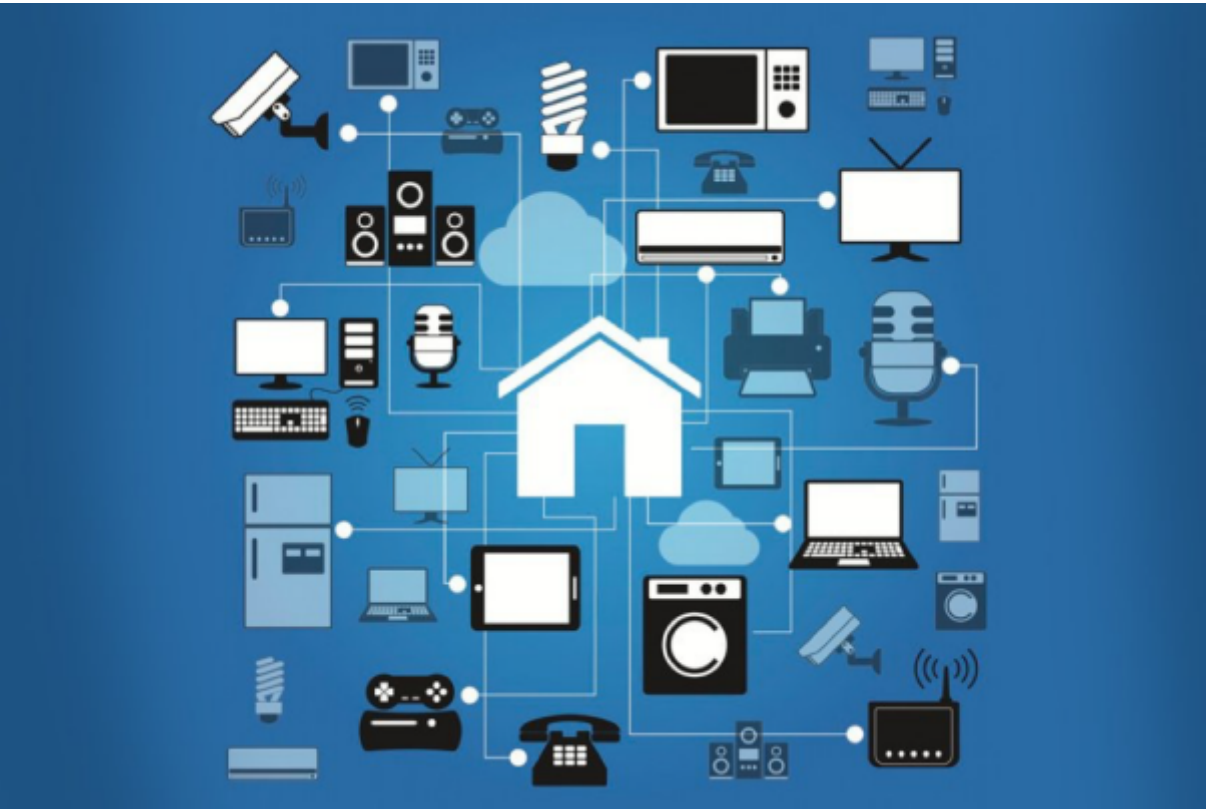


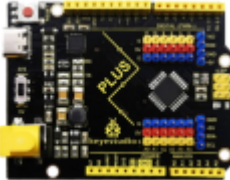
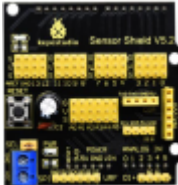


# Project 15 Multi-functional Smart Home



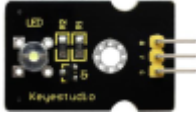


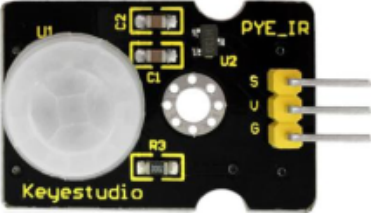


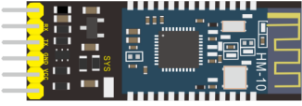
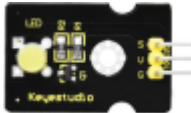
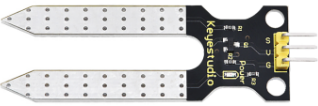







## 1. Description

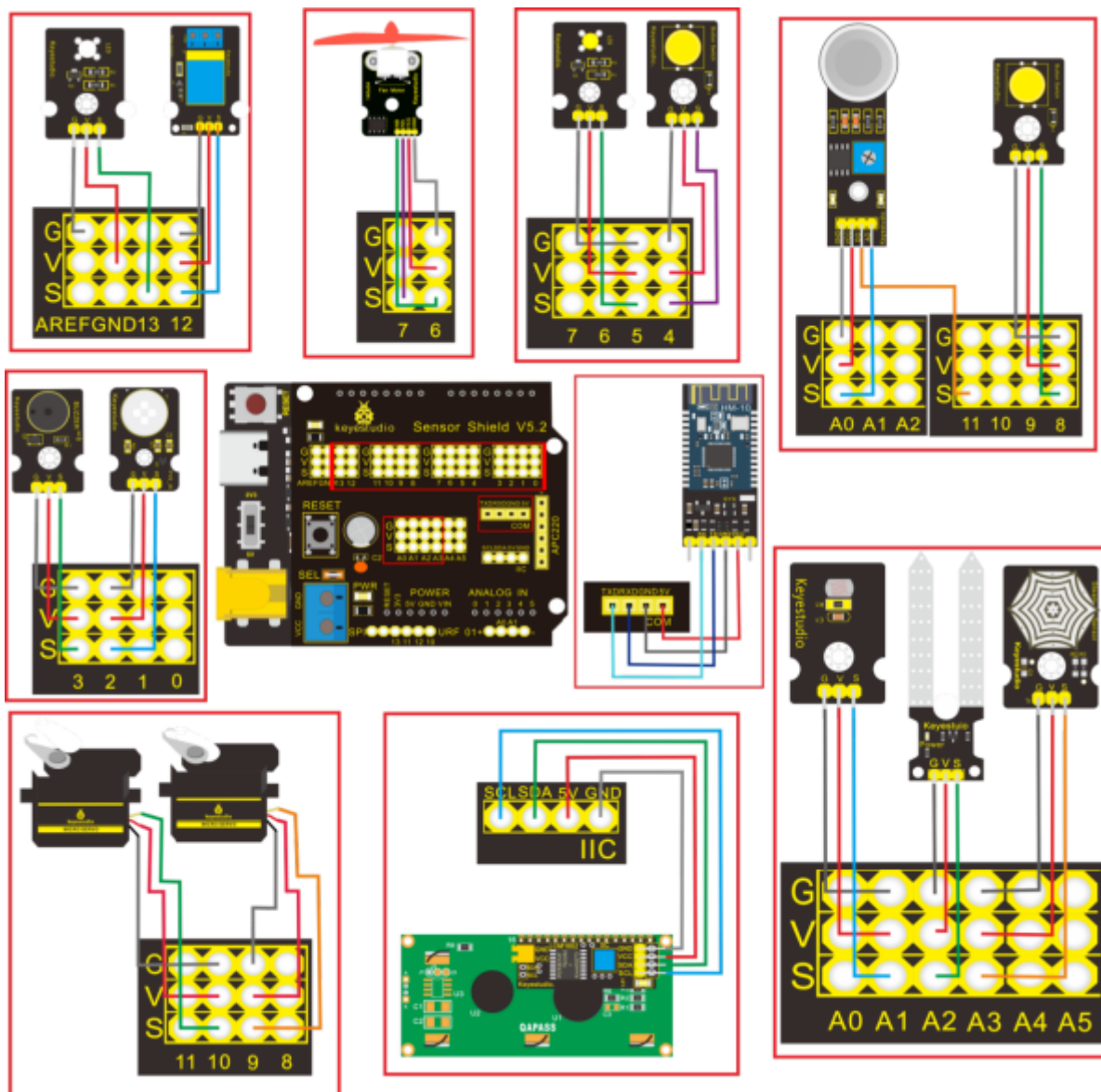
In the previous projects, we’ve introduced how to use sensors, modules and HM-10 Bluetooth module. For this lesson, we will present all functions of this smart home.

## 2. Needed Components

PLUS control board*1	Expansion board*1	Fan*1	Servo*2
			
1602LCD display*1	Button sensor*2	Whit LED*1	Relay module*1

PLUS control board*1	Expansion board*1	Fan*1	Servo*2
			
Passive buzzer*1	PIR motion sensor*1	Steam sensor*1	Photocell sensor*1
			
BT module*1	Yellow LED*1	Soil humidity sensor*1	MQ-2 gas sensor*1
			
USB cable*1	F-F Dupond wires	4pin F-F Dupond wire*1	3pin F-F Dupond wires*10
			

### 3. Wiring Diagram

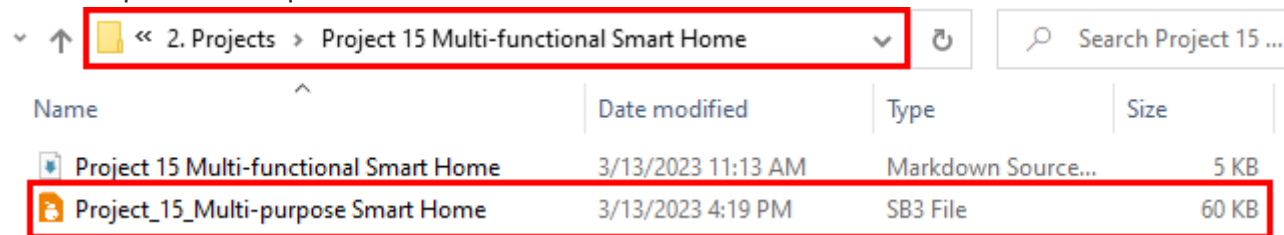


Names	Sensor/module pins	Expansion pins	Installation position
PIR motion sensor	G/V/S	G/V/2	⑤
Passive buzzer	G/V/S	G/V/3	⑩
Button sensor 1	G/V/S	G/V/4	③
Yellow LED	G/V/S	G/V/5	⑫
Fan	GND/VCC/INA/INB	G/V/7/6	⑮
Button sensor 2	G/V/S	G/V/8	④
Servo 1 for door	Brown line/Red line/Orange line	G/V/9	⑰
Servo 2 for window	Brown line/Red line/Orange line	G/V/10	⑪

Names	Sensor/module pins	Expansion pins	Installation position
MQ-2 gas sensor	GND/VCC/D0/A0	G/V/11/A0	⑩
Relay module	G/V/S	G/V/12	⑥
White LED	G/V/S	G/V/13	①
1602LCD display	GND/VCC/SDA/SCL	GND/5V/SDA/SCL	②
Photocell sensor	G/V/S	G/V/A1	⑭
Soil humidity sensor	G/V/S	G/V/A2	
Steam sensor	G/V/S	G/V/A3	⑬

## 4. Test Code

For complete code, please refer to our tutorial.



(1) Remove the Bluetooth module please when uploading the test code. Otherwise, the code will fail to be uploaded. Remember to pair Bluetooth after uploading the code.

(2) For how to download and use APP, please refer to Project 14.

## 5. Test Result

Upload the test code, stack expansion board on PLUS Control Board, and power on.

After pairing and connecting Bluetooth successfully, we can control the smart home through app.

(1) Functions:



No.	Button	Control Character	Function	No	Button	Control Character	Function
1	SCANNING		Pair and connect to HM-10 Bluetooth module	2	DISCONNECT		Disconnect Bluetooth
3		Click to send "a", click again to send "b"	Click to turn on white LED, click again to turn off LED	4		Click to send "c", click again to send "d"	Click to turn on relay module; click again to turn off relay module
5		Hold and press to send "e" release to send "g"	Click to play music	6		Hold and press to send "f" release to send "g"	Click to play music (alternative song)
7		Click to send "h", click again to send "s"	Click to turn on photocell sensor, light shows the data; click again to turn off photocell sensor	8		Click to send "i" click again to send "S"	Click to turn on gas sensor, gas displays the detected data; click again to turn off gas sensor
9		Click to send "j" click again to send "S"	Click to turn on soil humidity sensor, soil shows data, click again to turn off soil humidity sensor	10		Click to send "k" click again to send "S"	Click to turn on steam sensor, water displays the detected data; click again to turn off steam sensor
11		Click to send "l" ; click again to send "m"	Click to open the door; click again to close the door	12		Drag slider to send "t 50 #", 't' represents initial character; 50 is the angle of servo 1 ; '#' implies termination character	Slider controls the angle of servo 1 to rule the door, door displays the angle value of servo 1
13		Click to send "n"; click again to send "o"	Click to open the window; click again to close the window	14		Drag slider to send "u 34 #", 'u' represents initial character; 34 is the angle of servo 2; '#' stands for termination character	Slider controls the angle of servo 2 to rule the window, win shows the angle value of servo 2
15		Click to send "p" ; click again to send "q"	Click to turn on LED; click again to turn off LED	16		Drag slider to send "v 100 #", 'v' represents initial character; 100 is the PWM value of led2; '#' stands for termination character	Slider controls LED brightness, led2 displays brightness value
17		Click to send "r" ; click again to send "s"	Click to turn on fan; click again to turn off fan	18		Drag slider to send "w 153 #", 'w' represents initial character; 153 is the PWM value of fan ; '#' stands for termination character	Slider controls rotation speed, fans indicates the rotation speed value

(2) Gas alarm: When MQ2 gas sensor detects a gas leakage(detected value>300, here you may use lighter gas for testing), the buzzer emits an alarm till the value is under 100.

(3) Close window in rainy days: When the steam sensor detects a value over than 800, the servo

linked to Pin 10 turns 90° to close the door. Otherwise, it turns to 180° to open the window.

(4) Turn off light at night: When the photocell sensor detects a value less than 300 and PIR motion sensor detects someone is nearby, RGB light goes on in red. Otherwise, it goes off.

(5) Soil humidity: Insert the humidity sensor into soil. When the detected humidity value is within 10(10 is included) ~ 100, the buzzer emits sound. If the value is less than 10, the buzzer keeps silence.

(6) Door bypass code: The door is equipped with a 1602LCD display, two buttons and Servo 1. Press button 1 to enter passwords.

Correct passwords is ". - - . - ." , in which "." means "press the button" and " - " means "press and hold the button for more than 2S".

Each time you enter one password, the display will show a "\*" . Press button 2 after inputting all passwords.

If it is correct, the screen displays "open" and Servo 1 turns to 180° to open the door. When the motion sensor detects no one 5s later, the door close automatically.

If it is wrong, the display shows "error". Wait for 2s and re-enter the passwords when you see and

"again". Or press and hold button 2 to ring the doorbell(the buzzer emits sounds).

