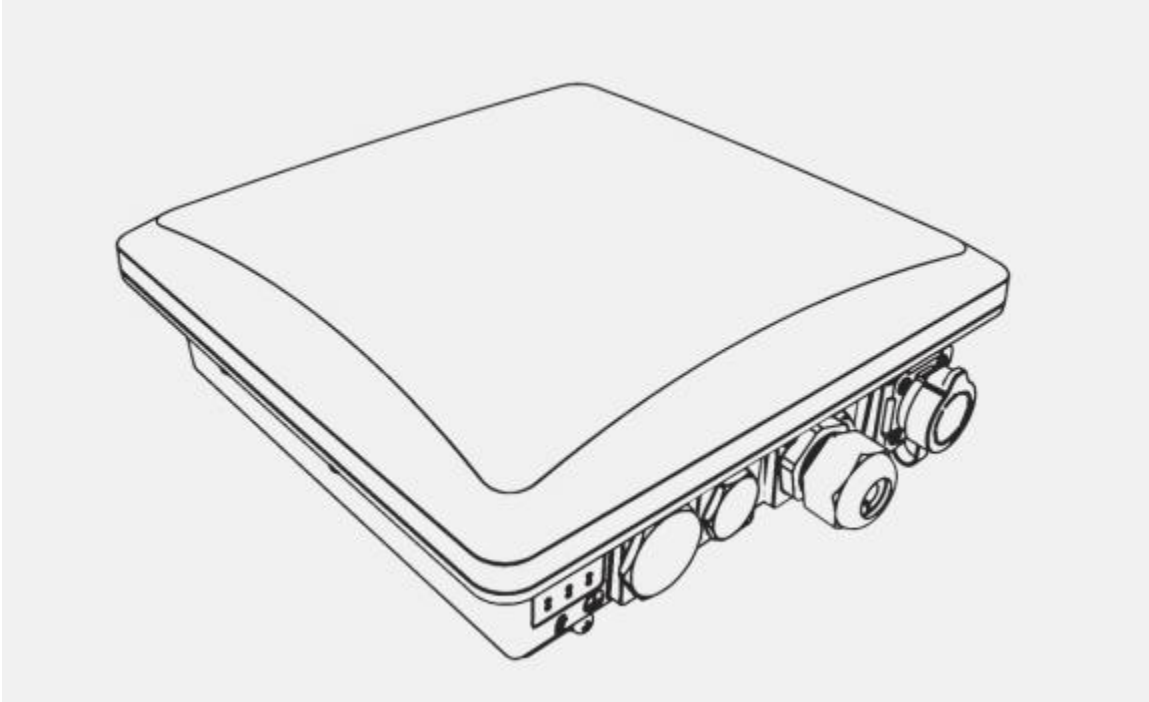


RAK7393 / RAK7393C WisGate Connect



1. Product Introduction

1.1 Overview

The RAK7393 / RAK7393C WisGate Connect is a LoRaWAN gateway based on Raspberry Pi CM4. It is specially designed as a powerful and flexible gateway for Smart Cities and Smart Farming.

It supports up to 16 loRa channels, multi-backhaul with Ethernet, Wi-Fi, and Cellular connectivity.

It can be powered via PoE or 9~36 VDC power supply. The gateway provides two type-N connectors for LoRaWAN antennas and an internal antenna panel with embedded GPS, LTE and WiFi antennas.

The RAKPiOS is a tailored operating system for RAK7393 / RAK7393C. It is a fork of the Raspberry Pi OS with all the required drivers to use the device, some security changes, helper scripts and Docker included by default. With the included rakpios-cli you can easily configure the network and deploy several IoT services from a curated list of docker containers available from the device.

1.2 Features

Hardware

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- Supports up to 16 channels
- Backhaul: Wi-Fi, Ethernet, LTE (optional, available with RAK7393C)
- PoE (802.3at) + Surge protection
- Supports 9~36 VDC power supply
- GPS
- Internal antenna for Wi-Fi, GPS and LTE, external antenna for LoRa

Software

- Computing with Raspberry Pi CM 4
- Based on the LoRa Concentrator Engine: Semtech SX1303
- RAK Pi OS, a tailored operating system that expands your options while maintaining compatibility with the stock Raspberry Pi OS
- Built-in ChirpStack Network Server
- LoRaWAN 1.0.3
- MQTTv3.1 Bridging with TLS encryption
- Command-line tool for network and Docker image management
- Web-based administration tool offering easy access to your application

2. Specifications

2.1 Block Diagram

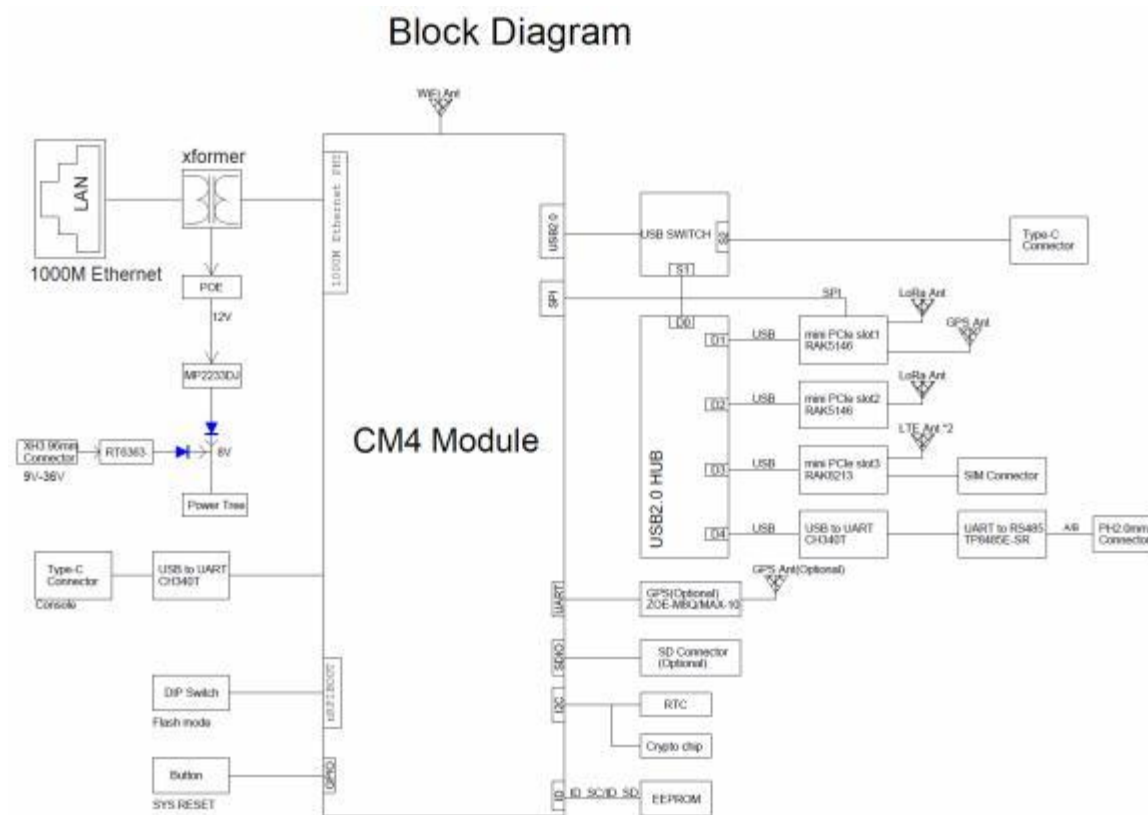


Figure 1: Block diagram

2.2 Main Specifications

Feature	Specifications
Computing	Raspberry Pi CM4
Operating system	RAK Pi OS
Wireless	Wireless 2.4 GHz/5.0 GHz (IEEE 802.11 b/g/n/ac) BLE Bluetooth 5.0

Feature	Specifications
LoRa feature	SX1303 mPCIe card 16 channels RX Sensitivity: -139 dBm (Min) TX Power: 27 dBm (Max) Listen Before Talk
Frequency	EU868 / IN865 / US915 / AU915 / KR920 / AS923 EU433 / CN470
Cellular Feature	<p>Supports Quectel EG95-E/EG95-NA/EC25-AU/ EC25-E / EC25-J (IoT/M2M -optimized LTE Cat 4 Module)</p> <p>EG95-E for EMEA Region (Europe, Middle East and Africa)</p> <p>LTE FDD: B1/B3/B7/B8/B20/B28A</p> <p>WCDMA: B1/B8</p> <p>GSM/EDGE: B3/B8</p> <p>EG95-NA for North America Region</p> <p>LTE FDD: B2/B4/B5/B12/B13</p> <p>WCDMA: B2/B4/B5</p> <p>EG25-AU for Australia/New Zealand/Taiwan Region</p> <p>LTE FDD: B1/B2/ B3/B4/B5/B7/B8/B28</p> <p>LTE TDD: B40</p> <p>WCDMA: B1/B2/B5/B8</p> <p>GSM: B2/B3/B5/B8</p> <p>EG25-E for EMEA/Korea/Thailand Region</p> <p>LTE FDD: B1/B3/B5/B7/B8/B20</p> <p>LTE TDD: B38/B40/B41</p> <p>WCDMA: B1/B5/B8</p>

Feature	Specifications
	GSM: B3/ B8 EG25-J for Japan Region LTE FDD: B1/B3/B8/B18/B19/B26 LTE TDD: B41 WCDMA: B1/B6/B8/B19
Power Supply	PoE (IEEE 802.3at) 42~57 VDC 9~36 VDC
ETH	RJ45 (10/100/1000 M)
Antenna	LoRa: Two Type-N connectors, external antenna GPS / Wi-Fi / LTE: Internal antenna
Ingress protection	
Enclosure material	Aluminum and plastic
Dimensions	240 x 240 x 89.5 mm
Operating temperature	-20° C to +55° C
Operating humidity	0-95% RH non-condensing
Installation Method	Pole or wall mounting

3. Hardware

The hardware specification covers the interfacing of the RAK7393 / RAK7393C and its corresponding functionalities. It also presents the parameters and the standard values of the gateway.

3.1 LoRa Radio Specifications

Feature	Specifications
Operating Frequency	EU868 / IN865 / US915 / AU915 / KR920 / AS923 / EU433 / CN470
Transmit Power	27 dBm (Max)
Receiver Sensitivity	-139 dBm (Min)

3.2 Interfaces



Figure 2: Interfaces

Warning ▲!

The gateway supports eMMC by default. If you need to insert an SD card, you can contact RAK technical support.

The SIM cardslot of the cellular versions is not hot-swappable. Make sure the gateway is switched off before inserting or ejecting the SIM card.

Restart Key Function

- **Long press** (2sand above): Restart the gateway.

LEDs Status

LEDs	Status	Description
Power	On	Device power on

LEDs	Status	Description
	Off	Device power off
ETH	On	Linkup
	Off	Linkdown
	Flash	Data transmitting and receiving
LoRa1	On	LoRa1 is working
	Off	LoRa1 is not working
LoRa2	On	LoRa2 is working
	Off	LoRa2 is not working
WLAN (AP Mode)	On	WLAN is working
	Off	Wi-Fi disable
WLAN (STA Mode)	Slow Flash	(1Hz) - Connection Disconnected
	On	Connection Successful
LTE	Slow Flash 1	(200ms Bright /1800ms Dark) Unregistered network (Network searching)
	Slow Flash 2	(200ms Dark /1800ms Bright) Idle status (Online)
	Quick Flash	Data Transmitting and Receiving

4. Software

RAKPiOS, a custom OS based on the Raspberry Pi OS that includes all of the required drivers, some security changes, helper scripts, and Docker by default.

Model	Source
RAK7393 / RAK7393C WisGate Connect	Download

Class A警告语

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

FCC:

FCC compliance statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 30cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

ISED compliance statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) L'appareil ne doit pas produire de brouillage;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED Radiation Exposure statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 30 cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR-102 établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 30 cm entre le radiateur et votre corps.