

การควบคุมเครื่องจักรอัจฉริยะโดยใช้การสื่อสารระหว่างเครื่องจักรกับเครื่องจักร

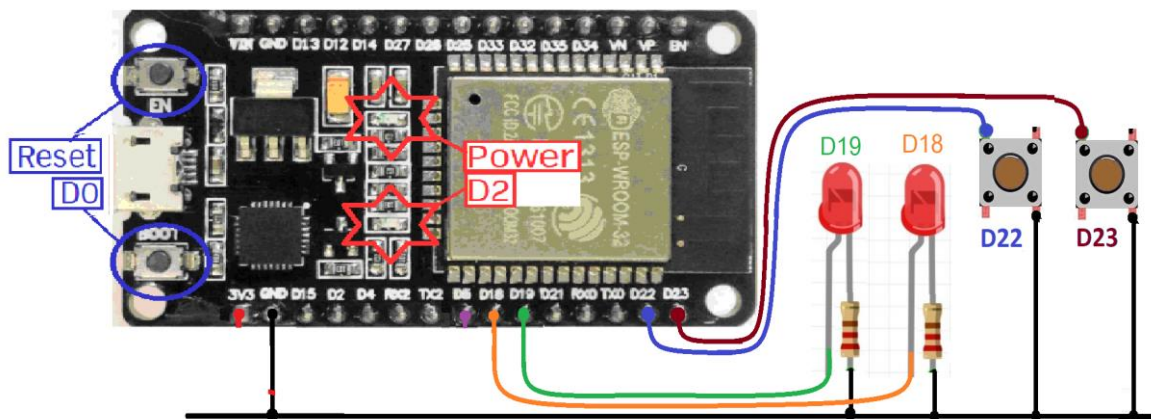
M2M - Intelligence Machine Control

ชื่อ-สกุล : อนุรักษ์ โตะแอ รหัสนักศึกษา : B6310158

6/6 – 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}



โปรแกรมที่ใช้ทดสอบ

```

Quiz101 | Arduino 1.8.19
File Edit Sketch Tools Help

Quiz101
#define Button1 22
#define LED1 19
#define Button2 23
#define LED2 18

int buttonState1 = 0;
int buttonState2 = 0;

void setup() {
  Serial.begin(115200);
  pinMode(Button1, INPUT_PULLUP);
  pinMode(LED1, OUTPUT);
  pinMode(Button2, INPUT_PULLUP);
  pinMode(LED2, OUTPUT);
}

void loop() {

  if (digitalRead(Button1) == LOW) {
    delay(20);
    buttonState1 = 1 - buttonState1;
    digitalWrite(LED1, buttonState1);
    while (digitalRead(Button1) == LOW);
    delay(20);
  }

  if (digitalRead(Button2) == LOW) {
    delay(20);
    buttonState2 = 1 - buttonState2;
    digitalWrite(LED2, buttonState2);
    while (digitalRead(Button2) == LOW);
    delay(20);
  }
}

```

```

#define Button1 22
#define LED1 19
#define Button2 23
#define LED2 18

int buttonState1 = 0;
int buttonState2 = 0;

void setup() {
  Serial.begin(115200);
  pinMode(Button1, INPUT_PULLUP);
  pinMode(LED1, OUTPUT);
  pinMode(Button2, INPUT_PULLUP);
  pinMode(LED2, OUTPUT);
}

void loop() {

  if (digitalRead(Button1) == LOW) {
    delay(20);
    buttonState1 = 1 - buttonState1;
    digitalWrite(LED1, buttonState1);
    while (digitalRead(Button1) == LOW);
    delay(20);
  }

  if (digitalRead(Button2) == LOW) {
    delay(20);
    buttonState2 = 1 - buttonState2;
    digitalWrite(LED2, buttonState2);
    while (digitalRead(Button2) == LOW);
    delay(20);
  }
}

```

รูปการทดสอบ 1

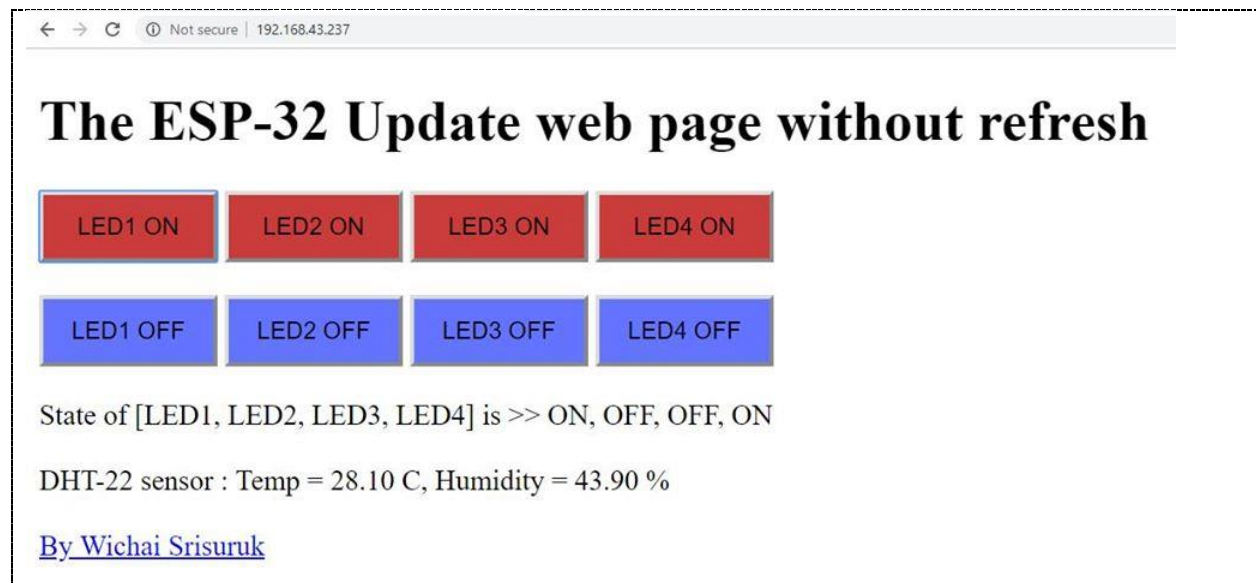


รูปการทดสอบ 2



Quiz_102 – Web Control 4 LED and Monitor Humid/Temperature

- เพิ่มเติมจาก Q202 อยากได้ปุ่มสำหรับคุมปิด-เปิด หลอดไฟ LED 4 ดวง
- อยากมีกด Link ไปที่หน้า FB ของตัวเอง
- https://www.colorhexa.com/008cba?fbclid=IwAR3dIZ_gRgDWmREmnzukuLbMxV3pOHy4YIPuLEz8-ZzTOX2VhWxcH2QjLGk



← → ↻ ⓘ Not secure | 192.168.43.237

The ESP-32 Update web page without refresh

LED1 ON

LED2 ON

LED3 ON

LED4 ON

LED1 OFF

LED2 OFF

LED3 OFF

LED4 OFF

State of [LED1, LED2, LED3, LED4] is >> ON, OFF, OFF, ON

DHT-22 sensor : Temp = 28.10 C, Humidity = 43.90 %

By Wichai Srisuruk

โปรแกรมที่ใช้ทดสอบ

```

Quiz202 | Arduino 1.8.19
File Edit Sketch Tools Help

Quiz202 index.h
#include <WiFi.h>
#include <WiFiClient.h>
#include <WebServer.h>
#include "DHTesp.h"
#include "index.h" //Our HTML webpage contents with javascripts
#define DHT_Pin 4
#define testLED1 5
#define testLED2 18
#define testLED3 19
#define testLED4 21
//SSID and Password of your WiFi router
const char* ssid = "jjjj";
const char* password = "0846894722";
WebServer server(80); //Server on port 80
DHTesp dht;
String ledState1 = "NA";
String ledState2 = "NA";
String ledState3 = "NA";
String ledState4 = "NA";
//=====
// This routine is executed when you open its IP in browser
//=====
void setup(void) {
  Serial.begin(115200);
  dht.setup(DHT_Pin, DHTesp::DHT22); // DHT_Pin D4, DHT22
  pinMode(testLED1, OUTPUT);
  pinMode(testLED2, OUTPUT);
  pinMode(testLED3, OUTPUT);
  pinMode(testLED4, OUTPUT);
  Serial.print("\n\nConnect to ");
  Serial.println(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("\nWiFi connected");
  server.on("/", []() {
    // Your code here
  });
  server.begin();
  Serial.println("WebServer started");
}

void loop() {
  // Your code here
}

```

```

#include <WiFi.h>
#include <WiFiClient.h>
#include <WebServer.h>
#include "DHTesp.h"

```

```

#include "index.h" //Our HTML webpage contents with javascripts
#define DHT_Pin 4
#define testLED1 5
#define testLED2 18
#define testLED3 19
#define testLED4 21

//SSID and Password of your WiFi router
const char* ssid = "jjjj";
const char* password = "0846894722";
WebServer server(80); //Server on port 80
DHTesp dht;
String ledState1 = "NA";
String ledState2 = "NA";
String ledState3 = "NA";
String ledState4 = "NA";
//=====
// This routine is executed when you open its IP in browser
//=====

void setup(void) {
  Serial.begin(115200);
  dht.setup(DHT_Pin, DHTesp::DHT22); // DHT_Pin D4, DHT22
  pinMode(testLED1, OUTPUT);
  pinMode(testLED2, OUTPUT);
  pinMode(testLED3, OUTPUT);
  pinMode(testLED4, OUTPUT);
  Serial.print("\n\nConnect to ");
  Serial.println(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500); Serial.print(".");
  }
  Serial.print("\nConnected "); Serial.println(ssid);
  Serial.print("IP address: "); Serial.println(WiFi.localIP());
  server.on("/", handleRoot);
  server.on("/setLED", handleLED);
  server.on("/readADC", handleADC);
  server.begin();
  Serial.println("HTTP server started");
}

void handleRoot() {
  String s = MAIN_page; //Read HTML contents
  server.send(200, "text/html", s); //Send web page
}

void handleADC() {
  float h = dht.getHumidity();
  float t = dht.getTemperature();
  String tmpValue = "Temp = ";
  tmpValue += String(t) + " C, Humidity = ";
  tmpValue += String(h) + " %";
  server.send(200, "text/plain", tmpValue); //Send value to client ajax request
}

void handleLED() {

```

```

String t_state = server.arg("LEDstate"); //Refer xhttp.open("GET",
"setLED?LEDstate="+led, true);
Serial.println(t_state);
if (t_state == "11") {
  digitalWrite(testLED1, HIGH); //Feedback parameter
  ledState1 = "ON";
}
if (t_state == "10") {
  digitalWrite(testLED1, LOW); //Feedback parameter
  ledState1 = "OFF";
}
if (t_state == "21") {
  digitalWrite(testLED2, HIGH); //Feedback parameter
  ledState2 = "ON";
}
if (t_state == "20") {
  digitalWrite(testLED2, LOW); //Feedback parameter
  ledState2 = "OFF";
}
if (t_state == "31") {
  digitalWrite(testLED3, HIGH); //Feedback parameter
  ledState3 = "ON";
}
if (t_state == "30") {
  digitalWrite(testLED3, LOW); //Feedback parameter
  ledState3 = "OFF";
}
if (t_state == "41") {
  digitalWrite(testLED4, HIGH); //Feedback parameter
  ledState4 = "ON";
}
if (t_state == "40") {
  digitalWrite(testLED4, LOW); //Feedback parameter
  ledState4 = "OFF";}
server.send(200, "text/plain", ledState1 + ", " + ledState2 + ", " + ledState3 + ", " +
ledState4); //Send web page
}
void loop(void) {
  server.handleClient(); //Handle client requests
}

```

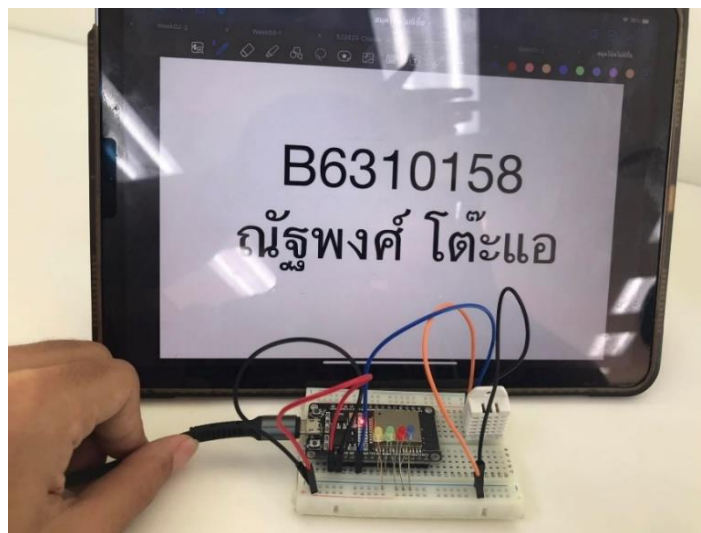
รูปถ่ายหน้า Web Browser



รูปการทดสอบ 1



รูปการทดสอบ 2



-

File Edit Search Tools Help

GUI204

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 #include <HTS.h>
4 #define Pin_DHT22 15
5 const char ssid = "j355"; //Your Wifi
6 const char password = "084694722"; //Your Wifi password
7 const char mqtt_server = "test.mosquitto.org";
8 const char topic = "MIQiz204";
9 DHTesp dht;
10 WiFiClient espClient;
11 PubSubClient client(espClient);
12 long lastMsg = 0;
13 char msg[50];
14 int counter = 0;
15 int SW1 = 4;
16 int SW2 = 5;
17 int LED1 = 19;
18 int LED2 = 21;
19 int LED3 = 22;
20 int LED4 = 23;
21 void setup_wifi() {
22   delay(10);
23   Serial.println();
24   Serial.print("Connecting to "); Serial.println(ssid);
25   WiFi.begin(ssid, password);
26   while (WiFi.status() != WL_CONNECTED) {
27     delay(500); Serial.print(".");

```

COM3

Attempting MQTT connection...connected
Publish message: Temp: 26.40°C Humid: 34.50%
Message arrived [MIQiz204] Temp: 26.40°C Humid: 34.50%
--> Temp: 26.40°C Humid: 34.50%
Publish message: Temp: 26.30°C Humid: 98.00%
Message arrived [MIQiz204] Temp: 26.30°C Humid: 98.00%
--> Temp: 26.30°C Humid: 98.00%
Publish message: Overheat Alarm
Message arrived [MIQiz204] Overheat Alarm
--> Overheat Alarm
Publish message: Intruders Alarm
Message arrived [MIQiz204] Intruders Alarm
--> Intruders Alarm
Publish message: Temp: 26.50°C Humid: 44.00%
Message arrived [MIQiz204] Temp: 26.50°C Humid: 44.00%
--> Temp: 26.50°C Humid: 44.00%
Message arrived [MIQiz204] ON1

--> ON1

Publish message: Temp: 26.40°C Humid: 39.10%
Message arrived [MIQiz204] Temp: 26.40°C Humid: 39.10%
--> Temp: 26.40°C Humid: 39.10%
Publish message: Temp: 26.50°C Humid: 36.00%
Message arrived [MIQiz204] ON1

< Autoterm Show timestamp No line ending 115200 baud Clear output

```
#include <WiFi.h>
#include <PubSubClient.h>
#include "DHTesp.h"
#define Pin_DHT22 15
const char* ssid = "jjjj"; //Your Wifi
const char* password = "0846894722"; //Your Wifi password
const char* mqtt_server = "test.mosquitto.org";
const char* topic1 = "M1Quiz204";
DHTesp dht;
WiFiClient espClient;
PubSubClient client(espClient);
long lastMsg = 0;
char msg[50];
int Counter = 0;
int SW1 = 4;
int SW2 = 5;
int LED1 = 19;
```



```

int LED2 = 21;
int LED3 = 22;
int LED4 = 23;
void setup_wifi() {
  delay(10);
  Serial.println();
  Serial.print("Connecting to "); Serial.println(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500); Serial.print(".");
  }
  randomSeed(micros());
  Serial.println(""); Serial.println("WiFi connected");
  Serial.println("IP address: "); Serial.println(WiFi.localIP());
}
void reconnect()
{ while (!client.connected()) // Loop until we're reconnected
  { Serial.print("Attempting MQTT connection...");
    String clientId = "ESP32 Client-";
    clientId += String(random(0xffff), HEX); // Create a random client ID
    if (client.connect(clientId.c_str())) // Attempt to connect
    { Serial.println("connected"); // Once connected, publish an announcement...
      client.publish(topic1, "Hello World Akki"); // ... and resubscribe
      client.subscribe(topic1);
    }
    else
    { Serial.print("failed, rc=");
      Serial.print(client.state());
      Serial.println(" try again in 5 seconds");
      delay(5000);
    }
  }
}
void callback(char* topic, byte* payload, unsigned int length)
{ char myPayload[50];
  Serial.print("Message arrived [");
  Serial.print(topic1);
  Serial.print("] ");
  for (int i = 0; i < length; i++)
  { Serial.print((char)payload[i]);
    myPayload[i] = payload[i];
    myPayload[i + 1] = '\0'; // End of String
  }
  Serial.print("\n ---> "); Serial.println(myPayload);
  myPayload[4] = '\0'; // String less than 4 characters
  if ((String)myPayload == "ON")
  { digitalWrite(LED1, HIGH);
    digitalWrite(LED2, HIGH);
    digitalWrite(LED3, HIGH);
    digitalWrite(LED4, HIGH);
  }
  if ((String)myPayload == "ON1") {
    digitalWrite(LED1, HIGH);
  }
  if ((String)myPayload == "ON2") {
    digitalWrite(LED2, HIGH);
  }
  if ((String)myPayload == "ON3") {
    digitalWrite(LED3, HIGH);
  }
}

```

```

}
if ((String)myPayload == "ON4") {
    digitalWrite(LED4, HIGH);
}
if ((String)myPayload == "OFF")
{ digitalWrite(LED1, LOW); digitalWrite(LED2, LOW);
  digitalWrite(LED3, LOW); digitalWrite(LED4, LOW);
}
if ((String)myPayload == "OFF1") {
    digitalWrite(LED1, LOW);
}
if ((String)myPayload == "OFF2") {
    digitalWrite(LED2, LOW);
}
if ((String)myPayload == "OFF3") {
    digitalWrite(LED3, LOW);
}
if ((String)myPayload == "OFF4") {
    digitalWrite(LED4, LOW);
}
}
void setup()
{ Serial.begin(115200);
  pinMode(LED1, OUTPUT);
  pinMode(LED2, OUTPUT);
  pinMode(LED3, OUTPUT);
  pinMode(LED4, OUTPUT);
  pinMode(SW1, INPUT_PULLUP);
  pinMode(SW2, INPUT_PULLUP);
  dht.setup(Pin_DHT22, DHTesp::DHT22);
  setup_wifi();
  client.setServer(mqtt_server, 1883);
  client.setCallback(callback);
}
void loop()
{ if (!client.connected()) reconnect();
  { client.loop();
    if (digitalRead(SW1) == 0)
    { client.loop();
      snprintf (msg, 75, " Overheat Alarm ");
      Serial.print("Publish message: ");
      Serial.println(msg);
      client.publish(topic1, msg);
      while (digitalRead(SW1) == 0);
      delay(100);
    }
    if (digitalRead(SW2) == 0)
    { client.loop();
      snprintf (msg, 75, " Intruders Alarm");
      Serial.print("Publish message: ");
      Serial.println(msg);
      client.publish(topic1, msg);
      while (digitalRead(SW2) == 0);
      delay(100);
    }
  }
  long now = millis();
  if (now - lastMsg > 5000)
  { lastMsg = now;

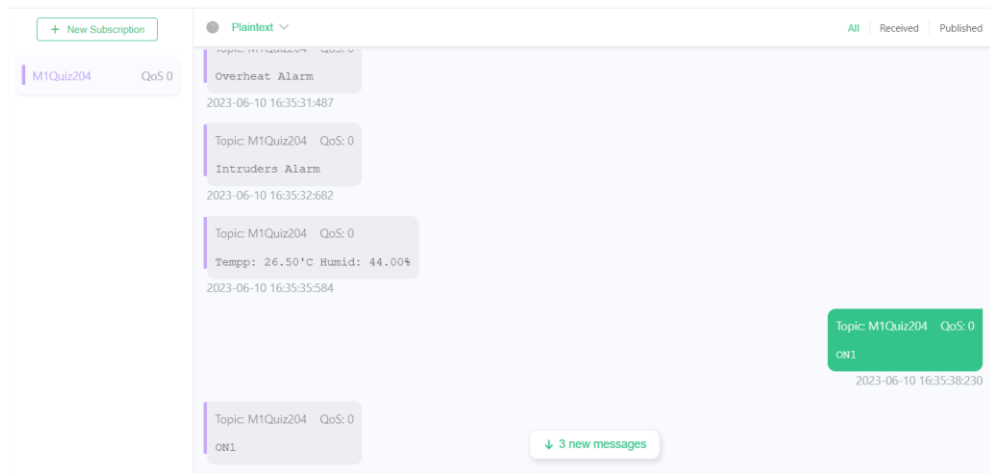
```

```

float humid = dht.getHumidity();
float temp = dht.getTemperature();
sprintf (msg, 75, "Temp: %.2f'C Humid: %.2f%%", temp, humid);
Serial.print("Publish message: ");
Serial.println(msg);
client.publish(topic1, msg);
}
}

```

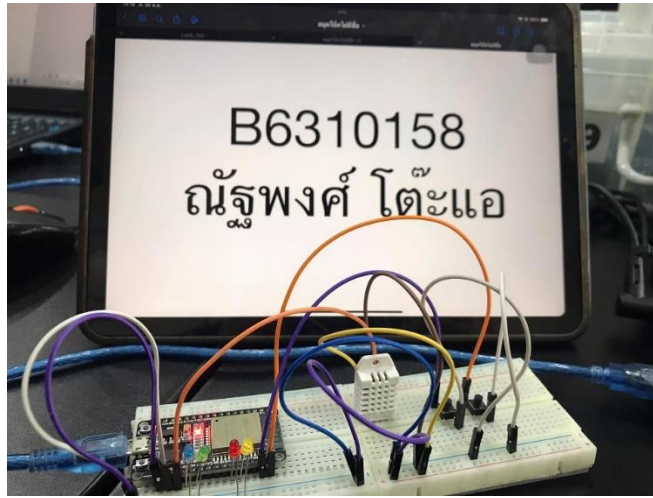
รูปหน้าจอ MQTT Lens



รูปการต่อวงจร - 1

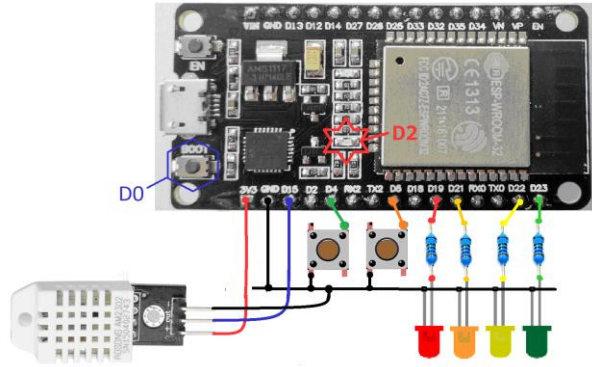



รูปการต่อวงจร – 2



Quiz_104 – Blynk and LINE from (DHT22 + 4 LED + 2 Switch)

- ควบคุมการปิดเปิด 4 LED
- อ่านค่า DHT-22 แล้วส่งไปยัง Blynk ทุกๆ 5 วินาที
- บันทึกค่าไปยัง Google Sheet
- หากอุณหภูมิเกิน 28°C ให้แจ้งไปยัง LINE
- รับค่าสวิตช์กำหนด SW1 แจ้ง Overheat Alarm, SW2 แจ้ง Intruders Alarm ไปยัง LINE

	
โปรแกรมที่ใช้ทดสอบ	
รูปหน้าจอ Blynk	
รูปหน้าจอ LINE	
รูปการต่อวงจร – 1	
รูปการต่อวงจร – 2	