



SMART COMMUNICATION

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# TLM194 2.4GHz LoRa RF Modem

with 2 x 10/100Base-T(x) Ports,  
1 x RS232 and 1 x RS485 Serial Ports



# Main Features

- Supports 2 x 10/100Base-T(X) ports
- Supports Full/Half-Duplex, auto MDI/MDI-X on each port
- Supports 1 x RS232 and 1 x RS485 Serial Connection up to 921600 Baud
- Embedded web interface for ease of use
- REDZ special design, plug and play Server-Client Operating Modes
- Instant switch between operating modes with buttons
- Up to 10 client connections in Server Mode
- DHCP Server Capability
- Easy to follow Device Status on web interface
- 2.4GHz LoRa based Radio Frequency (RF) Communication
- 128 bit AES Encryption and Decryption on over the air communication
- LoRa or FLRC Selectable Modulation Options
- LoRa Rx Group Address and Device Address Configurable
- LoRa Tx Group Address and Device Address Configurable
- LoRa Signal Bandwidth Configurable: 200, 400, 800, 1600 kHz
- LoRa Radio Power Configurable between -18dBm (~0,02mW) to 13dBm (~20mW)
- Easy to follow LoRa data packages on web interface
- Black List and White List based LoRa package filter
- Firmware Upgrade over Web
- 2 firmware storage capability on same device (1 active only)
- 5-48V (max. 60V) DC wide range power input
- Wide operating temperature range from -40 to 85 °C
- Rugged Metal IP-40 housing design
- DIN-Rail mounting



# Description

**TLM Series LoRa Radio Modems are designed for industrial-grade Radio Frequency (RF) communication and particularly for facilities of rugged industry and infrastructure.**

TLM Series LoRa Radio Modems are tailored to perform various features such as wide temperature range, wide power input range and several connectivity ports. Thus, TLM Series LoRa Radio Modems are the best choice for facility management, sewage treatment, power utility, telecommunication, transportation and all other applications that require industrial Radio Frequency (RF) connectivity.

TLM Series LoRa Radio Modems can create a LoRa Based RF network and connect Serial and/or ETH based devices with each other. All communication can be done over Radio Frequency network, based on LoRa standard. TLM Series LoRa Radio Modems can act as TCP to Lora Gateway as TCP Server, TCP to Lora Gateway as TCP Client or Serial to LoRa Gateway all in one device. Typical applications: Automated Meter reading, Wireless networks, Home – Building – Industrial Automation, Remote Control, Wireless Sensors, Telemetry, Wireless Alarm and Security Systems...

# Technical Specifications

## Ethernet Switch Technology

<b>Ethernet Standards</b>	IEEE 802.3 for 10Base-T IEEE 802.3u for 100Base-T(X) IEEE 802.3x Flow Control
<b>Mac Table</b>	1K MAC address entry
<b>Processing</b>	Store-and-Forward
<b>Memory</b>	448K bits packet buffer memory

## Connectors And Ports

<b>SMA Antenna Connector for LoRa</b> tt	1 Standard SMA female interface, 50 ohm
<b>Console Port</b>	Micro USB connection for LOG in 115200 baud
<b>10/100T(X) RJ45 Ports</b>	Ethernet Connection on 2 ports
<b>Serial Ports</b>	5 pin wired Terminal Connection Tx, Rx, GND for RS232 A and B for RS485
<b>Reset Buttons</b>	Reset to Client and Reset to Server Operating modes buttons

## LoRa Technology

<b>Based on</b>	Powerful Cortex M3 Pre-Certified according to EN 300 328
<b>Sensitivity</b>	Down to -130 dBm
<b>Output Power level</b>	Up to 13dBm
<b>Link Budget</b>	Up to 142 dB
<b>Communication Distance</b>	More than 12km (Line of Sight)
<b>Typical Communication Distance Indoor/Urban</b>	>2km
<b>Frequency Range</b>	Min 2 402 000 137 Hz Max 2 479 999 939 Hz
<b>LoRa Bandwidth Options</b>	200 kHz 400 kHz 800 kHz 1600 kHz
<b>Tx Power Level</b>	-18dBm (~0,02mW) to 13dBm (~20mW) Configurable
<b>LoRa Spreading Factor</b>	SF5 SF6 SF7 SF8 SF9 SF10 SF11 SF12



## Led Indicators

<b>Power indicator</b>	Power LED
<b>10/100T(X) Indicators</b>	Activity LEDs: ETH1, ETH2 and TLM (Activity of device itself)
<b>System Indicators</b>	Status LED, Tx and Rx of data LEDs and Server LED (LED ON: Server Operating Mode, LED OFF: Client Operating Mode)
<b>LoRa Indicators</b>	Alive (Blinks during normal operation), Tx and Rx of data LEDs
<b>Console Indicators</b>	Tx and Rx of data LEDs

## Power

<b>Input Range</b>	5-48V DC wide range power input (Allows up to 60 V DC)
<b>Reverse Polarity Protection</b>	Available
<b>Thermal Shutdown and Current Limit Protection</b>	Available



## Physical And Environmental Characteristics

Enclosure	Metal, IP 40
Dimensions	43 x 95 x 124 (w x d x h) mm
Weight	~400gr

Storage Temperature	-65 to 150 °C
Operating Temperature	-40 to 85 °C
Operating Humidity	5% to 95% Non-condensing

# Ordering Information

**TLM194**  
**2.4GHz LoRa RF Modem, 2x 10/100 T(x) ETH ports,**  
**1 x RS232 & 1 x RS485, 5-48V (max. 60V) DC Power Input**

## Product Comparison

Model	868MHz LoRa Communication	2.4GHz LoRa Communication	5-48V (max. 60V) DC Power input	90 - 265V AC (100 - 370V DC), 47Hz to 63Hz AC Power Input	3 Phase AC Power input, 110V-240V/50-60Hz AC Power Input	2 x 10/100 T(x) ETH ports	1 x RS232 and 1 x RS485 Serial Ports	Instant Switch to Client or Server Operating Modes with Button	BPL (Broadband Power Line) Link
TLM154	●		●			●	●	●	
TLM194		●	●			●	●	●	
TLM254	●			●		●	●	●	
TLM294		●		●		●	●	●	
TLM655	●				●	●	●	●	●
TLM695		●			●	●	●	●	●