

แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต

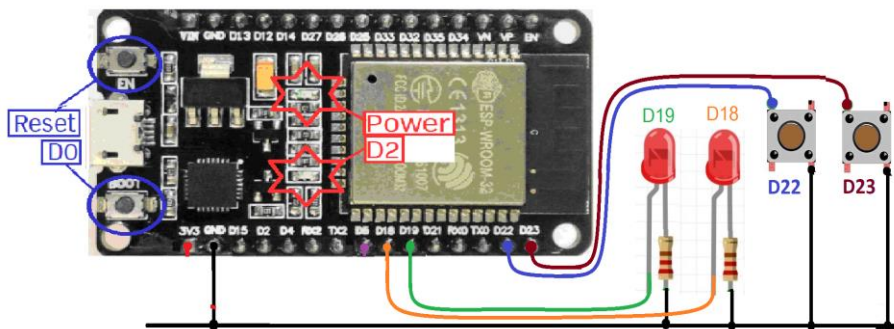
IoT Approaches to Manufacturing System

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4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_101 – กดติด กดดับ 2 ชุด

- หากต้องการให้ใช้ 1 สวิตช์ ควบคุม 1 LED แบบกดติด-กดดับ จำนวน 2 วงจรจะต้องวงจรและเขียนโปรแกรมอย่างไร {SW-D22 -- LED-D19, SW-D23 -- LED-D18}



Q101 | Arduino 1.8.19

File Edit Sketch Tools Help

Q101

```
1 //Quiz_101_กดติด กดดับ 2 ชุด
2 #define pushButton1 22
3 #define LEDPin1 19
4 #define pushButton2 23
5 #define LEDPin2 18
6 int buttonState1 = 0;
7 int buttonState2 = 0;
8
9 void setup() {
10   Serial.begin(115200);
11   pinMode(pushButton1, INPUT_PULLUP);
12   pinMode(LEDPin1, OUTPUT);
13   pinMode(pushButton2, INPUT_PULLUP);
14   pinMode(LEDPin2, OUTPUT);
15 }
16 void loop() {
17   if (digitalRead(pushButton1) == LOW) {
18     delay(20);
19     buttonState1 = 1 - buttonState1;
20     digitalWrite(LEDPin1, buttonState1);
21     while (digitalRead(pushButton1) == LOW);
22     delay(20);
23   }
24   if (digitalRead(pushButton2) == LOW) {
25     delay(20);
26     buttonState2 = 1 - buttonState2;
27     digitalWrite(LEDPin2, buttonState2);
28     while (digitalRead(pushButton2) == LOW);
29     delay(20);
30   }
31 }
32 }
33 }
```

Done Saving.

Leaving...

Hard resetting via RTS pin...

```
//Quiz_101_กดติด กดดับ 2 ชุด

#define pushButton1 22

#define LEDPin1 19

#define pushButton2 23

#define LEDPin2 18

int buttonState1 = 0;

int buttonState2 = 0;


void setup() {

  Serial.begin(115200);

  pinMode(pushButton1, INPUT_PULLUP);

  pinMode(LEDPin1, OUTPUT);

  pinMode(pushButton2, INPUT_PULLUP);

  pinMode(LEDPin2, OUTPUT);

}

void loop() {

  if (digitalRead(pushButton1) == LOW) {

    delay(20);

    buttonState1 = 1 - buttonState1;

    digitalWrite(LEDPin1, buttonState1);

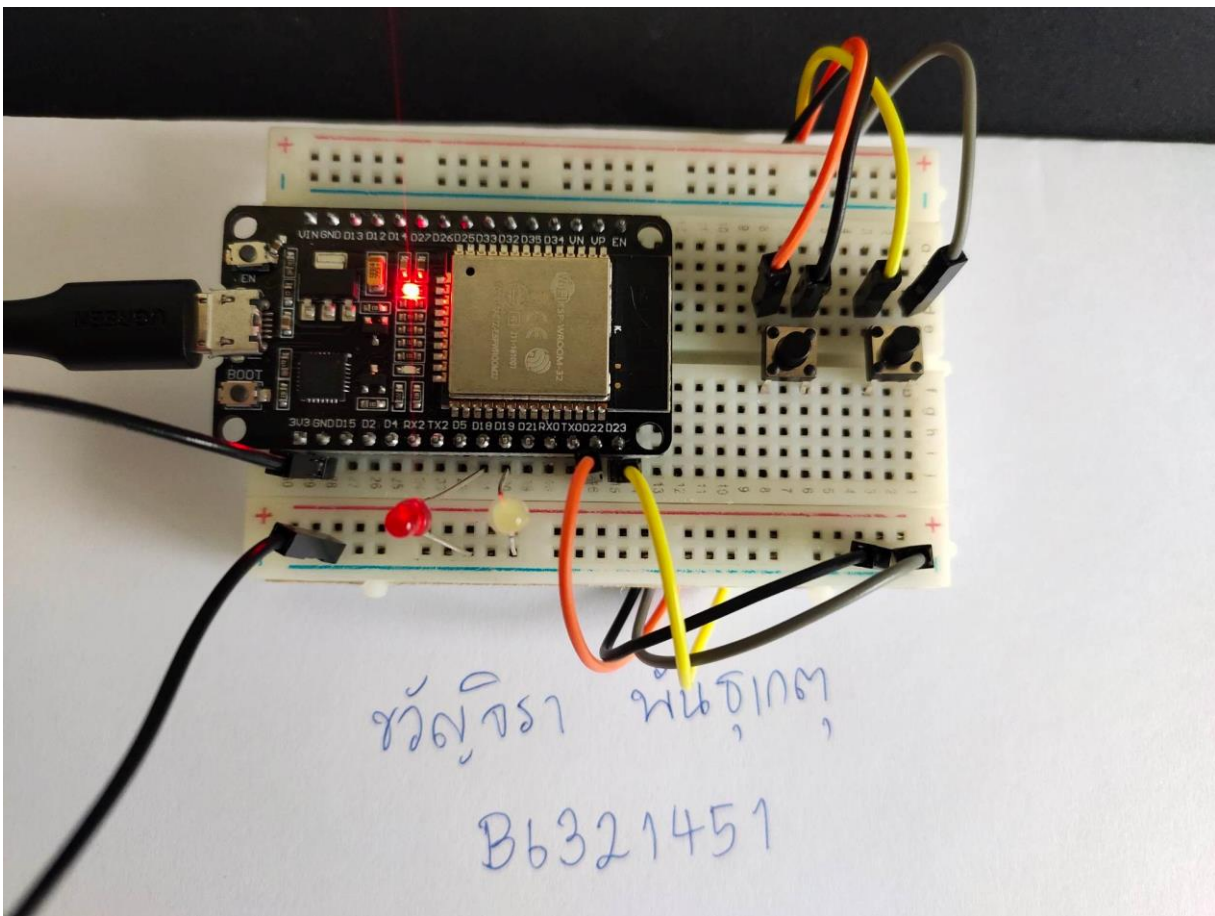
    while (digitalRead(pushButton1) == LOW);

    delay(20);}

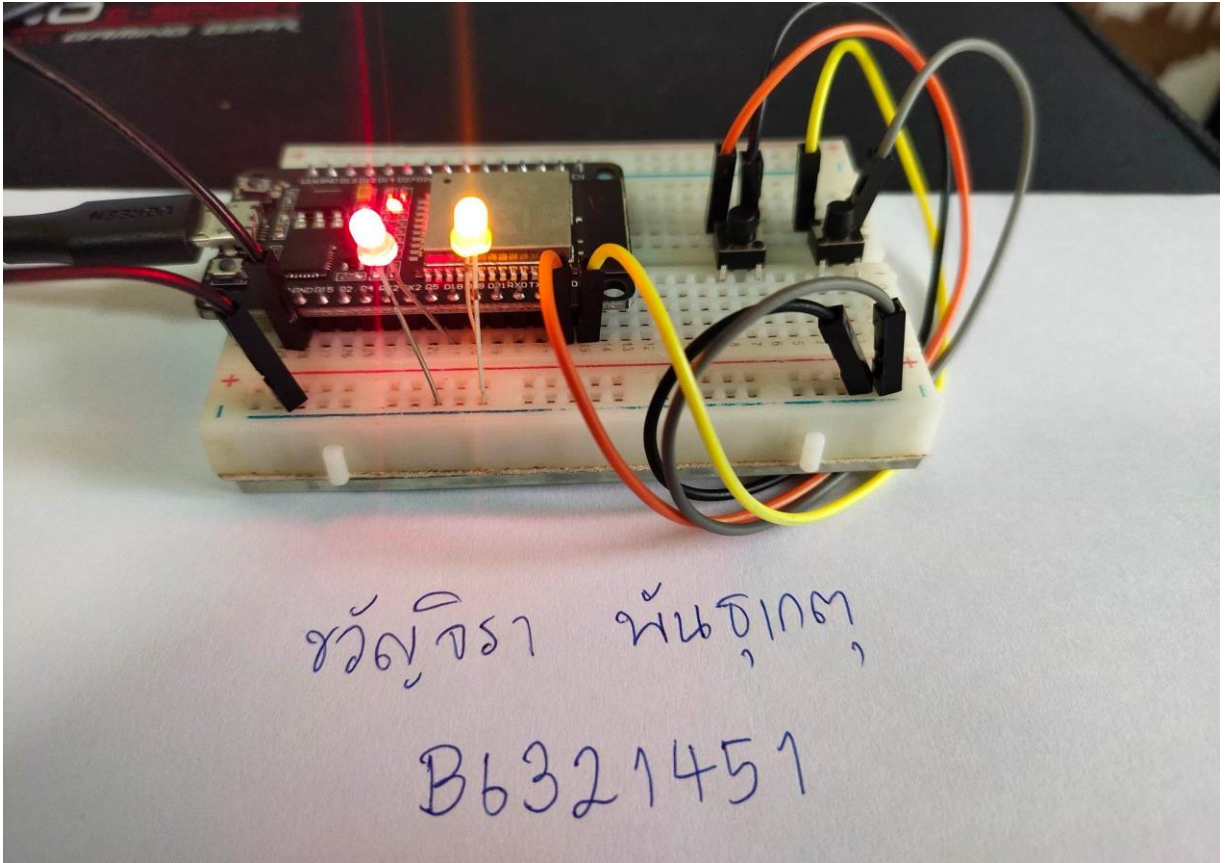
}
```

```
if (digitalRead(pushButton2) == LOW) {  
  
    delay(20);  
  
    buttonState2 = 1 - buttonState2;  
  
    digitalWrite(LEDPin2, buttonState2);  
  
    while (digitalRead(pushButton2) == LOW);  
  
    delay(20);  
  
}  
}
```

รูปการต่อวงจร - 1



รูปการต่อวงจร - 2



Video

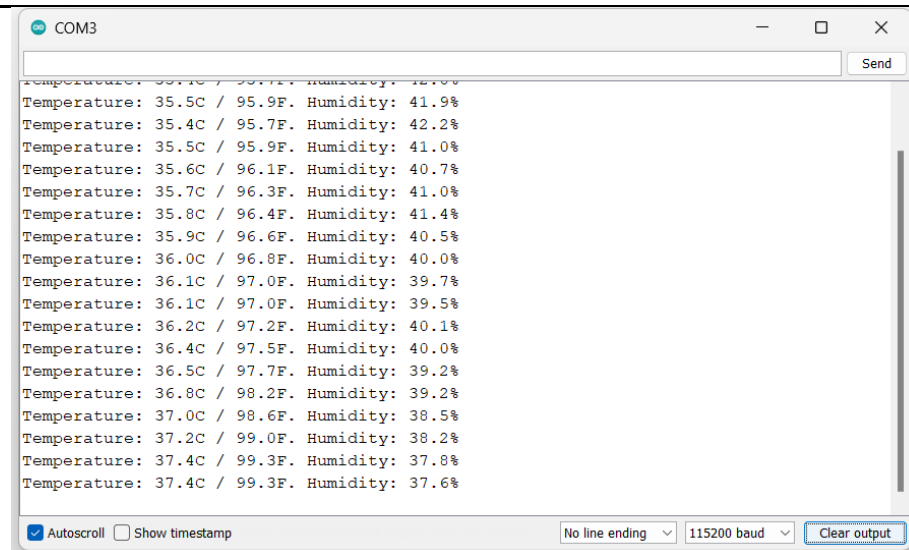
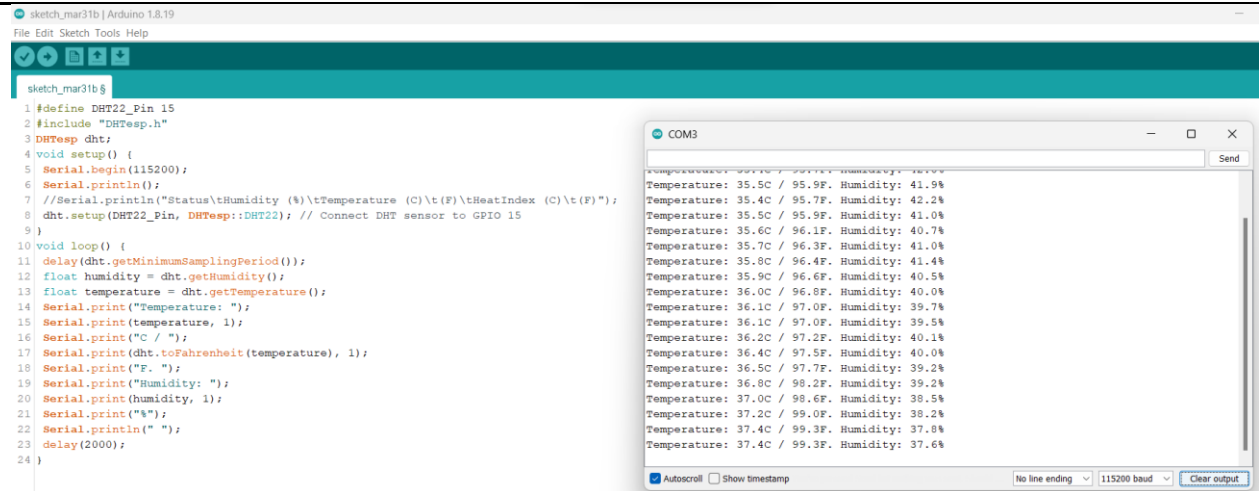
<https://www.youtube.com/watch?v=61rc4MitXqQ>

Quiz_102 – ปรับการแสดงผลที่ Serial Monitor เป็นดังนี้

Temperature: 23.0C / 74.7F. Humidity: 24.9%

Temperature: 23.0C / 74.7F. Humidity: 24.9%

Temperature: 23.0C / 74.7F. Humidity: 24.9%



```
#define DHT22_Pin 15
```

```
#include "DHTesp.h"
```

```
DHTesp dht;
```

```
void setup() {
```

```
  Serial.begin(115200);
```

```
  Serial.println();
```

```
  //Serial.println("Status\tHumidity (%)\tTemperature (C)\t(F)\tHeatIndex (C)\t(F)");
```

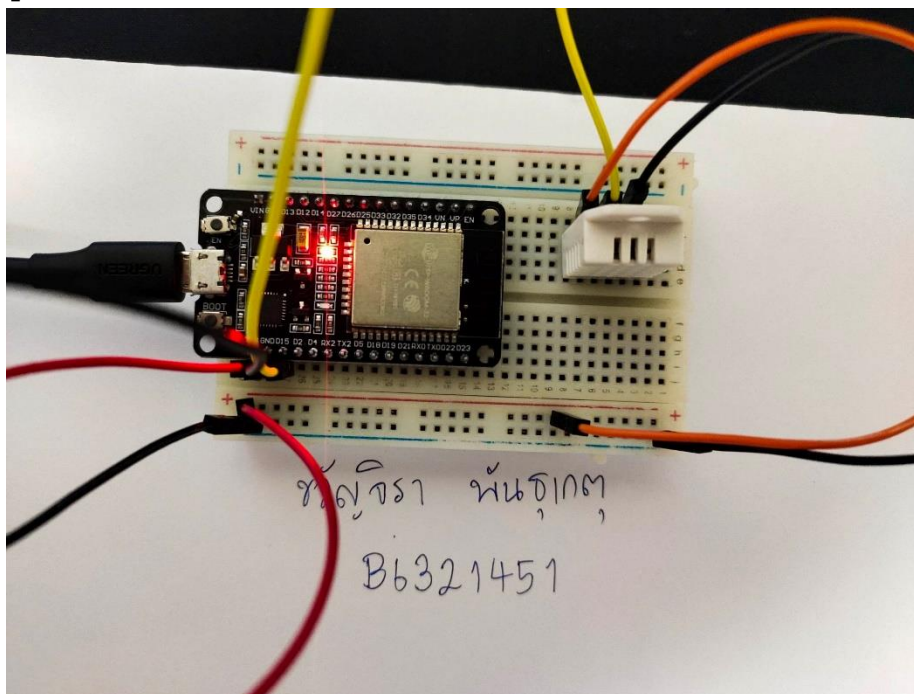
```

dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
}

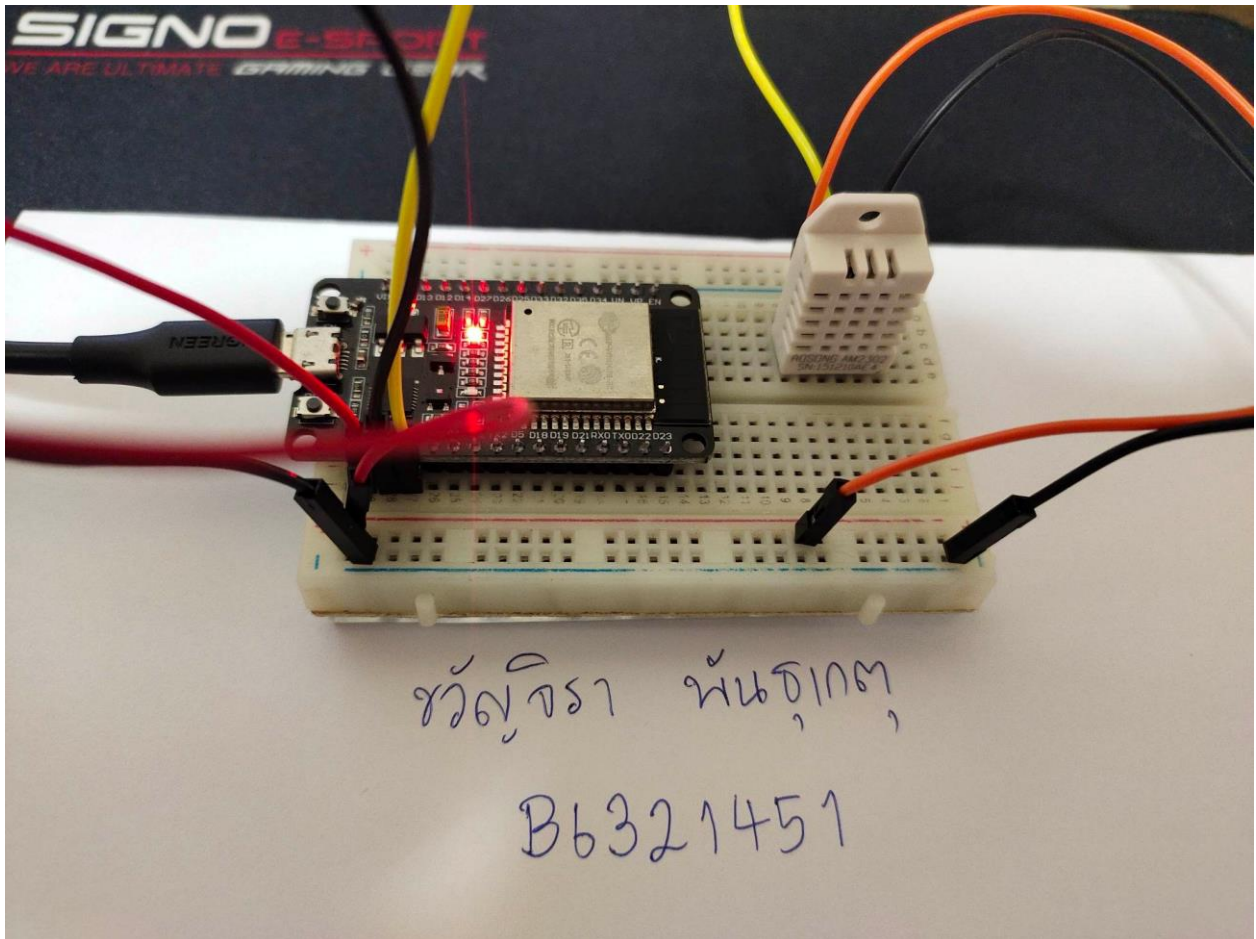
void loop() {
  delay(dht.getMinimumSamplingPeriod());
  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();
  Serial.print("Temperature: ");
  Serial.print(temperature, 1);
  Serial.print("C / ");
  Serial.print(dht.toFahrenheit(temperature), 1);
  Serial.print("F. ");
  Serial.print("Humidity: ");
  Serial.print(humidity, 1);
  Serial.print("%");
  Serial.println(" ");
  delay(2000);
}

```

รูปการต่อวงจร - 1



รูปการต่อวงจร - 2

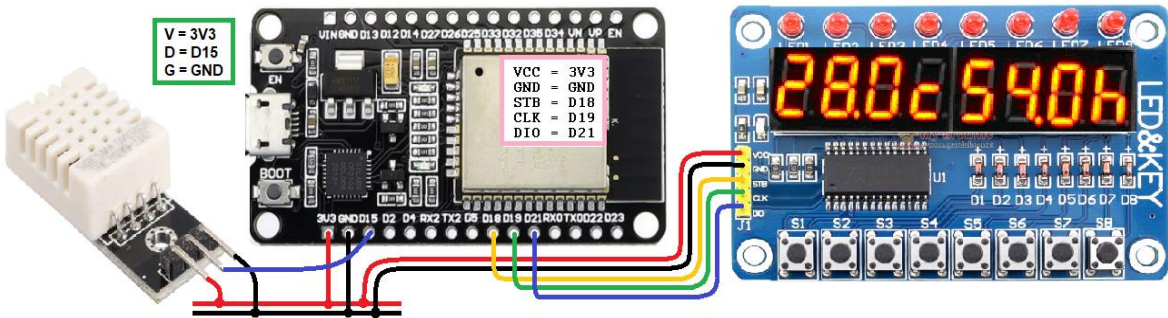


Video

https://www.youtube.com/shorts/7_qGwZy1J-U

Quiz_103 – Read Sensor and Show

- ต่อวงจรเพิ่มเติม ทดสอบการทำงานด้วยโปรแกรมต่อไปนี้ และปรับแก้ให้ถูกต้อง



V = 3V3
D = D15
G = GND

VCC = 3V3
GND = GND
STB = D18
CLK = D19
DIO = D21

28.0C 54.0%

Q103 | Arduino 1.8.19
File Edit Sketch Tools Help

Q103

```

1 #include <TM1638plus.h>
2 #include "DHTesp.h"
3 #define Pin_DHT22 15 // D15
4 #define Brd_STB 18 // strobe = GPIO connected to strobe line of module
5 #define Brd_CLK 19 // clock = GPIO connected to clock line of module
6 #define Brd_DIO 21 // data = GPIO connected to data line of module
7 bool high_freq = true; //default false, If using a high freq CPU > ~100 MHz set to true.
8 DHTesp dht;
9 TM1638plus tm(Brd_STB, Brd_CLK, Brd_DIO, high_freq);
10 void setup() {
11   Serial.begin(115200);
12   dht.setup(Pin_DHT22, DHTesp::DHT22);
13   tm.displayBegin();
14 }
15 void loop() {
16   float h = dht.getHumidity();
17   float t = dht.getTemperature();
18   Serial.print("Temperature: ");
19   Serial.print(t); Serial.print(" °C");
20   Serial.print("Humidity: ");
21   Serial.print(h); Serial.print(" %\n");
22   int Temp2 = (int)t/10; int Temp1 = (int)t%10; int Temp0 = (int)(t*10)%10;
23   int Humi2 = (int)h/10; int Humi1 = (int)h%10; int Humi0 = (int)(h*10)%10;
24   tm.displayHex(0, Temp2);
25   tm.displayASCIIwDot(1, Temp1 + '0'); // turn on dot
26   tm.displayHex(2, Temp0);
27   tm.display7Seg(3, B01011000); // Code=7gfedcba
28   tm.displayHex(4, Humi2);
29   tm.displayASCIIwDot(5, Humi1 + '0'); // turn on dot
30   tm.displayHex(6, Humi0);
31   tm.display7Seg(7, B01101000); // Code=7gfedcba
32   delay(2000);
33 }

```

COM3

Temperature: 37.30 °C	Humidity: 34.60 %
Temperature: 37.30 °C	Humidity: 34.70 %
Temperature: 37.30 °C	Humidity: 34.90 %
Temperature: 37.30 °C	Humidity: 35.20 %
Temperature: 37.30 °C	Humidity: 35.00 %
Temperature: 37.30 °C	Humidity: 34.90 %
Temperature: 37.30 °C	Humidity: 34.90 %
Temperature: 37.30 °C	Humidity: 34.80 %
Temperature: 37.30 °C	Humidity: 35.10 %
Temperature: 37.30 °C	Humidity: 35.30 %
Temperature: 37.30 °C	Humidity: 35.20 %
Temperature: 37.30 °C	Humidity: 34.60 %
Temperature: 37.30 °C	Humidity: 34.50 %
Temperature: 37.30 °C	Humidity: 34.70 %
Temperature: 37.30 °C	Humidity: 34.60 %
Temperature: 37.30 °C	Humidity: 35.20 %
Temperature: 37.30 °C	Humidity: 35.80 %
Temperature: 37.30 °C	Humidity: 35.50 %
Temperature: 37.30 °C	Humidity: 34.60 %

Done uploading.
Leaving...
Hard resetting via RTS pin...

ESP8266, 80MHz, 92160

```
#include <TM1638plus.h>
```

```
#include "DHTesp.h"
```

```
#define Pin_DHT22 15 // D15
```

```
#define Brd_STB 18 // strobe = GPIO connected to strobe line of module
```

```
#define Brd_CLK 19 // clock = GPIO connected to clock line of module
```

```
#define Brd_DIO 21 // data = GPIO connected to data line of module
```



```
bool high_freq = true; //default false,, If using a high freq CPU > ~100 MHZ set to true.
```

```
DHTesp dht;
```

```
TM1638plus tm(Brd_STB, Brd_CLK , Brd_DIO, high_freq);
```

```
void setup() {
```

```
  Serial.begin(115200);
```

```
  dht.setup(Pin_DHT22, DHTesp::DHT22);
```

```
  tm.displayBegin();
```

```
}
```

```
void loop() {
```

```
  float h = dht.getHumidity();
```

```
  float t = dht.getTemperature();
```

```
  Serial.print("Temperature: ");
```

```
  Serial.print(t); Serial.print(" *C\t");
```

```
  Serial.print("Humidity: ");
```

```
  Serial.print(h); Serial.print(" %\n");
```

```
  int Tempp2 = (int)t/10; int Tempp1 = (int)t%10; int Tempp0 = (int)(t*10)%10;
```

```
  int Humi2 = (int)h/10; int Humi1 = (int)h%10; int Humi0 = (int)(h*10)%10;
```

```
  tm.displayHex(0, Tempp2);
```

```
  tm.displayASCIllwDot(1, Tempp1 + '0'); // turn on dot
```

```
  tm.displayHex(2, Tempp0);
```

```
  tm.display7Seg(3, B01011000); // Code=tgfedcba
```

```
  tm.displayHex(4, Humi2);
```

```
  tm.displayASCIllwDot(5, Humi1 + '0'); // turn on dot
```

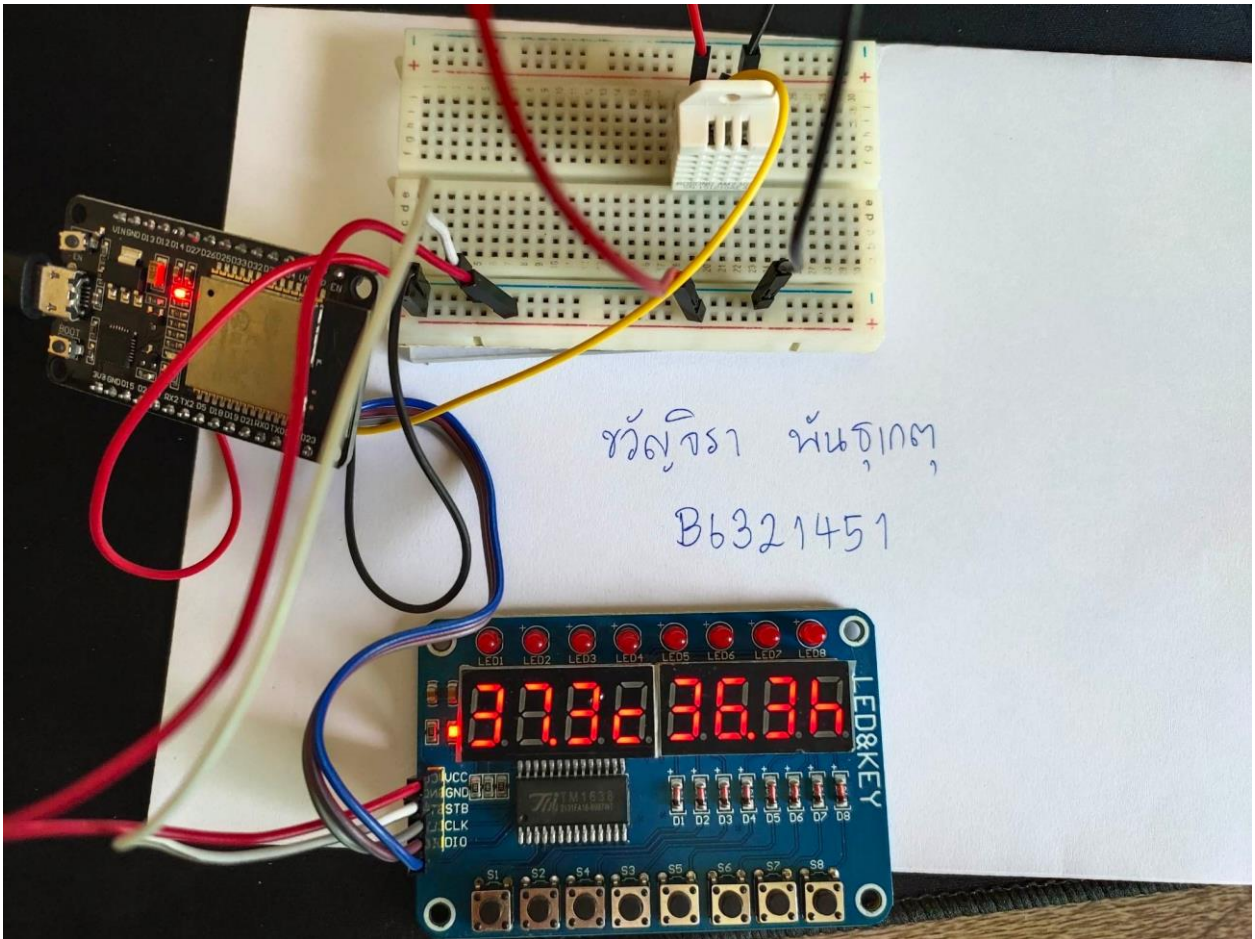
```
  tm.displayHex(6, Humi0);
```

```
tm.display7Seg(7, B01110100); // Code=tgfedcba
```

```
delay(2000);
```

```
}
```

รูปการต่อวงจร - 1



รูปการต่อวงจร - 2

