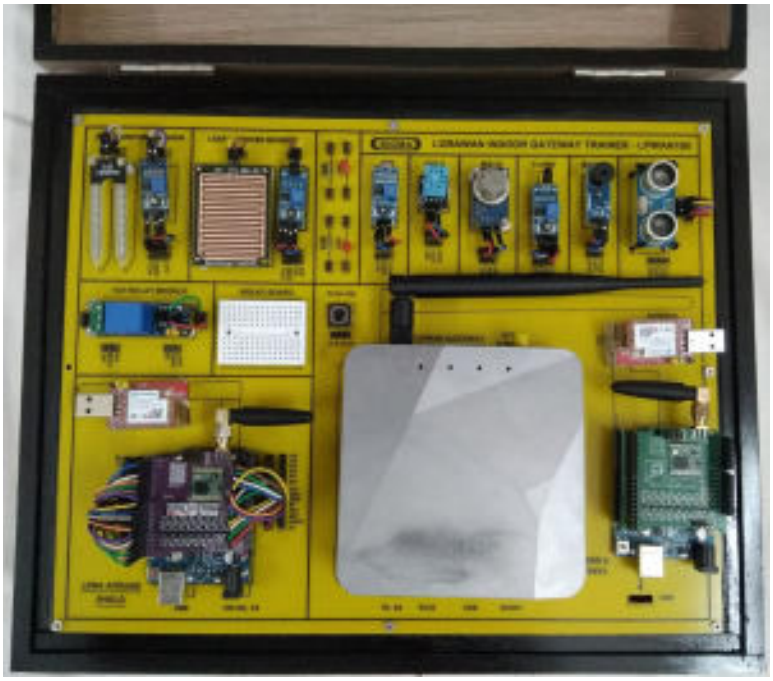
06. LORAWAN INDOOR GATEWAY TRAINER

MODEL- LORAWAN-INDOOR100

SPECIFICATIONS



This trainer has been designed with a view to provide practical and experimental knowledge of Internet of Things (IOT) with LoRaWAN Gateway Communication Sensors programing with Arduino IOT Boards with LoRaWAN Gateways.

SPECIFICATIONS

A. Main Specs

1. Following Parts and Modules are assembled on Single PCB of size - 18 Inch x 15 Inch.
2. The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place.
3. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement.
4. Modules and Parts should be removable without desodlering for easy repair / replacement
5. The acrylic cover is fitted on PCB to safeguard main parts.

B. Micro Controllers

1. Arduino UNO R3 : 2 No
2. Lora Arduino Shield : 2 No
3. 5 dbi LoRa Antenna for 865MHz : 2 No
4. LoraWAN IOT Gateway : 1 No

C. Sensors

1. Flame Sensor : 1 No
2. Photosensitive LDR Sensor : 1 No
3. Temperature and Humidity Sensor : 1 No
4. Ultrasonic Distance Sensor : 1 No

D. Multiple Onboard Embedded Communication Protocols

1. I2C
2. SPI
3. UART

E. Programming Examples

1. Arduino Programming

F. Applications

1. Smart Buildings & Home Automation
2. Logistics and Supply Chain Management
3. Smart Metering
4. Smart Agriculture
5. Smart Cities
6. Smart Factory

G. Features

1. Open Source OpenWrt system
2. Managed by Web GUI,SSH via LAN or WiFi
3. Emulates 49x LoRa• demodulators
4. LoRaWAN® Gateway
5. 10 programmable parallel demodulation paths
6. Semtech SX1276 LoRa" IC
7. LoRa" Expansion board direct Compatible with Arduino Uno
8. Interface with Arduino Uno
9. Suitable for LoRaWAN or Peer to Peer LoRa Protocol
10. Compatible with 3.3V or 5V GPIO Pin Arduino Board
11. Frequency Band: IN865
12. Low power consumption
13. External Antenna via SMA Female connector
14. Open-Source LMIC Library
15. LoRaWAN Class A Support
16. LoRaWAN Activation Mode Support: ABP & OTAA

H. LoRaWAN Gateway Specification

1. The LPS8N is an open-source LoRaWAN• Gateway. It lets you bridge LoRa" wireless network to an IP network via WiFi or Ethernet. The LoRa wireless allows users to send data and reach extremely long ranges at low data rates.
2. The LPS8N uses Semtech packet forwarder and is fully compatible with LoRaWAN° protocol. It includes a SX1302/03 LoRa0 concentrator, which provides 10 programmable parallel demodulation paths.

LoRa Gateway – LPS8N

1. SX1302 : 1 No - LoRa® Transceiver Module
2. SX1250 : 2 No - LoRa® Transceiver Module
3. SX1308 : 1 No - LoRa® Transceiver Module
4. SX1257 : 2 No - LoRa® Transceiver Module

Hardware System:

1. Processor : 400MHz Arm 9331 processor
2. RAM : 64MB
3. ROM : 16MB Flash
4. Frequency Band : IN865 for India – 865 MHz

Interface:

1. Ethernet Port : 10M/100M RJ45
2. Wi-Fi : 2.4 GHz - 802.11 b/g/n
3. LoRaWAN Wireless : 1 No
4. USB 2.0 Host Port : 1 No
5. Mini-PCI E connector : 1 No
6. Power Supply : 5V DC, 2A, by USB Port -Type C

3. WiFi Specs for Gateway:

1. IEEE 802.11 b/g/n
2. Frequency Band: 2.4 ~ 2.462GHz
3. Tx power:

   11n tx power : mcs7/15: 11db mcs0 : 17db

   11b tx power: 18db

   11g 54M tx power: 12db

   11g 6M tx power: 18db

4. Wifi Sensitivity
   11g 54M : -71dbm
   11n 20M : -67dbm

4. LoRa Specs for LoRa Gateway:

1. Up to -140 dBm sensitivity
2. 70 dB CW interferer rejection at 1 MHz offset
3. Protocols : Class A / Class B / Class C
4. Able to operate with negative SNR, CCR up to 9dB
5. 8 x 8 channels LoRa packet detectors,
   8 x SF5-SF12 LoRa demodulators,
   8 x SF5-SF10 LoRa demodulators,
   125/250/500 kHz LoRa demodulator
   1 x GFSK demodulator
6. Emulates 49 x LoRa demodulators and 1 x (G)FSK demodulator
7. Dual digital TX & RX radio front-end interfaces
8. 10 programmable parallel demodulation paths
9. Dynamic data-rate (DDR) adaptation
10. True antenna diversity or simultaneous dual-band operation

5. Features of LoRaWAN Gateway:

1. Open Source OpenWrt system
2. Managed by Web GUI, SSH via WAN or WiFi
3. Remote access with Reverse-SSH
4. Emulates 49x LoRa demodulators
5. LoRaWAN Gateway
6. 10 programmable parallel demodulation paths
7. Pre-configure to support different LoRaWAN regional settings.
8. Allow to customize LoRaWAN regional parameters.
9. Support Local decode ABP end node info and transfer to MQTT server
10. Support different level log in.

I. Micro Controllers and other parts

1.	LoRa Arduino Shield	: 2 Nos.
2.	Arduino UNO Board	: 2 Nos
3.	USB Cables	: 2 No
4.	Flame Sensor	: 1 No
5.	Photosensitive LDR Sensor	: 1 No
6.	Temperature and Humidity Sensor	: 1 No
7.	Ultrasonic Distance Sensor	: 1 No
8.	White LED	: 5 Nos.
9.	Audio Buzzer	: 1 No
10.	Relay Module	: 1 No
11.	Jumper Wires Male to Male	: 20 Nos
12.	Jumper Wires Female to Female	: 20 Nos
13.	Jumper Wires Female to Male	: 20 Nos

J. Accessories

1.	All Cables and Adaptors	
2.	Pen Drive	: 16 GB with All Codes and Soft copy of Manual
3.	E-Books for IOT Subject	: 100 Nos. in PDF Format
4.	Mp4 Video for IOT Subject	: 100 Nos
5.	Online Cloud/Server Services	: For 1 Years on Cloud Server
6.	Live Training at College	: For 2 Days for 4 Hours per Day
7.	After Sale Training support	: By Online Zoom Meeting or By Whatsapp Video

EXPERIMENTS

1. To explain theory of All Micro Controller Boards, All Wireless Gateways and All Sensors Parts
2. To measure all Sensors data using Arduino Boards
3. To setup and configure LoRaWAN Cloud Server
4. To send live Sensors Data between two Arduino Lora Shield using Peer-to-Peer Lora Communication
5. To send live Sensors Data between two Lora USB Modules using Peer-to-Peer Lora Communication
6. To send live Sensors Data to LoRaWAN Cloud and View on Website Page Dashboard
7. To send live Sensors Data to LoRaWAN Cloud and View on Android Mobile App
8. To send live Sensors Data to LoRaWAN Cloud and save on MySQL Cloud Server and then store and export it in xls file
9. To send Sensors data to Local Host Server, store and export it in xls file
10. To send Sensors data to Local Host Server and Display on website html page

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