TLM755
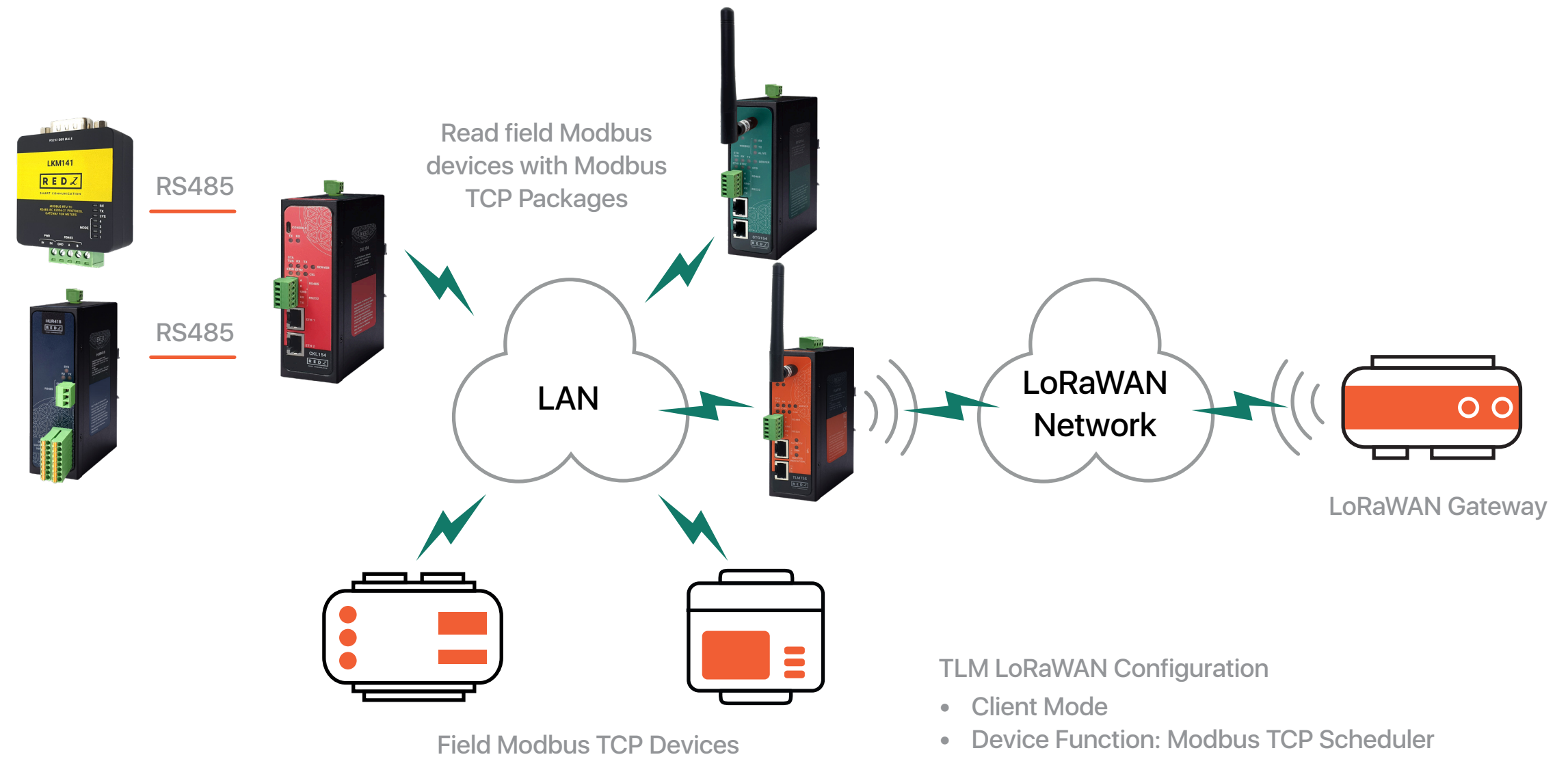# LoRaWAN EndNode
Modem with Modbus
TCP/RTU Scheduler

with 2 × 10/100Base-T(x) Ports, 1 × RS232 and
1 × RS485 Serial Ports and/or BPL (Broadband Power Line Link)

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

RS485

RS485

Read field Modbus devices with Modbus TCP Packages

LAN

LoRaWAN Network

LoRaWAN Gateway

Field Modbus TCP Devices

TLM LoRaWAN Configuration
- Client Mode
- Device Function: Modbus TCP Scheduler

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

TLM Series LoRaWAN EndNode Modems can create a link between field devices and LoRaWAN server. Field devices with TCP/IP connectivity can be read via Modbus TCP protocol and data can be sent to LoRaWAN Server. Also field devices with RS232/RS485 Serial interface can be read in Modbus RTU protocol and data can be sent

to LoRaWAN Server. Transparent connection between field devices and applications and LoRaWAN server is also available. Typical applications: Automated Meter reading, Wireless networks, Home – Building – Industrial Automation, Remote Control, Wireless Sensors, Telemetry, Wireless Alarm and Security Systems...

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Main Features

- Supports 2 x 10/100Base-T(X) ports
- Supports Full/Half-Duplex, auto MDI/MDI-X on each port
- DHCP Server Capability
- 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
- 3 Main Device Functions:
  - LoRaWAN Modbus TCP Scheduler
  - LoRaWAN Modbus RTU Scheduler
  - LoRaWAN Transparent Mode (Transparent bridge between LoRaWAN and TCP/IP or Serial Side)
- Up to 10 device connection in Modbus TCP or RTU Scheduler or Transparent TCP/IP modes

- Definable Modbus Serial Interface for Modbus RTU (RS232 or RS485 usage in same device)
- Selectable Modbus Function Code, Definable Register Address, Total Register Number, Query Interval and Time Out durations.
- Built in LoRaWAN payload size check and Duty Cycle Check
- User can read any data in any interval
- TLM will automatically split based on Maximum Payload Size allowed and Duty Cycle Block Times
- Easy monitor of transmitted data on web interface
- Easy to follow Device Status on web interface
- 868MHz LoRaWAN RF Communication
- Activation Over Air (OTAA) or Activation by Personalization (ABP) Selectable
- User defined LoRAWAN Port
- Adaptive Data Rate functionality

- Selectable Uplink Data Rate
- Selectable Power Level
- LoRaWAN Class C and Class A support
- Easy to follow LoRaWAN packages on web interface
- Black List and White List based TCP/IP connection filter in transparent mode
- Firmware Upgrade over Web
- 2 firmware storage capability on same device (1 active only)
- Wide operating temperature range from -40 to 85 °C
- Rugged Metal IP-40 housing design
- DIN-Rail mounting

Technical Specifications

Ethernet Switch Technology

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

BPL (Broadband Powerline) Technology

PHY Data Rate	Up to 240 MHz
MAC Layer Protocol	CSMA/CA
Modulation Technology	OFDM-432
VLAN	IEEE802.1q/ IEEE802.1p/ IEEE802.3d

Modbus Characteristics

Modbus Protocol	Modbus TCP or RTU Selectable by User
Modbus Devices	Up to 10 Modbus command can be defined by User
Modbus Address	Independently selectable by User
Modbus Function Code	Read Coil Status (FC=01)
	Read Input Status (FC=02)
	Read Holding Registers (FC=03)
	Read Input Registers (FC=04)
	Selectable
Modbus Command Setting	Register Adress
	Total Number of Registers
	Query Interval
	Time Out
	Independently Selectable for each command
Modbus RTU Serial Settings	Serial interface RS232 or RS485
	Serial data settings and Baud Rate
	Independently Selectable for each command

LoRa Technology

Based on	STM32L151CxU6Axx
	Pre-Certified according to EN 300 220
Sensitivity	Down to -138 dBm
Output Power level	Up to 20 dBm
Link Budget	Up to 156 dB
Communication Distance	Up to 15 km (Line of Sight)
Typical Communication Distance Indoor/Urban	> 2 km

LoRaWAN Activation Options	Activation Over Air (OTAA)
	Activation by Personalization (ABP)
	User Selectable
LoRaWAN Port	User Selectable
Adaptive Data Rate	Available
Uplink Data Rate	SF12 / 125 kHz / 250 bps
	SF11 / 125 kHz / 440 bps
	SF10 / 125 kHz / 980 bps
	SF9 / 125 kHz / 1760 bps
	SF8 / 125 kHz / 3125 bps
	SF7 / 125 kHz / 5470 bps
	SF7 / 250 kHz / 11000 bps
	FSK 50k / NA / 50000 bps
Tx Power Level	0 to 16dBm Configurable
LoRaWAN Class	Class A
	Class C

Led Indicators

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

Connectors and Ports

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

Physical & Environmental Characteristics

Enclosure	Metal, IP 40
Dimensions	43 × 95 × 124 (w × d × h) mm
Weight	~ 380 gr
Storage Temperature	– 65 to 150 °C
Operating Temperature	– 40 to 85 °C
Operating Humidity	5% to 95% Non-condensing

Power

Input Range	3 phase input, 110 V – 240 V / 50 - 60 Hz
Power and Data	AC Power supply use L1-N only. Phase 2-3 connections are used to BPL signal transmission
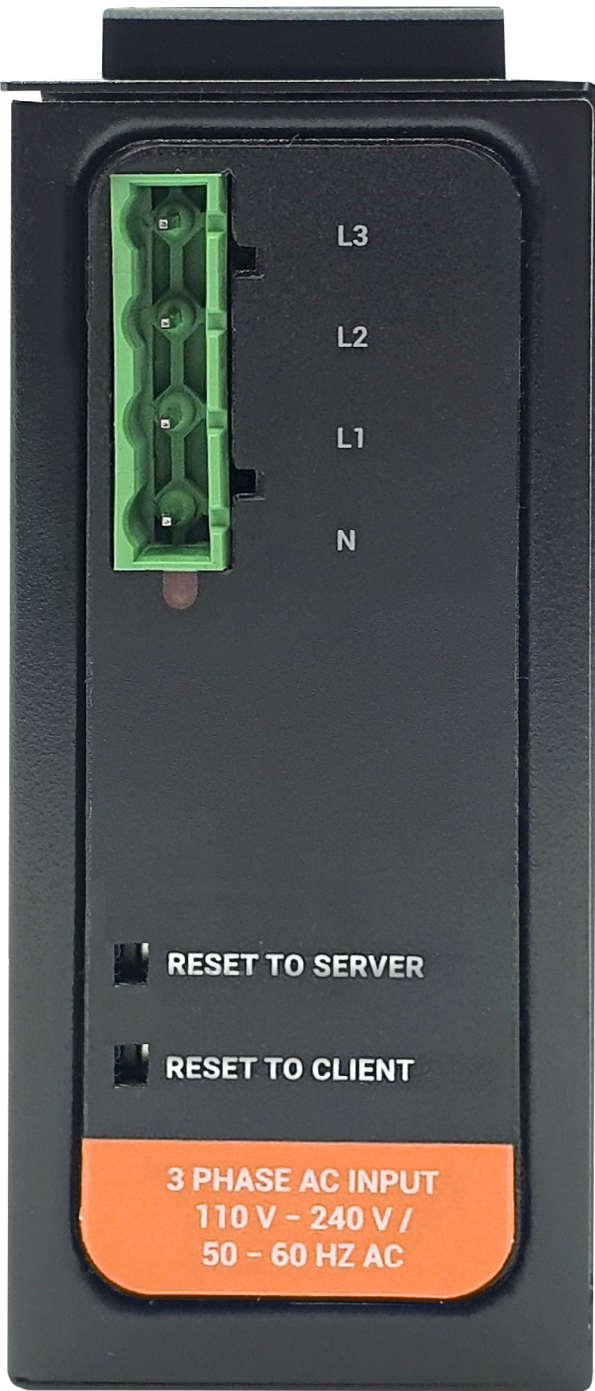
Ordering Information

TLM755

868MHz LoRaWAN EndNode Modem with Modbus TCP/RTU Scheduler,
2 × 10 / 100 T (x) ETH ports + 1 x BPL (Broadband Power Line) Link,
1 × RS232 & 1 × RS485, 3 Phase AC Power Input,
110 V – 240 V / 50 – 60 Hz

Product Selection

Model	5 – 48V DC Power Input (Allows Up to 60 V DC)	90 – 265V AC (100 – 370V DC), 47Hz to 63Hz AC Power Input	3 Phase AC Power input, 110 V – 240 V / 50 – 60 Hz AC Power Input	2 × 10/100 T(x) ETH ports	1 × RS232 and 1 × RS485 Serial Ports	BPL (Broadband Power Line) Link
TLM354	●			●	●	
TLM454		●		●	●	
TLM755			●	●	●	●

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