

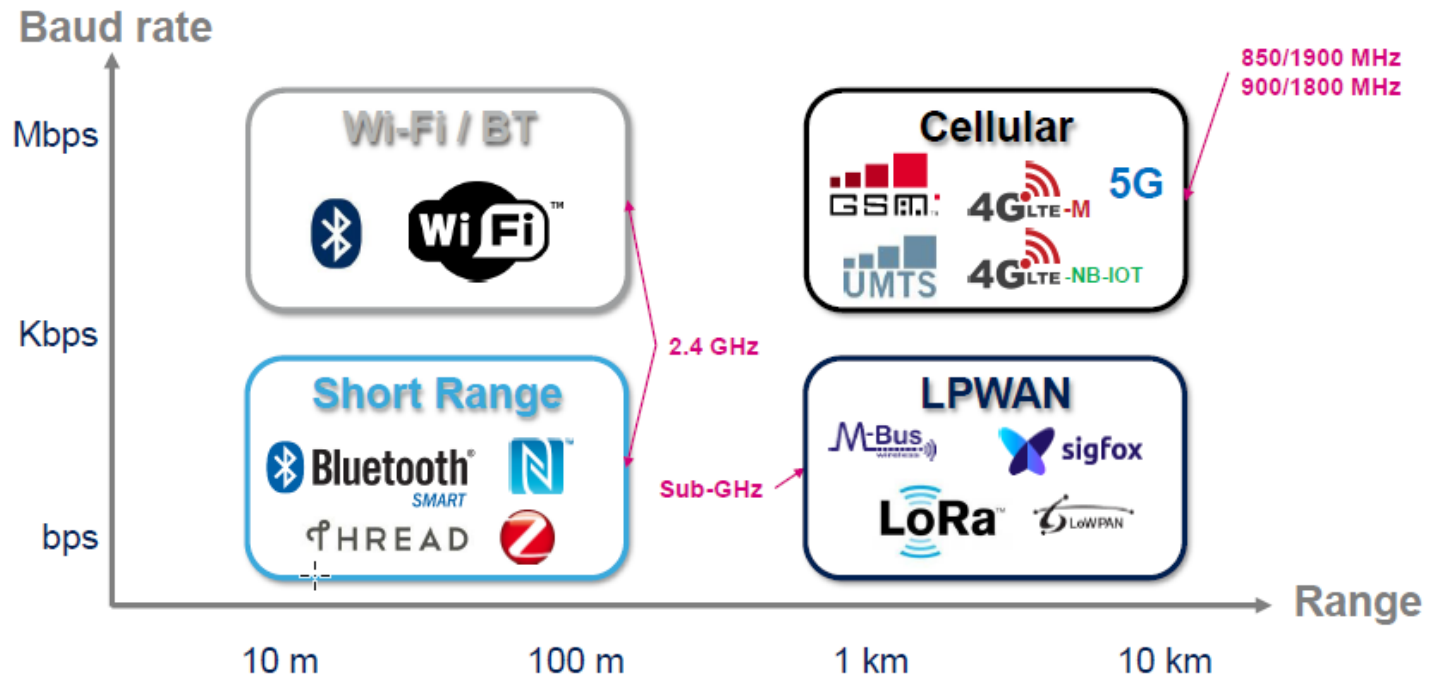


MiP Wireless Modules for IoT market using LPWAN Protocols

Customer oriented. Competence. Quality.

LPWAN Communication Technology

Communication Technologies - Overview



The MiP Series

The MiP Series is a family of high performance wireless modules designed to be easily integrated on any board.

- **Extremely small footprint**, 11.3 mm x 8.9 mm
- **Lightweight**, 0.48 g
- **Flexible**, same footprint and same signals for all the modules
- **Cost effective**, open core option to write your own application
- **Safe**, secure element option
- **Optimized**, high performance radio features
- **Stable**, high frequency stability in a wide temperature range
- **Made in EU**, designed and manufactured in Italy by Mipot

MiP Protocols

The MiP series support a variety of protocols:

- **Worldwide Protocols with Different Frequencies**



- **Custom Private Network**

LoRa Mipot Network

LoRa Modem



MiP Protocols

➤ Worldwide Protocols – Future

- New SigFox



- New Mioty ...



MiP Series - Characteristics



Single/Dual Core M4/M0+



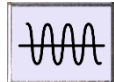
LoRa/FSK



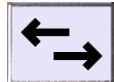
52 pins



11.30 x 8.90 mm



from 868 MHz to 960 MHz



SPI, I²C
UART, LPUART



Secure element



-40°C +85°C



-115 dBm@2-FSK
-135 dBm@LoRa



+14 dbm@868MHz
+20 dBm@915MHz



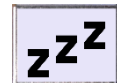
50Ω antenna pad



100 mA@+14dBm
140 mA@+20dBm



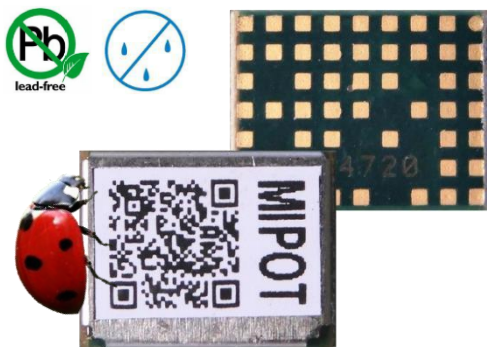
Power Down 1.5 μA



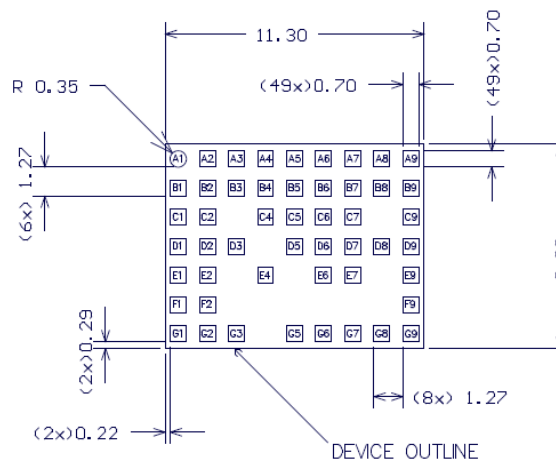
World coverage



Footprint and mechanical dimensions



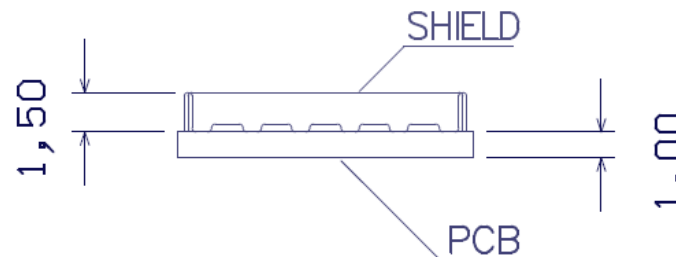
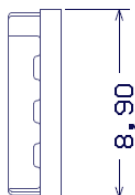
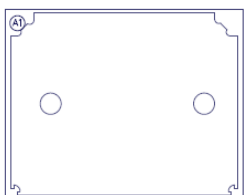
FOOTPRINT _ TOP VIEW



ALL DIMENSIONS ARE IN MILLIMETERS
OCCUPIED AREA = 100.57 mm²

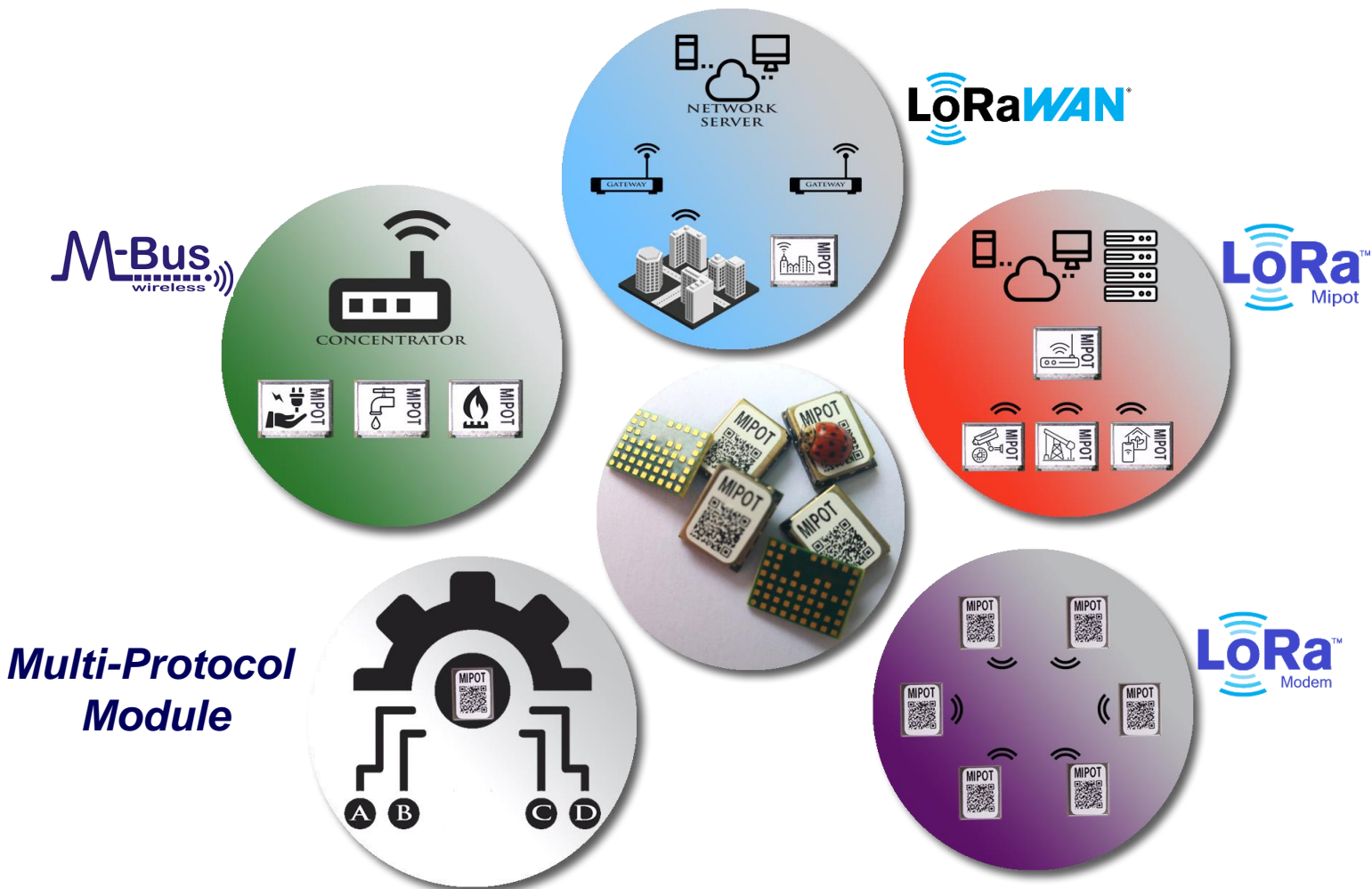
All the MiP modules share the same mechanical dimensions and footprint

TOP VIEW



MiP Ecosystem

Not only a radio product but an ecosystem built on different radio stacks.



From the previous Line to the New one



FROM
Form Factor
15,5 x 26 mm

- 32001353 LoRaWAN 868 MHz
- 32001345M LoRa Modem 868 MHz
- 32001345 LoRa Mipot 868 MHz
- 32001409 LoRaWAN US 915 MHz
- 32001324 wMBUS 868 MHz
- 32001445 IEEE 802.15.4 2400 MHz

TO
Form Factor
11,3 x 8,9 mm

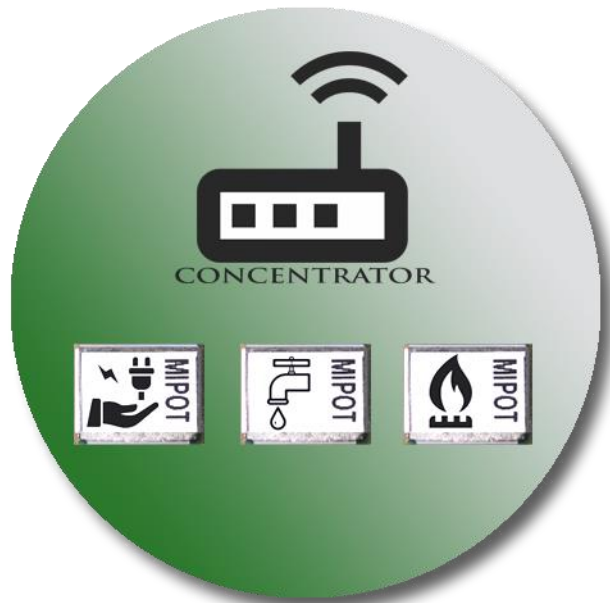


32001505AEU – wMBus
32001505BEU – LoRaWAN (Europe)
32001505BUS – LoRaWAN (US)
32001505CEU – LoRa Mipot+
32001505DEU – LoRa Modem
32001505FEU – LoRaWAN+LoRa Modem

...

Many others are coming soon!

MiP Ecosystem



Taking advantage of the MiP FSK modulation capabilities Mipot created a wireless M-BUS radio stack, compliant with the latest OMS 4 specifications.

Wireless M-BUS and OMS 4 represent, de facto, the european standard for metering systems including water, gas and electric power meters.

MiP Module part number: **32001505AEU**

Low power characteristics

- ✓ Power down current consumption 1.5 μ A
- ✓ 11 mA in RX mode

RF Performances

- ✓ -115 dBm Sensitivity @FSK
- ✓ +14 dBm Output power @FSK

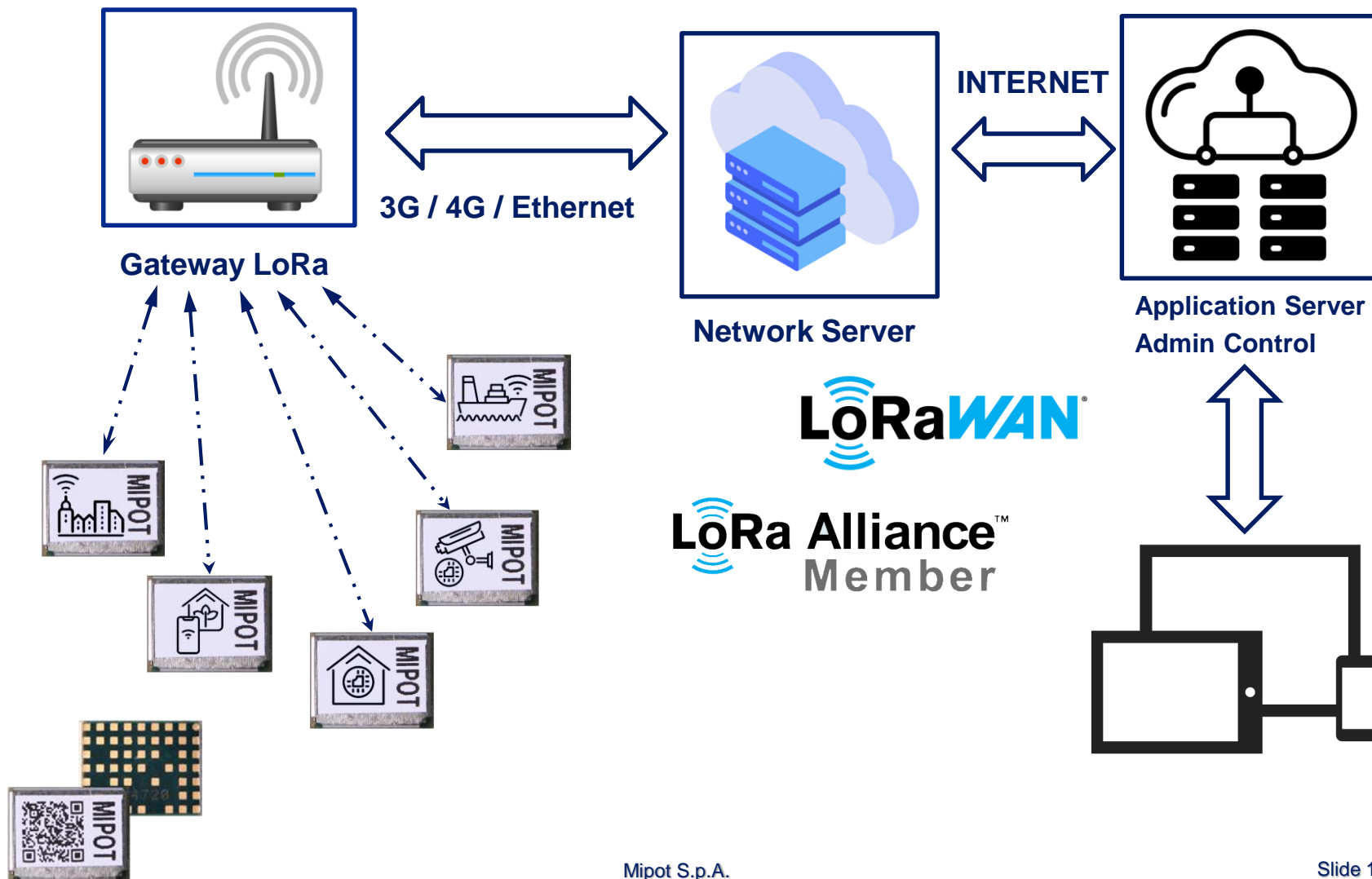
Protocols available

- ✓ WMBUS OMS4

Interfaces

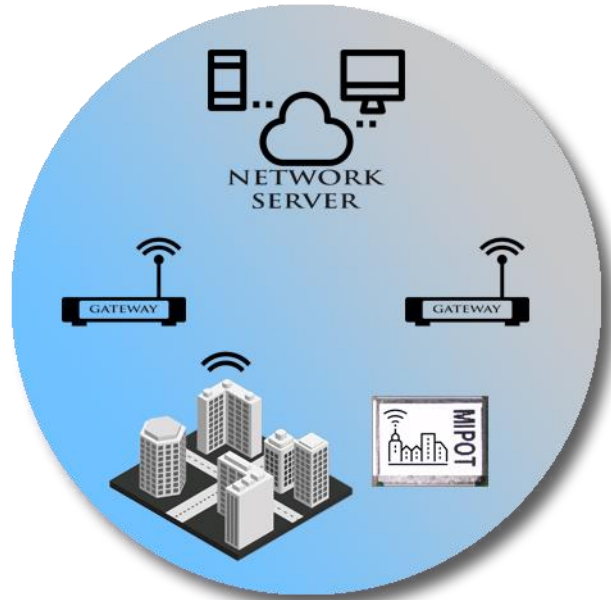
- ✓ Smart peripheral interfaces selector (UART, LPUART, SPI, I2C)

LoRaWAN





MiP Ecosystem



Built on LoRa Alliance specifications 1.03, the MiP allow an easy implementation of the most popular LoRa network protocol.

MiP Module part number:

32001505BEU



32001505BUS



Low power characteristics

- ✓ Power down current consumption 1.5 μ A
- ✓ 11 mA in RX mode

RF Performances

- ✓ -135 dBm Sensitivity @LoRa
- ✓ +14 dBm Output power @868MHz
- ✓ +20 dBm Output Power@915MHz

Protocols available

- ✓ LoRaWAN[®]

Interfaces

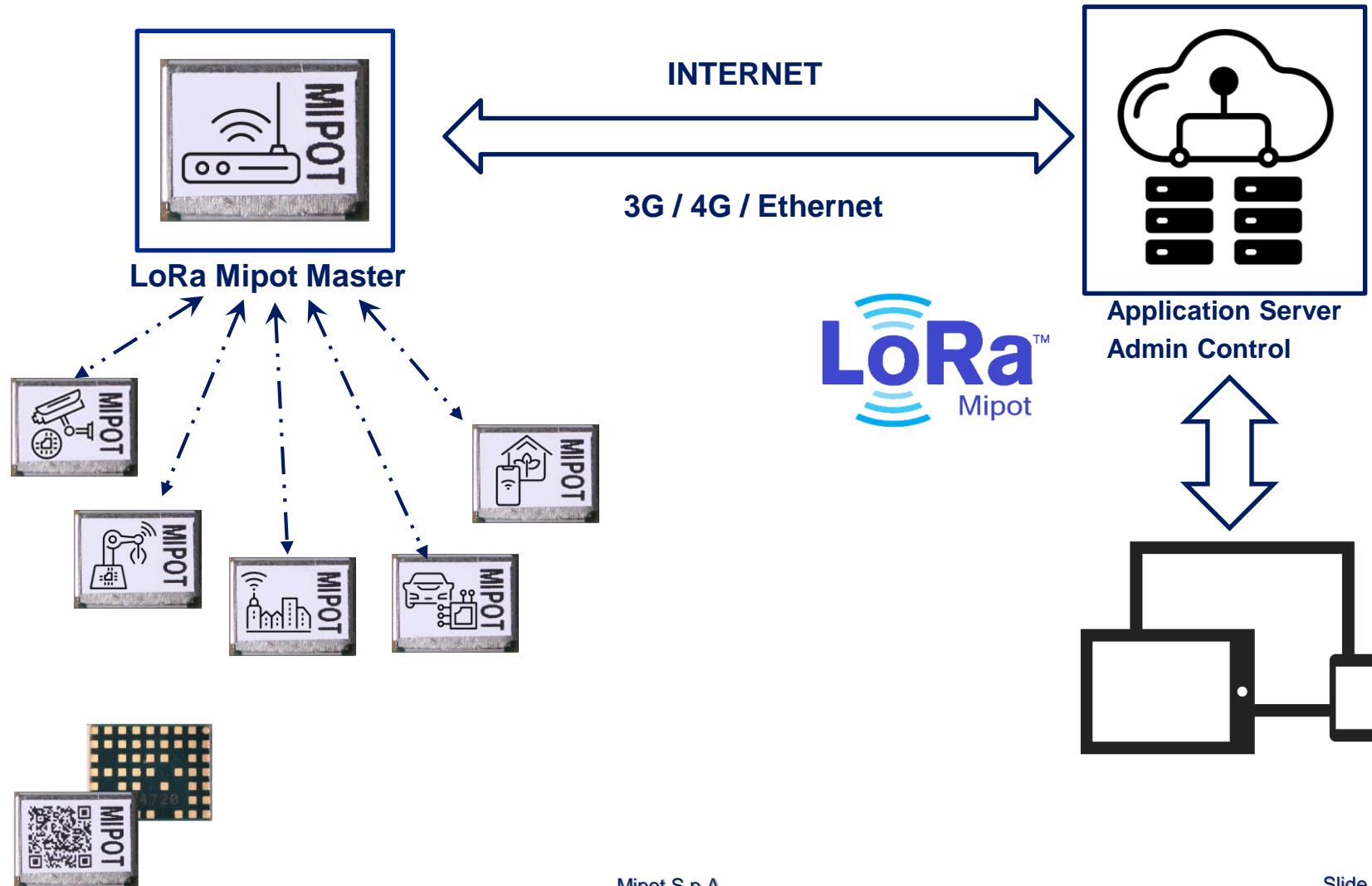
- ✓ Smart peripheral interfaces selector (UART, LPUART, SPI, I2C)

Highlights

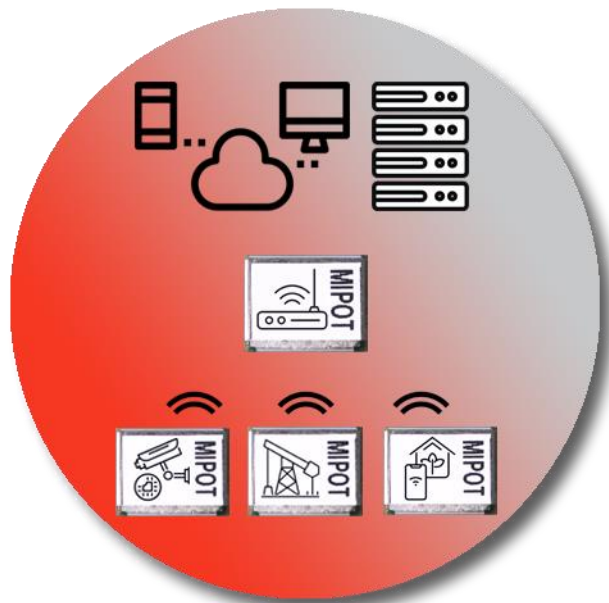
- ✓ Smart Automatic Antenna Tuning System



LoRa Mipot



MiP Ecosystem



LoRa Mipot+ is a LoRa modulation system with a proprietary network protocol.

In this star topology network, MiP modules can be configured either as end-nodes or master devices.

A Master device collects data from the end-nodes. The network can operate on three different channels.

All devices speaking on a given channel constitute a radio subnet, handled by a single Master.

Masters can route radio messages to other subnets or even act as repeaters.

No LoRaWAN gateway, public or private, is needed.

MiP Module part number: **32001505CEU**

Protocols available

- ✓ LoRa Mipot+

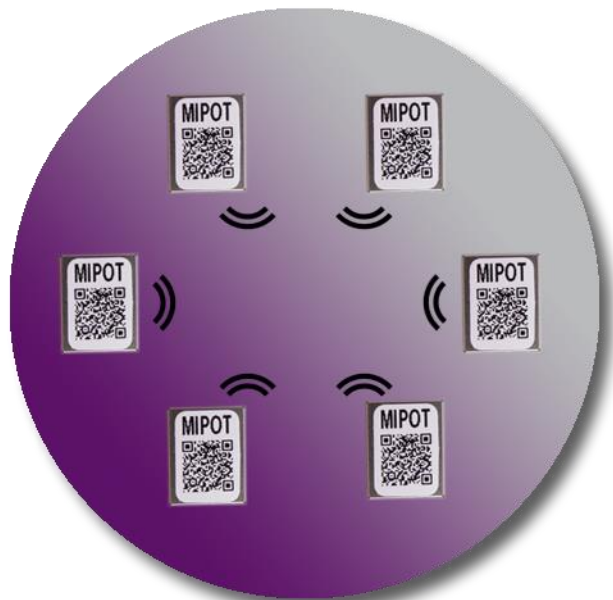
Interfaces

- ✓ Smart peripheral interfaces selector (UART, LPUART, SPI, I2C)

Highlights

- ✓ 3 channels
- ✓ Smart Automatic Antenna Tuning System

MiP Ecosystem



For developers who want to experience the maximum freedom or wish to implement their own network protocol, Mipot proposes the LoRa modem stack.

The developer can configure the radio with all available features on an easy message-based communication system.

Each module still has its own serial identification number but it transmits in broadcast mode.

The application layer above, left to the Customer to implement, should take care of the radio network allowing the design of any topology network.

MiP Module part number: **32001505DEU**

Protocols available

- ✓ LoRa Modem

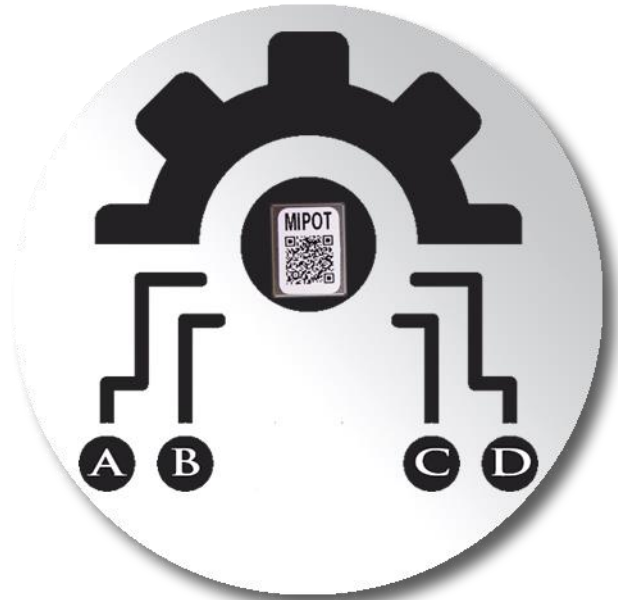
Interfaces

- ✓ Smart peripheral interfaces selector (UART, LPUART, SPI, I2C)

Highlights

- ✓ 3 channels
- ✓ Smart Automatic Antenna Tuning System

MiP Ecosystem



Multi-Protocol Module

The Mip modules are designed to handle multiple stacks inside the same chip.

Feel free to customize your radio product with any combination of the available stacks or even design your own one.

MiP Module part number: **32001505XEU**

Protocols available

- ✓ LoRa Mipot+

Interfaces

- ✓ Smart peripheral interfaces selector (UART, LPUART, SPI, I2C)

Highlights

- ✓ 3 channels
- ✓ Smart Automatic Antenna Tuning System

Serie moduli wireless MiP (Mipot IoT Protocols)

Availability: Now!

www.mipot.com

Pricing and ordering info:

mipot@mipot.com

Technical support:

support@mipot.com

MiP modules ready today:

32001505AEU – wMBus

32001505BEU/US – LoRaWAN

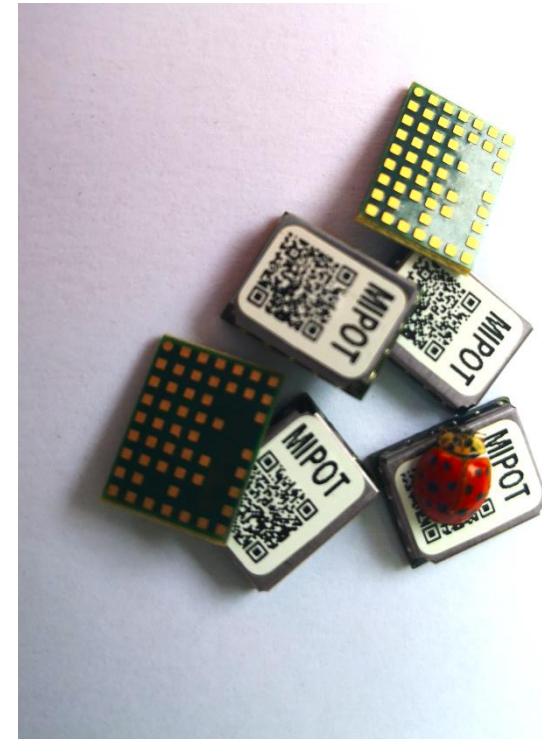
32001505CEU – LoRa Mipot+

32001505DEU – LoRa Modem

32001505FEU – LoRaWAN+LoRa Modem

...

Many others coming soon!



Case Study 1 - Device System for Healthcare and Social Care

PollicIoT Localization platform for people with cognitive disorders and dementia

The design concept of PollicIoT offers, in a Smart Health Assisted Living scenario, a **complete solution dedicated to assist Alzheimer patients**: from a web platform the caregiver will be able to locate the patient or receive alarm notifications if the patient should fall or move out of predefined perimeters, thanks to a wearable device equipped with GPS sensors, and identify the patient's position and movements.

Main features:

- LoRa Module
- With LEDs and Buttons
- GPS Module (Tracking)
- USB Connector
- Accelerometer
- Wearable technology
- Low consumption



Case Study 2 - Smart Agriculture – Water Sucking Detector System



More detail

- Full kit assembly in Mipot production
- Plastic Tube with porous ceramic
- Plastic Top Enclosure for the housing of the Electronic Board
- Electronic Board Production (Mipot)
- Stock and Logistic Service under the Customer needs
- Shipment directly to the final customer using customer portal for the orders.

Digital Tensiometer

Device to measure the water sucking load of the ground used for fruit trees and vineyard plantation.

Benefits :

- 1) With this device the final customer can check the Temperature and Ground Humidity from distance using LoRa Technology (Remote Control).
- 2) This allows the Smart factories to reduce the water consumption and to manage the use of the water only when is needed.
- 3) With this system you reduce the necessity of movements with tractors so the pollution in the air and the energy consumption.
- 4) Green economy in the field of smart factories / Smart Agriculture.

Studi Case 3 - Water Smart Metering or Gas Meetering



ELECTRONIC BOARD DESIGN and PRODUCTION:

- Electronic Board Design under Customer SPECS
- Used on Analog Meters
- Integrated wM-Bus Mipot Chip Set on Board
- Antenna Design on PCB
- PCBAs mass production

Benefits :

- Remote Control of the Energy / Water Consumption.
- Time Reduction for the reading of measurements.
- Smart City context connection with other devices.
- With this system you reduce the necessity of movements with cars so the pollution in the air and the energy consumption.

Case Study 4 - Smart Maintenance – Predictive Maintenance - Detector System with LoRa



Water Leak Detector

Device to detect the leak of the water in the water pipelines.

Benefits:

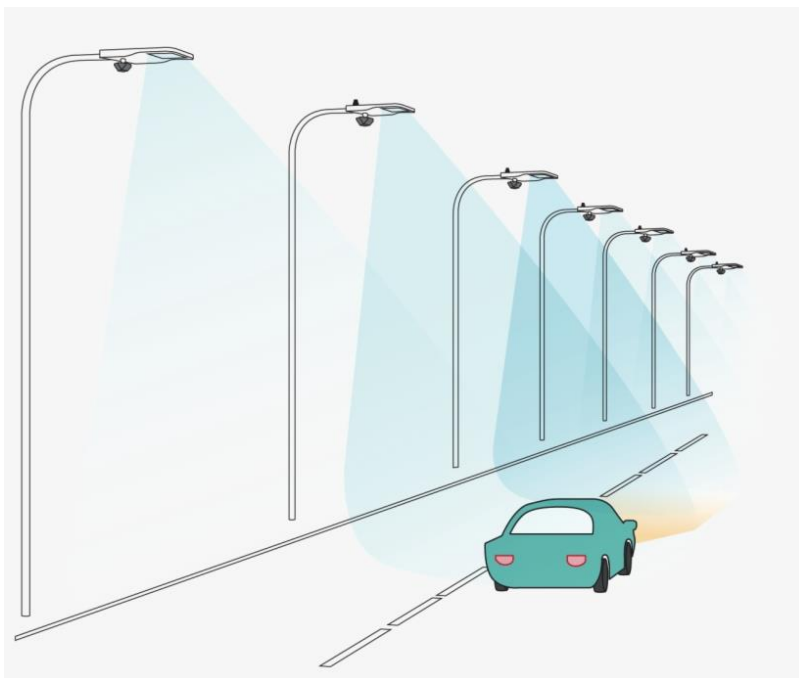
- 1) Reduce the water consumption
- 2) Eliminate the waste of water due to the leak of water
- 3) Predictive Maintenance of the water pipelines.



More details :

- Full Product assembled in Mipot
- Metallic Tube housing with vibration sensor
- Electronic Board Production
- Lora Mipot module on board
- Data transmission to a Gateway or an USB Dongle (Mipot)
- Custom antenna design

Case Study 5 - Smart City – Smart Lighting Application



Smart City Application (Smart Lighting):

Electronic Board with our Lora Module on Board under customer specs.

Benefits:

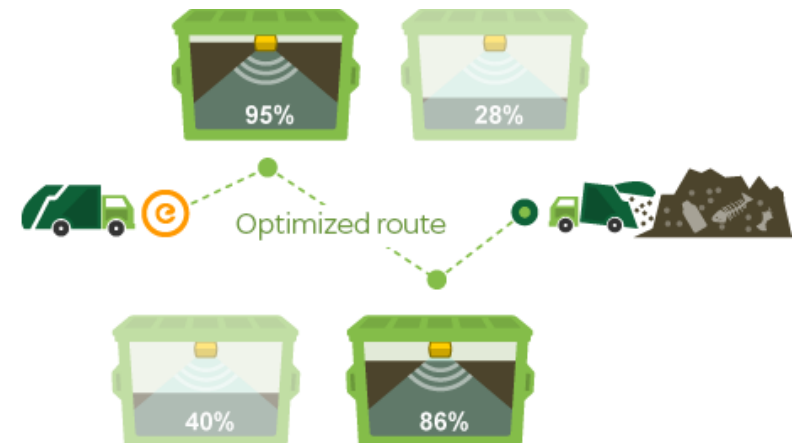
- 1) With this application the final user can switch on and switch off the light reducing the Power Consumption.
- 2) They can also Dimmer the light and reduce the Luminosity in Parcking Place and Tunnels when is not needed. So also in this way they can reduce the Power Consumption.
- 3) In this way, they can do a « Save Energy System » to reduce the power consumption and a Manage System of the Light during some periods of the day like during the night.
- 4) Remote Maintenance due to an active detection of Lamp problems. Predictive Maintenance as well.

Case Study 6 - Smart City

Smart Waste Management: Volumetric Sensor with LoRA + wM-BUS technology in one single chip.

Benefits:

- Using a New **MiP** Module with Multiprotocol System with low power energy usage (a battery used for 10 years) to check the level of the garbage in the Garbage Box.
- Manage of the Smart garbage collection. With this system you reduce the necessity of movements with tracktors so the pollution in the air and the energy consumption.
- Smart management of truck fleet.

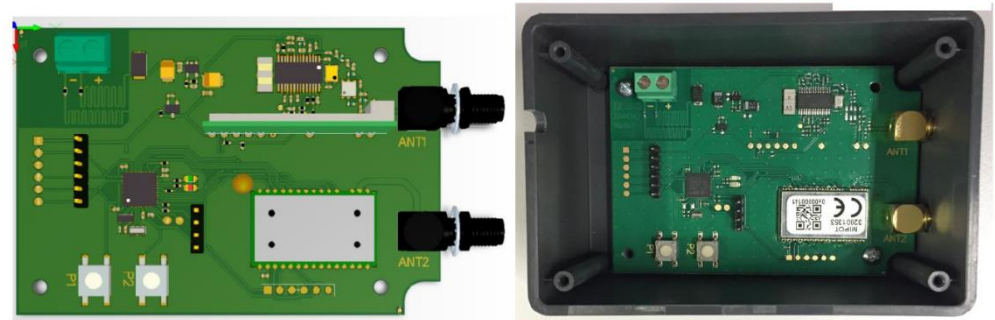


Case Study 7 – Lora Mipot Gateway

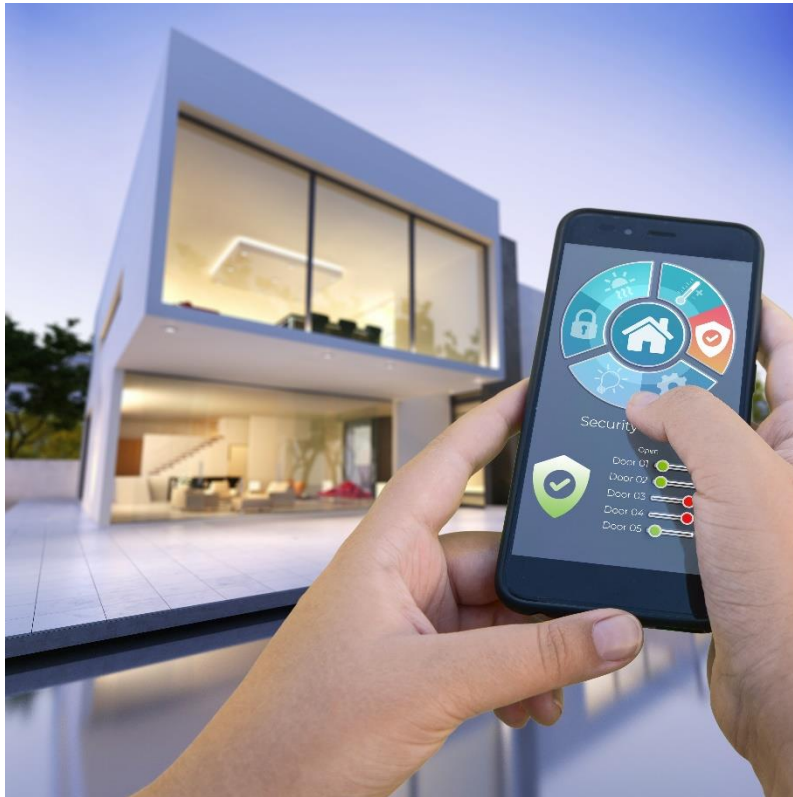
Gateway Device used in Medical Application to monitor the level of oxygen inside the oxygen tanks of Hospitals

Benefits :

- Remote control of Axygen level in all the Oxygen tanks of the Hospital
- Low Power consumption
- Smart management of Oxygen level with a Remote Platform Software
- Predictive Maintenance



Case Study 8 – Smart Building + Smart Home



Benefits:

- Remote Control
- Videosurveillance
- Reduction of Energy Consumption
- Green economy
- Reduction of Environmental Impact
- Predictive Maintenance
- Increased comfort and Human well-being

Thank you for your attention !

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