



IOT-110

Edge IoT Teaching Platform



IOT-110 is a platform that integrates training of edge computing, AI, and IoT. Its system consists of sensor modules, edge computing modules, and AI computing accelerators. The course provided is structured in a coherent and clear manner, and the concepts of sensors, networks, and applications can be introduced progressively and thoroughly. With this system, users shall be able to deploy various smart applications of IoT and edge computing.

Each of the 16 sensor modules is embedded in a separate aluminium housing with a built-in hook and powered by a rechargeable lithium battery, so the sensor modules can be deployed in many different locations as well as on the training stand. The name of each sensor is printed on the housing.

● Features

1. An open-source integrated development environment: users can start programming using an easy-to-use language.
2. Graphical programming language development tools: users can generate writing programs by dragging and dropping (ideal for beginner programmer)
3. A flexible structure: convenient to set up and deploy required experimental environments easily.
4. All data collected from sensors are stored in database. Data can also be uploaded to cloud servers, such as ThingSpeak, Amazon Web Services, and Microsoft Azure.
5. It is compatible with the MQTT communication protocol, and data is obtained through publication and subscription.

● Specifications

1. MQTT Broker (IOT-12001)
 - (1) Broadcom BCM2711, quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
 - (2) 4GB LPDDR4 SDRAM
 - (3) 2.4GHz and 5.0GHz IEEE 802.11b/g/n/ac wireless LAN
 - (4) 2x USB 3.0 ports, 2x USB 2.0 Ports

- (5) 2x Micro HDMI ports supporting up to 4K 60Hz video resolution
- (6) Support MQTT protocol
- (7) Include Camera



2. Wired Sensor Modules

- (1) Communication Node Boards (Wi-Fi)
 - a. ARM Cortex-M4 based @ 192MHz.
 - b. 802.11b/g/n wireless connectivity.
 - c. 352 KB of RAM.
 - d. 4 MB external Flash memory.
 - e. Micro-USB port for power supply.
 - f. Virtual COM port through onboard CP2102N USB-to-UART chipset.
 - g. Two buttons for system reset and external interrupt.
 - h. Peripheral interfaces including GPIO, UART, I²C, SPI, PWM, EINT, ADC, IrDA, I²S.
 - i. OLED Display 0.96" dot matrix.
 - j. Intelligent control LED x 3pcs.
 - k. Battery is included in the package.

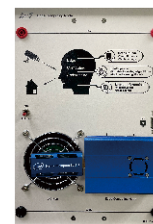


(2) Sensors List

- a. IOT-14001: Gas Sensor x 1
- b. IOT-14002: Hall Sensor x 1
- c. IOT-14003: Photo Interrupter Sensor x 1
- d. IOT-14004: Ultrasonic Distance Sensor x 1
- e. IOT-14005: Digital Pressure Sensor x 1
- f. IOT-14006: Dust Sensor x 1
- g. IOT-14007: Electromagnetic Buzzer Sensor x 1
- h. IOT-14008: IR Distance Sensor x 1
- i. IOT-14009: Loudness Sensor x 1
- j. IOT-14010: Digital Light Sensor x 1
- k. IOT-14011: Motion Sensor x 1
- l. IOT-14012: IMU 9DOF Sensor x 1
- m. IOT-14013: Relay Sensor x 1
- n. IOT-14014: UV Sensor x 1
- o. IOT-14015: Temperature and Humidity Sensor x 1
- p. IOT-14016: CO₂ Sensor x 1

(3) Edge Computing Node (IOT-14017)

- a. Edge Computing Node (Raspberry Pi 4)
- b. Intel NCS2
- c. Include Cooling Fan



(4) LCD Panel (IOT-14092)

- a. 13.3inch HDMI LCD
- b. Type : Capacitive



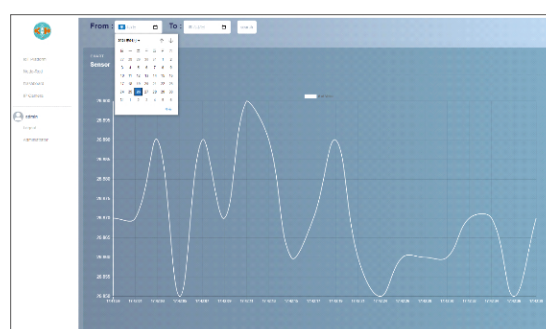
(5) DC Load (IOT-14018)

- a. DC Fan
- b. USB Bulb
- c. Yeelight LED Bulb



3. Web Server Set (IOT-12002)

- (1) It can display real-time information of sensors.
- (2) The historical query function allows users to access historical data easily.
- (3) The account management function allows users to manage web servers safely.
- (4) Storage : 2TB
- (5) Dongle : x 1



IOT-14001
Gas Sensor



IOT-14002
Hall Sensor



IOT-14003
Photo Interrupter
Sensor



IOT-14004
Ultrasonic Distance
Sensor



IOT-14005
Digital Pressure
Sensor



IOT-14006
Dust Sensor



IOT-14007
Electromagnetic
Buzzer Sensor



IOT-14008
IR Distance Sensor



IOT-14009
Loudness Sensor



IOT-14010
Digital Light
Sensor



IOT-14011
Motion Sensor



IOT-14012
IMU 9DOF
Sensor



IOT-14013
Relay Sensor



IOT-14014
UV Sensor



IOT-14015
Temperature and
Humidity Sensor



IOT-14016
CO₂ Sensor

● Experiment List of IoT

■ Perception Layer

1. Microcontroller Development

- (1) GPIO Control LED Blink Experiment
- (2) UART Communication Experiment
- (3) ADC Converter Experiment
- (4) External Interrupt Experiment
- (5) I²C Communication Experiment



2. Sensing Layer

- (1) Gas Measurement Experiment
- (2) Hall(Magnetic) Detection Experiment
- (3) Photoelectric Switch Experiment
- (4) Ultrasonic Distance Experiment
- (5) Barometric Pressure Measurement Experiment
- (6) Dust Measurement Experiment
- (7) Buzzer Control Experiment
- (8) IR Experiment
- (9) Noise Measurement Experiment
- (10) Illuminance Measurement Experiment
- (11) Motion Sensing Experiment
- (12) 9 DoF Measurement Experiment
- (13) Relay Control Experiment
- (14) Ultraviolet Measurement Experiment
- (15) Temperature and Humidity Measurement Experiment
- (16) Carbon Dioxide Measurement Experiment

■ Network Layer

3. Wi-Fi Communication

- (1) Wi-Fi AT Command Experiment
- (2) Wi-Fi Web Server Experiment
- (3) Wi-Fi Request Experiment

4. MQTT Communication

- (1) MQTT Broker Experiment
- (2) MQTT Protocol Introduction Experiment
- (3) Sensor Data Transmission Experiment
- (4) Actuator Control Experiment
- (5) MQTT Programming Experiment

■ Application Layer

5. Web Engineering

- IoT Web Server Experiment

6. Visual Programming Language

- (1) VPL Application Experiment
- (2) IoT Cloud Experiment
- (3) Smart Device Application Experiment

● Experiment List of Edge Computing

1. Computer Vision

- (1) Computer Vision and Image Processing Experiment
- (2) Perform Image Manipulation Experiment
- (3) Open and Stream Video Experiment
- (4) Track Face Detection In Vision Experiment
- (5) Train on Images by TensorFlow Experiment

2. Edge Computing With IoT

- (1) Face Recognition Experiment
- (2) Head Pose Experiment
- (3) Facial Landmarks Experiment
- (4) Emotions Recognition Experiment
- (5) Smart Home Experiment

● Accessories (IOT-19003)

1. Storage case
2. IOT-19101: MediaTek MCU
3. IOT-14081 : 802.11 b/g/n Wireless broadband router with built-in 4-port(or more) 10/100 MB switch hub
4. Experiment Manual
5. USB Cable
6. Ethernet Cable

● System Requirements

1. Above i5 8th Generation.
2. Above GTX 1060 (or RX 590)
3. Above 8GB RAM.
4. Above 500GB storage.
5. Windows 10 or Upper Version
6. Wireless Router (For Wi-Fi Communication Experiment)



K&H MFG. CO., LTD.

5F., No. 8, Sec. 4, Ziqiang Rd., Sanchong Dist, New Taipei City 241, Taiwan (R.O.C.)

<http://www.kandh.com.tw> E-Mail: education@kandh.com.tw

Tel : 886-2-2286-0700 (Rep.) 886-2-2286-7786

Fax: 886-2-2287-3066, 886-2-2287-9704

