

# KNOT LR8/LR9 kit

An out-of-the-box IoT Gateway solution for LoRa® technology.  
For ultimate versatility and cost-effectiveness.



*The first gateway with a CAT-M interface for LoRa®!*



LoRa® 868MHz or  
915MHz



CAT-M/NB  
technology



2.4 GHz  
wireless



Bluetooth



2x 100 Mbps  
Ethernet ports



PoE-in &  
PoE-out



MicroUSB



GNSS



GPIO



RS485/Modbus

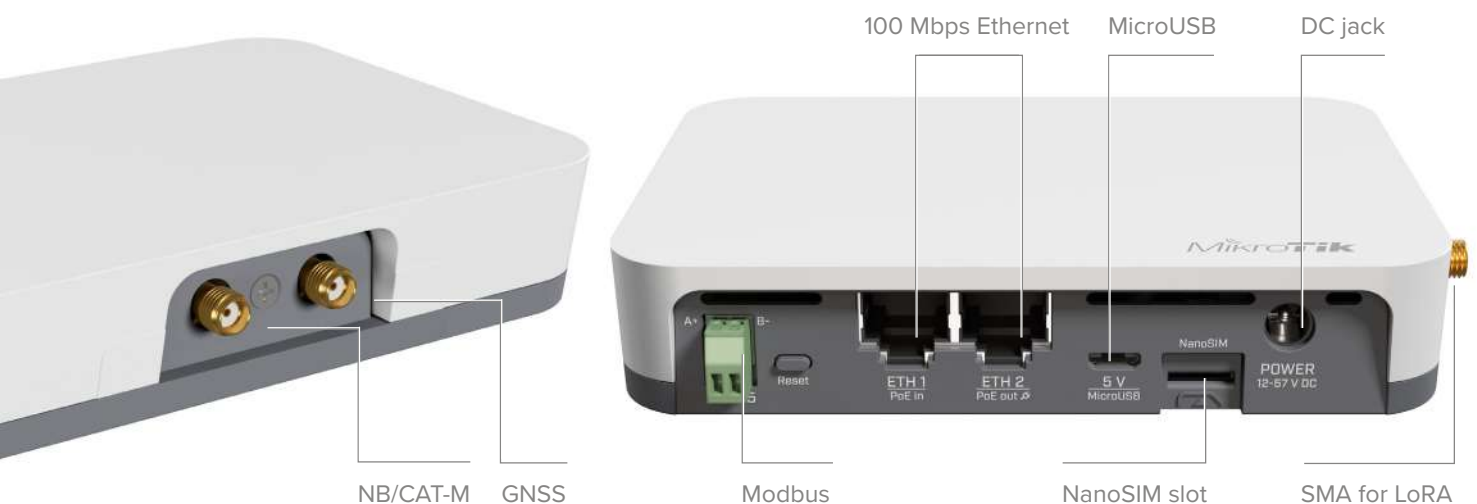
We all know the struggle of managing so many devices with different interfaces and communication protocols.. You keep adding new solutions to your setup to keep up, but the older devices are still too good to let them go. How do you integrate all of them in a single system that will serve you right? Easy – you “tie” them together by using the KNOT!

It doesn't matter whether you have devices that are no longer in production, devices that came out this year, or even some custom solutions by your technician – the KNOT can handle them all!

KNOT LR8/LR9 kit is an out-of-the-box IoT Gateway solution for LoRa® technology. It uses Narrow Band and CAT-M technology. Because of the low cost, low bandwidth cellular connection, it is supported by countless mobile operators around the globe. This kit contains a pre-installed UDP packet forwarder to any public or private LoRa® servers. With the support of 8 different channels, Listen Before Talk (LBT) and spectral scan features this product will astound you with its enticing price point.

It could be used as a backup connection for the Ethernet or as a management channel for your network. NB/CAT-M monthly plan is much cheaper than LTE. Why spend extra money on bandwidth you don't need? For example, you can manage a KNOT-powered vending machine with temperature and moisture sensors with only a few megabytes per day!

**/** KNOT features so many protocol support and connectivity options: 2.4 GHz wireless, Bluetooth, LoRa®, 2x 100 Mbps Ethernet ports with PoE-in and PoE-out, Micro-USB. Maximum convenience at the lowest cost!



With the Bluetooth interface, you can use the KNOT for asset tracking and telemetry based on Bluetooth advertisement packets. KNOT supports any BLE tag that sends advertisement data. iBeacon, Eddystone or any other format.

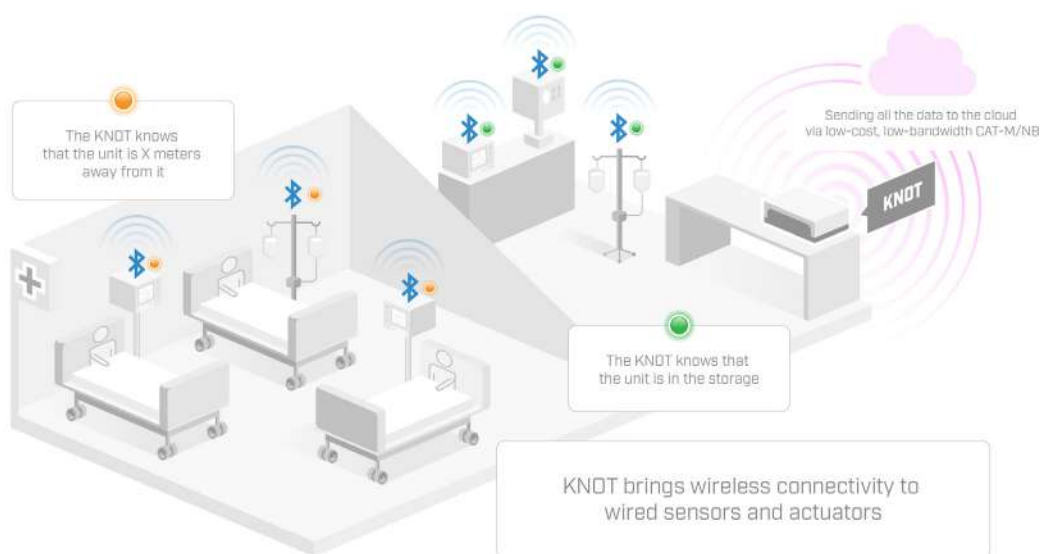
It has powerful filters for forwarding only relevant packets and ignoring others.

This kit can even help you in the most unusual situations. Remember the part about onboard GPIOs? Those pins can be used to read all kinds of analog sensors, interact with a single-board computer or other custom electronics – hobbyist kits, D.I.Y. robotics... It's like getting the whole Swiss Army instead of a Swiss Army knife!

KNOT is a great tool for most outdoor cabinet IoT applications as well. It comes with a DIN rail mount that allows easy integration with all kinds of setups: from agriculture and asset tracking to cold chain monitoring, industrial manufacturing, and so on.



Bring flexible low-cost connectivity to the most remote or tricky areas with the MikroTik KNOT!



How would all this work in real life? Well, let's imagine a hospital. Lots of expensive assets moving across huge buildings. Tools, equipment, meds, you name it. Everything gets moved around all the time. Usually, hospitals have to spend a lot of resources on inventory checking.

Let's fix that. Place low-cost Bluetooth tags on all the important items. Add a KNOT device in every storage room. Now the hospital management always knows if the equipment is returned to its place. Why stop there? You can add temperature sensors to medical supplies and use the KNOT to keep track. The possibilities are endless.



*Narrow Band and CAT-M technology is supported by many operators around the world!*

*\* According to the 3GPP deployment map, Feb 2021 <https://www.gsma.com/iot/deployment-map/>*

## Specifications

Product code	RB924i-2nD-BT5&BG77&R11e-LR8/LR9
CPU	QCA9531 650 MHz
Number of 100 Mbps Ethernet ports	2
Number of 100 Mbps Ethernet ports with PoE-out	1
Size of RAM	64 MB
Storage	128 MB flash SPI NAND
Concentrator Gateway card for LoRa®	R11e-LR8/R11e-LR9
Wireless	2.4 GHz 802.11 b/g/n dual-chain
Antenna gain	1.5 dBi
Bluetooth antenna gain	2 dBi
Antenna beam width	360°
Bluetooth	Version 5.2
Dimensions	122 x 87 x 26 mm
Operating system	RouterOS, License level 4
USB port	1 microUSB port type AB
SIM slots	1 Nano SIM
Built-in GPS	Yes (GPS, GLONASS, BeiDou, Galileo)
Operating temperature	-40°C to +70°C

## Powering

PoE-in input Voltage	12-57 V
Number of DC inputs	3 (PoE-in, DC jack, MicroUSB)
Supported input Voltage	12-57 V (PoE-in, DC jack), 5 V (MicroUSB)
PoE-out	802.3af/at
PoE-out ports	1 (Ether2)
Power adapter nominal voltage	24 V
Power adapter nominal current	1.2 A
Max power consumption (without attachments)	5 W
Max power consumption	18 W

## Certification & Approvals

Certification	Bluetooth, CE, FCC, IC
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## Wireless specifications

Rate (2.4 GHz)	Tx (dBm)	Rx (dBm)
1MBit/s	22	-96
11MBit/s	22	-89
6MBit/s	20	-93
54MBit/s	18	-74
MCS0	20	-93
MCS7	16	-71
<b>Bluetooth Wireless Specification</b>		
1M	4	-93

## Supported bands

### Module BG77

Cat M1: LTE FDD	B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85
Cat NB2: LTE FDD	B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85
Region	Global
GNSS (Optional)	GPS/GLONASS/BeiDou/Galileo/QZSS

## R11e-LR8/R11e-LR9 specifications

Product code	R11e-LR8	R11e-LR9
Interface	Mini-PCIe	
Supported class	A and C	
Frequency	863-870 MHz (EU863-870, RU864-870, IN865-867)	902-928 MHz (AU915-928, US902-928, AS923, KR920-923)
RF Output power	863-870 MHz 14 dBm	902-928 MHz 23 dBm
Receive max sensitivity	-137 dB @ SF12	
Range	Up to 15 km in rural environment and up to 2 km in urban environment when using MikroTik LoRa® 6.5 dBi antenna kit	
Operating ambient temperature	-40°C .. +70°C	
Max power consumption	2 W	

## Included parts



24 V 1.2 A  
power adapter



Wall mount  
set



DIN rail  
mount set



USB A Female to  
Micro B cable