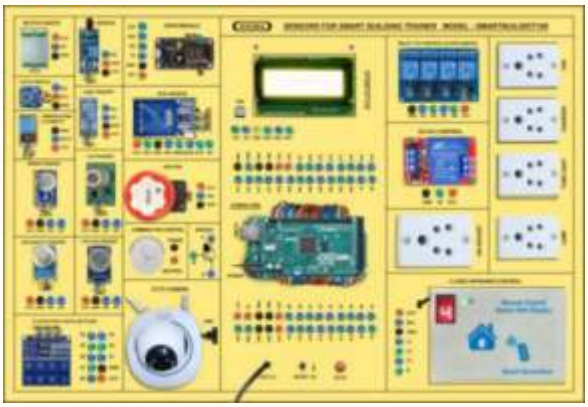
SENSORS FOR SMART BUILDING
MODEL-SMARTBUILDIOT100

This trainer has been designed with a view to provide practical and experimental knowledge of Sensors programing for Smart Building with Atmega 2560 Arduino Microcontroller IOT Board.



SPECIFICATIONS

(1) Hardware

Following Hardware is assembled on Single PCB of size - 18 Inch x 15 Inch

1. Arduino Atmega 2560 Microcontroller Board

1. Atmega 2560 Arduino Microcontroller board
2. Operating voltage: 5V
3. Input voltage (recommended): 7-12V
4. Input voltage (limits): 6-20V
5. Digital Input / Output pins : 54 (of which 14 provide PWM output)
6. Analog input pins : 16
7. DC current per I/O pin : 40mA
8. DC current for 3.3V pin : 50mA
9. Flash Memory 256 KB, 8KB used by bootloader
10. SRAM : 8 KB
11. EEPROM : 4 KB
12. Clock Speed : 16 Mhz
13. Mini USB Port
14. Power Jack – 9V DC, 2A

Sigma Trainers and Kits
E-113, Jai Ambe Nagar,
Near Udgam School,
Thaltej,
AHMEDABAD - 380054.
INDIA.

Phone(O): +91-79-26852427
Phone(F): +91-79-26767512
Mobile : +91-9824001168
Email : sales@sigmatrainers.com
: drluhar@gmail.com
Web : www.sigmatrainers.com

Dealer:-

2. Sensors and Main Parts

1. PIR Motion Sensor
2. RFID Reader Writer Sensor RC522 with RFID Keychain and RFID Cards
3. Smoke Detector Sensor Mq2
4. Fire Sensor
5. LPG Gas Sensor Mq6
6. Air Quality Sensor – Mq135
7. Ambient Temperature & Humidity Sensor – DHT11
8. CO2 Sensor
9. LDR Light Sensor
10. Touch Panel Sensor
11. Hooter
12. CCTV Camera
13. 8 Button Smart Capacitive Touch Panel Switch Board
14. Four 5 A sockets to control 3 Light bulbs and One Fan
15. 9 Inch Fan with Regulator
16. 16A AC Plug
17. 3 Infrared Channel Controller to control appliances using Infrared
18. IR Receiver
19. IR Sender
20. P2N2222A Transistor

3. Modules and Hardware:

1. 20 X 4 - LCD Display
2. 4 Channel Relay
3. ESP32 Wifi Module
4. 2 mm interconnection Sockets ESP32 Wifi Module

4. Application Software

1. For SMART Building Dashboard

2. Accessories

1.	USB Cable	: 2 No
2.	Ethernet Cable	: 1 No
3.	Micro USB to USB cable for ESP32	: 1 No
4.	Power Supply Adaptor	: +9 DC, 2A
5.	Jumper wires	: 50 Nos.
6.	Software and Driver CD	: 1 No.
7.	Practical Manual - Printed + Soft Copy	: 1 No.
8.	E-Books for IOT Subject	: 10 Nos. in PDF Format

9. Mp4 Video Class for IOT Subject : 40 Nos
10. Electric wires to connect to IR controlling device
11. Excitation accessories for each sensor
    Cigarette lighter to test flame sensor, gas sensor
    Light source/Torch for LDR
    Agarbatti and matchbox for smoke
    Plastic bag to collect Co2
    Light/Bulb for RELAY

3. Cabinet and PCB

The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement. The acrylic cover is fitted on PCB to safeguard parts. It works on 230 V AC Supply.

EXPERIMENTS

A. Theory Experiments for Arduino Atmega 2560 Board

1. To understand theory and working of Arduino Operating software.
2. To understand Pin and Connection Diagram of Arduino.
3. To understand USB Interface for Arduino.
4. To understand 20 x 4 LCD Display.
5. To understand 1.8 Inch TFT LCD Display

B. Theory of ESP32 Wireless Module

6. To understand theory and working of ESP32
7. To understand Operating System for ESP32
8. To understand Pin and Connection Diagram of ESP32
9. To understand USB Interface for ESP32

C. Theory Experiments for Sensors

10. To understand theory of Temperature and Humidity Sensor DHT11
11. To understand theory of CCTV Camera
12. To understand theory of Motion Sensor
13. To understand theory of RFID Sensor
14. To understand theory of Smoke Detector Mq2
15. To understand theory of Fire Sensor
16. To understand theory of LPG Gas Sensor Mq5
17. To understand theory of Air Quality Sensor Mq135
18. To understand theory of CO2 Sensor
19. To understand theory of LDR Light Sensor
20. To understand theory of 8-Way Touch Module Capacitive Touch Buttons

21. To understand theory of Hooter
22. To understand theory of Touch Panel
23. To understand theory of 4 Channel Relay
24. To understand theory of Infrared Control

D. Practical Experiments

25. To measure Air humidity & Temperature using DHT11
26. To check Security and monitoring using CCTV camera
27. To Stream live video using CCTV Camera in Mobile app
28. To detect motion using PIR sensor
29. To Read and Write data on RFID Cards using RFID Reader/Writer Sensor RC522
30. To detect Smoke using MQ-2 Smoke Sensor
31. To detect Fire using KY-026 Flame Sensor
32. To detect LPG Gas using LPG Gas sensor MQ-6
33. To measure Air Quality using Air Quality Sensor Mq135
34. To measure CO2 PPM value using CO2 Sensor SCD-40
35. To detect light intensity using LDR Light Sensor
36. To use 4 Channel Relays to control Light Bulb and Hooter
37. To identify the touch using Touch panel Capacitive Sensor TTP223
38. To control Lights and Fans using Capacitive Touch Sensor
39. To use Three Touch buttons of 8-Way Touch Panel to control 3 Light Bulbs
40. To use 4th Touch buttons of 8-Way Touch Panel to control Fan with Fan regulator
41. To use 5th Touch buttons of 8-Way Touch Panel to control 16A Plug to control 16A device like AC or Geyser
42. To use 6th, 7th and 8th Touch buttons of 8-Way Touch Panel to three devices using Infrared Control panel

E. Server, Cloud Configuration, IOT Gateway, Nodes and Mobile App Experiments

43. To send Sensors data using Wifi Wireless Node to Main Base IOT Receiver
44. To send and display Sensors Data in a server Web Page using HTTP, Java and PHP Code
45. To send Sensors data to website webpage and store them into MySQL Server
46. To receive and show Sensors data on Android based Mobile App
47. To send and display Sensors Data on website Smart Dashboard on a server