quality, water quality, and other environmental parameters to support ecological projects.
- **Emergency Services and Disaster Response:** Emergency Services and Disaster Response Solutions, leveraging LoRaWAN gateways to provide critical communication during emergencies to facilitate disaster response and rescue operations.
- **Consumer Applications:** Consumer IoT Applications, suitable for personal use such as home security systems and health monitoring devices.

Figure 1: Application Domains Illustration

1.3 Key Features

- **Network Server Compatibility:** Seamlessly supports multiple LoRaWAN network servers, such as The Things Network (TTN) and ChirpStack, offering flexible network service options.
- **Built-in Network Server Capabilities:** Plug-and-play functionality simplifies network deployment and accelerates the implementation of IoT projects.
- **Robust Signal Coverage:** Provides 5 to 10 kilometers of LoRaWAN signal coverage.
- **High Hardware Performance:** Equipped with a MediaTek MT7628 processor and Semtech SX1302 baseband chip, ensuring the stability

and reliability of data transmission.

- **User-Friendly Management Tools:** Comes with professional management tools and cloud services, allowing for easy configuration through a user-friendly web interface for rapid deployment and management.

Software Features

- OpenVPN
- Built-in Network Server (full LoRaWAN support V1.0.3)
- Software and Ul sit on top of OpenWRT
- Full LoRaWAN Stack support with Semtech SX1302
- LoRa Frame filtering (node whitelisting)
- Buffering of LoRa frames in Packet Forwarder mode in case of NS outage (no data loss)
- Listen Before Talk (Specific to the 868 MHz frequency band.)
- Fine timestamping (optional 868 MHz or 915 MHz frequency bands.)

2 Product Exterior Views

The exterior of the ThinkNode-G1 indoor gateway is shown in the figure below.

Figure 2:Right 45 degree view

Figure 3:Front View Illustration

3 Product Dimension Drawing

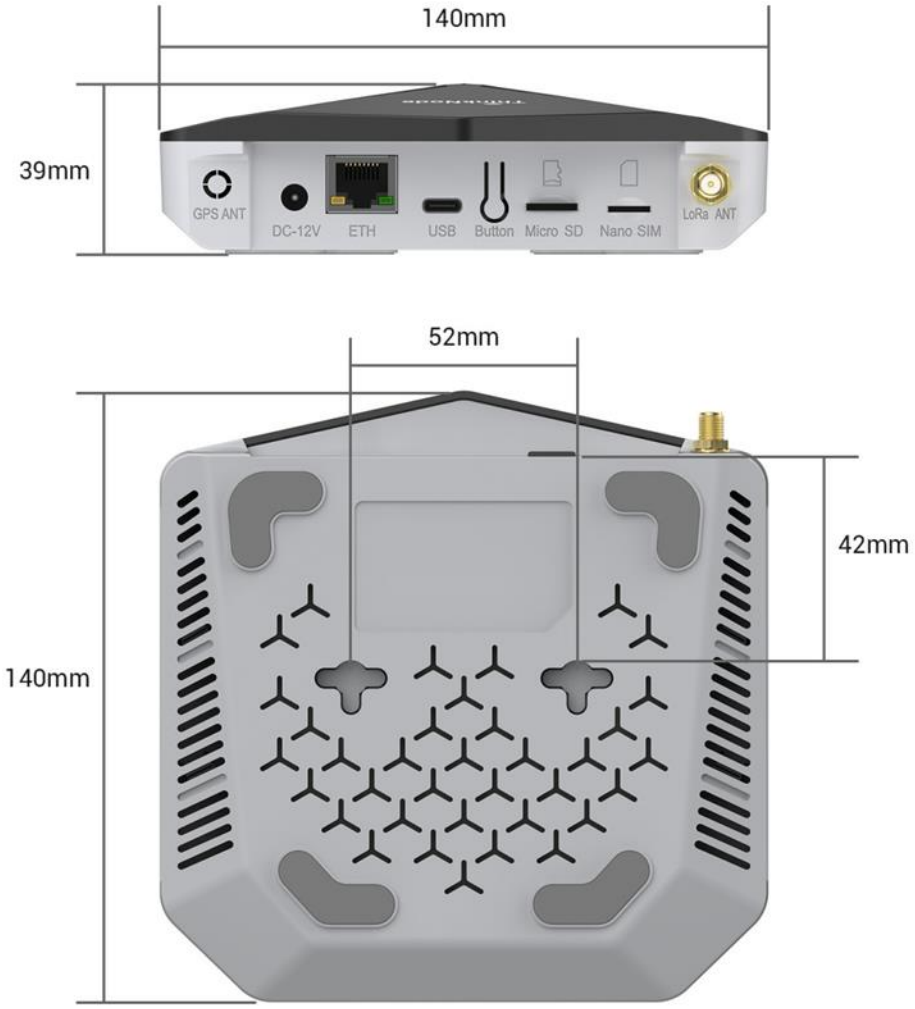

Figure 4: Device Dimensions

4 UI Components

4.1 LED Indicator Mode

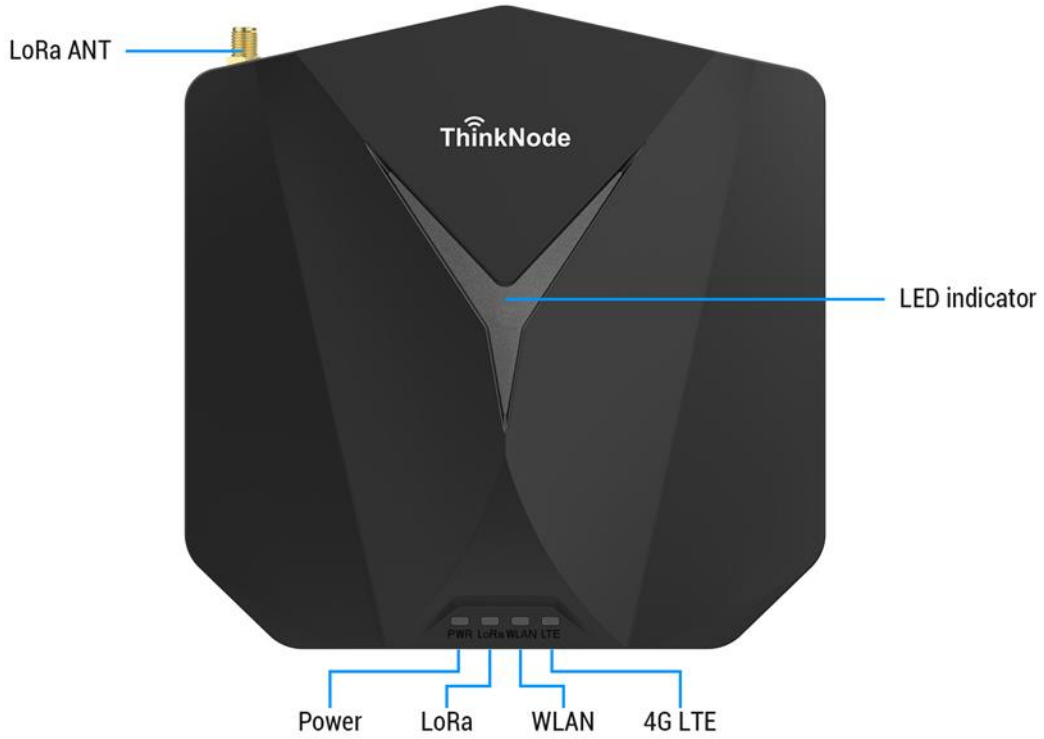

Figure 5:Indicator Light Illustration

Mode		Description
Green	Solid	Operating normally, good internet connection.
	Slow Blinking	Device/hotspot is starting up.
Blue	Slow Blinking	Configuration mode, and will auto exit after 5 mins if no activity.
	Rapid Blink	Press the button for 20s until the indicator show fast flash will trigger the factory reset.
White	Solid	Download OTA upgrade firmware.
	Slow Blink	Upgrade burned OTA firmware.
Red	Solid	Hardware issue or internet connection failure.

4.2 Port Descriptions

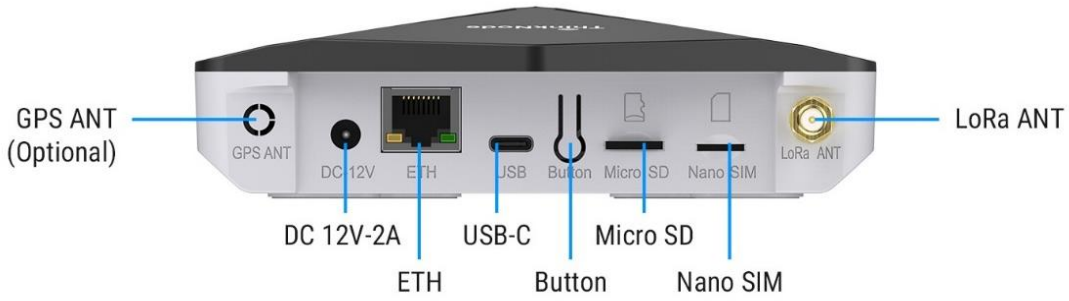

Figure 6: Port Diagram

Note:

- **SIM or SD cards are not hot-swappable. Always ensure the gateway is powered off before inserting or removing the SIM or SD card.**
- **Do not power the gateway without connecting the antenna, as this may damage the radio function.**

Port	Description
GPS ANT	Antenna interface for external GPS antenna (optional).
DC-12V	Power input interface for connecting a 12V-2A DC power supply.
ETH	Ethernet interface for connecting an Ethernet cable to a wired network (does not support POE).
USB-C	USB-C debugging interface for connecting to a computer for debugging or viewing system log information.
Button	User setting button, which can be used to set the gateway's flashing mode/operation mode.
Micro SD	TF card interface for connecting a TF card to store gateway and user information.
Nano SIM	For inserting a 4G SIM card (optional), only available in the 4G version.
LoRa ANT	Antenna interface for connecting an RP-SMA Male LoRa antenna.

4.3 Button Mode

Mode	Description
Double Click	A quick double click will trigger a software restart.
Press for 5s	Press and hold the button for 5 seconds, then release, the blue indicator light will start blinking slowly, entering the configuration mode, and it will automatically exit after 5 minutes of inactivity.
Press for 20s	Press and hold the button for 20 seconds until the blue indicator light flashes rapidly, triggering a factory reset and software restart.

5 System Architecture Diagram

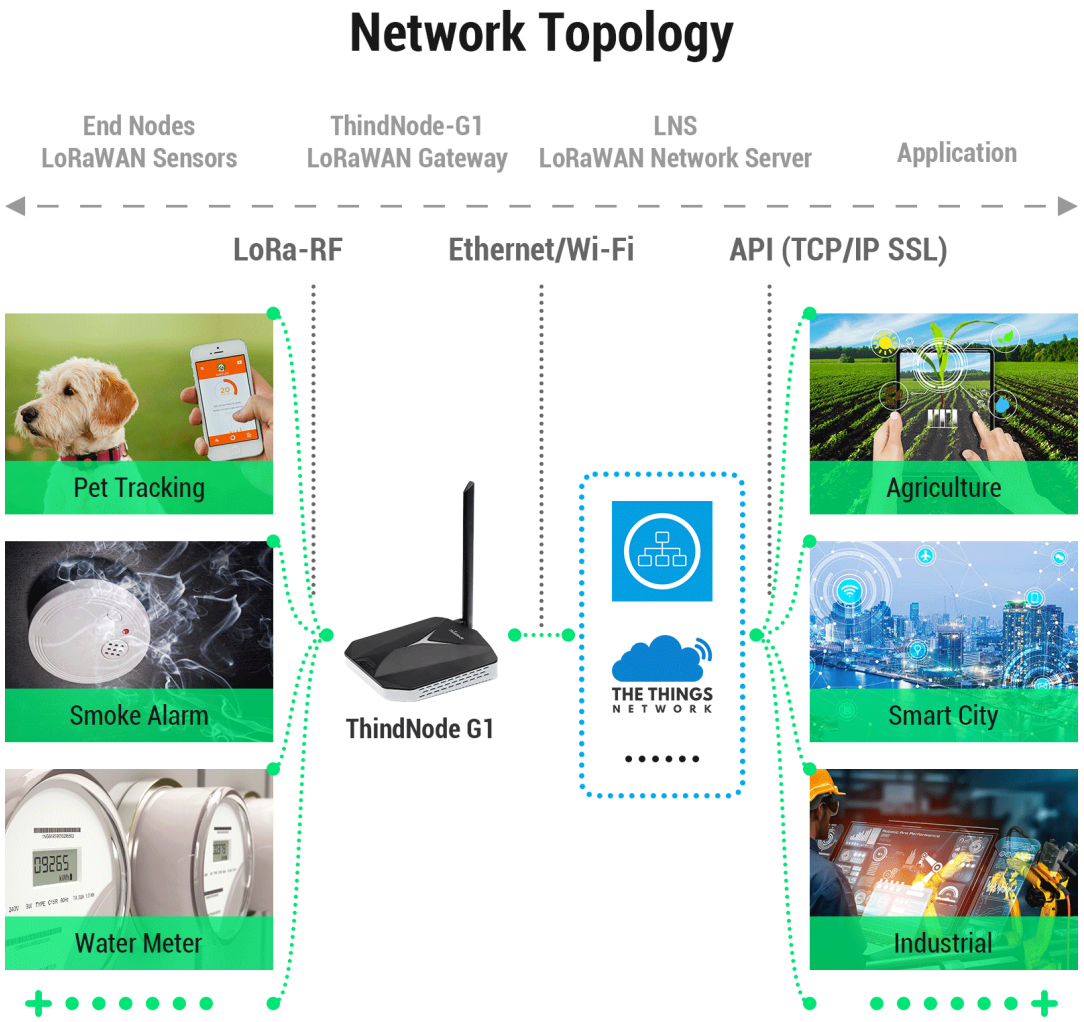

Figure 7: ThinkNode-G1 Indoor Gateway System Architecture Diagram

6 System Block Diagram

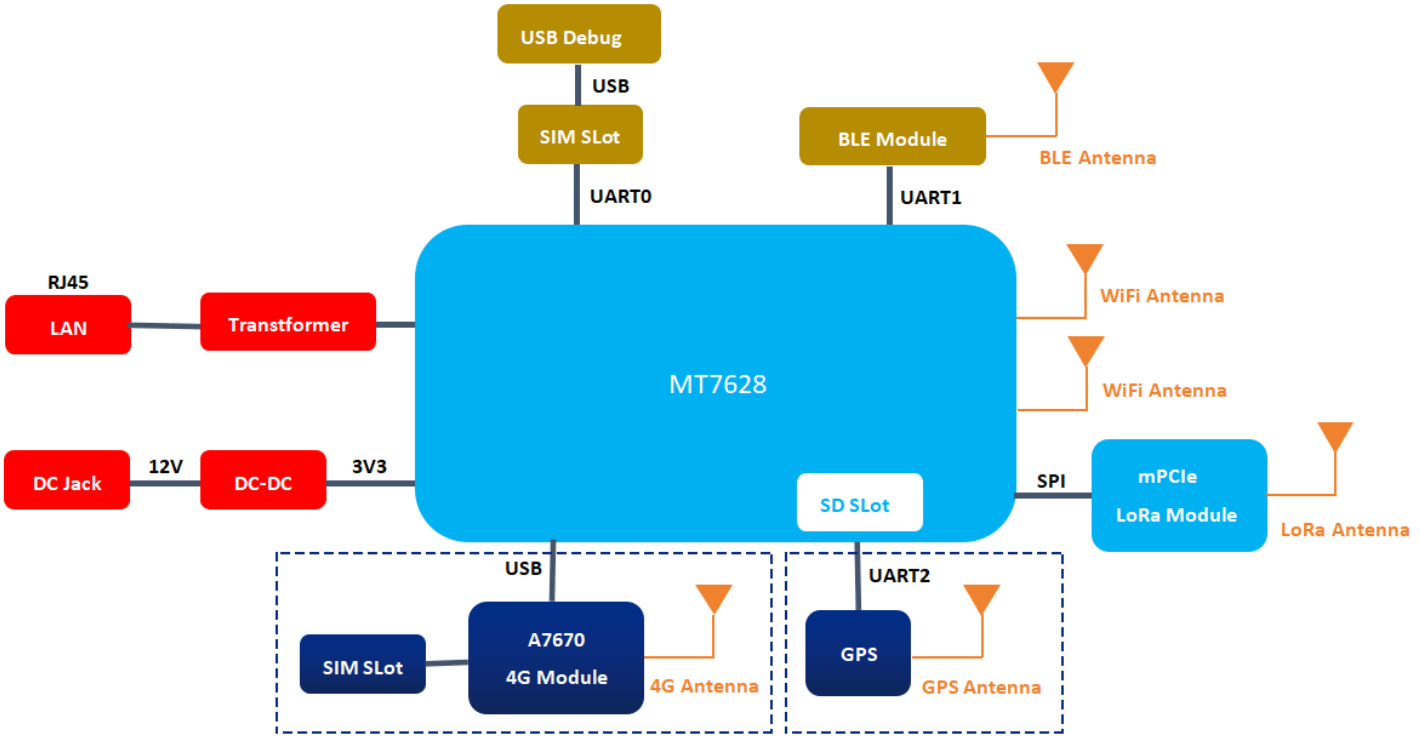

Figure 8:System Architecture Diagram of ThinkNode-G1 Indoor Gateway

7 Technical Specifications

7.1 Performance Parameters

Item Group	Item		Parameter	
Main Controller	Processor		MT7628（MIPS24KEc@580MHz）	
	RAM		DDR2 128MB	
	Flash		32MB	
System Power Consumption	Software (OpenWRT)		Supports network user interface for easy configuration and monitoring	
LoRa Features	LoRa Gateway Chip		SX1302（8-Channel）	
	LoRa Sensitivity		-125dBM@125KHz/SF7	
			-139dBM@125KHz/SF12	
	LoRa TX Power		Up to 26dBm	
	LoRaWAN® Protocol		Supports Class A/Class B/Class C	
	Frequency Band		EU868/US915	
Network	WiFi		Supports IEEE 802.11 b/g/n wireless standards, built-in antenna	
	Wired		Support IEEE 802.3, IEEE 802.3u wired standards, RJ45 (10M / 100M)	
	Bluetooth		Dual module, Bluetooth V2.1+EDR and V5.2	
	LTE Cat(Optional)		Global band (SIM7670)	
	Ethernet		RJ45(10M/100M)	
Antenna Features	Antenna		LoRa: 3dBi external rod antenna, Wi-Fi: internal PCB antenna, BLE: ceramic antenna	
	Antenna Impedance		50 Ohms	
Electrical Characteristics	Input Voltage		DC 12V-2A	
	System Power Consumption	Configuration Mode	Power Consumption	
			Min(W)	Max (W)
		WiFi	1.5	1.6
		Ethernet	1.5	1.7
		4G Mode	1.9	2.1

7.2 Physical Characteristics

Feature	Specification
Dimensions	140(L)*140(W)*39(H)mm
Weight	204.8g
Color	Black with Grey, Matte surface texture
Mounting Method	Desktop placement,Wall mounting, Wall-mounted installation
Housing Material	ABS+PC(Case)、PC frosted (light guide)

7.3 Electrical Characteristics

7.3.1 RF Specifications

Wi-Fi Radio Specifications

Feature	Specification
Frequency Band	2.4 GHz (802.11b/g/n)
Wireless Communication Technology	2x2 MIMO
RX Sensitivity TX Power	-95dBm (Min)
Optional Frequency Bands	20 dBm (Max)
Frequency Band	2.4 GHz:1-13

LoRa® Radio Specifications

Feature	Specification	
LoRa Baseband Processor	SX1302	
Number of Signal Channels	8 channels	
Region	EU868	US915
Receive Sensitivity	-125 dBm (Min)	-125 dBm (Min)
Transmit Power	26 dBm (Max)	25 dBm (Max)

7.4 Environmental Requirements

Feature	Specification
Operating Temperature	-20℃ to 55℃
Storage Temperature	-30℃ to 70℃

8 Certifications

9 User Guide

- User Manual

10 Related Documents and Resources

- ThinkNode G1 Gateway
- Multiple LoRa nodes
- SX1302 Datasheet

11 Revision History

Date	Version	Release Notes
2025/3/3	V1.0	Initial release