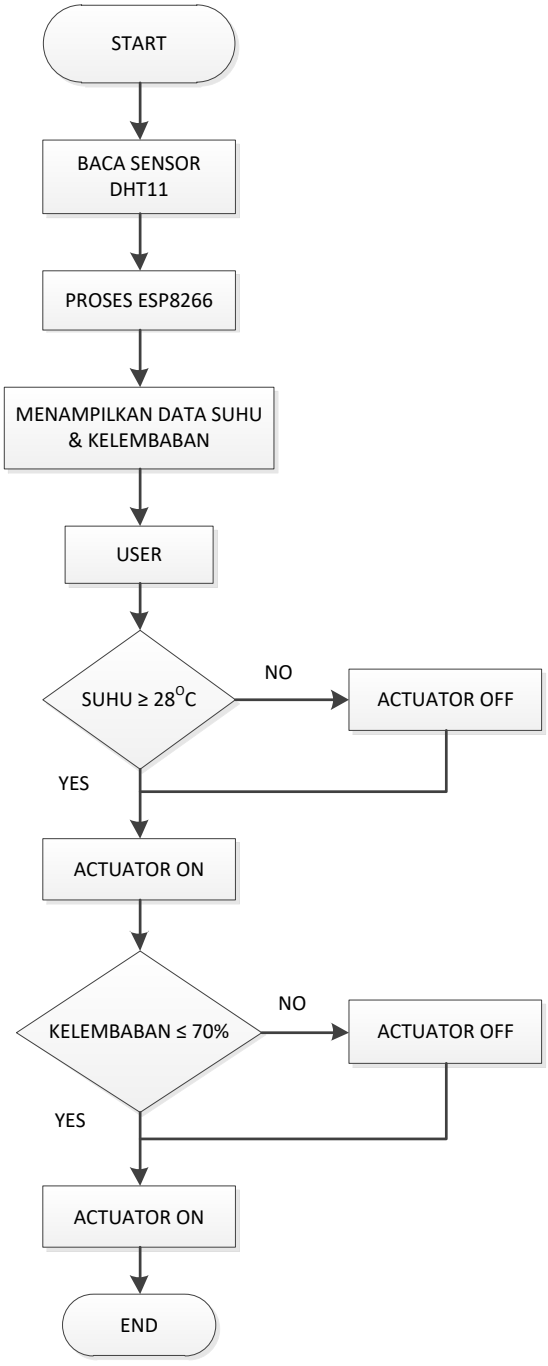
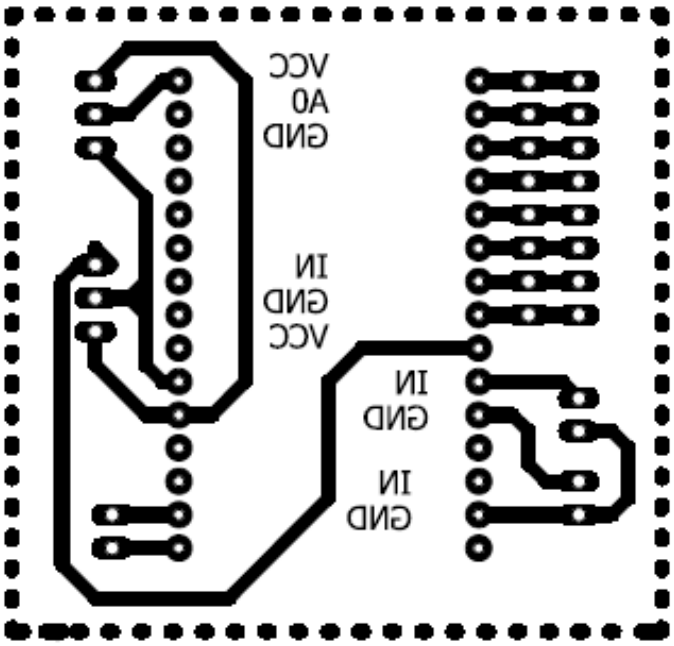
LAMPIRAN-LAMPIRAN

Lampiran 1. Tampilan Alat

Lampiran 2. Flowchart



Lampiran 3. *Layout* PCB



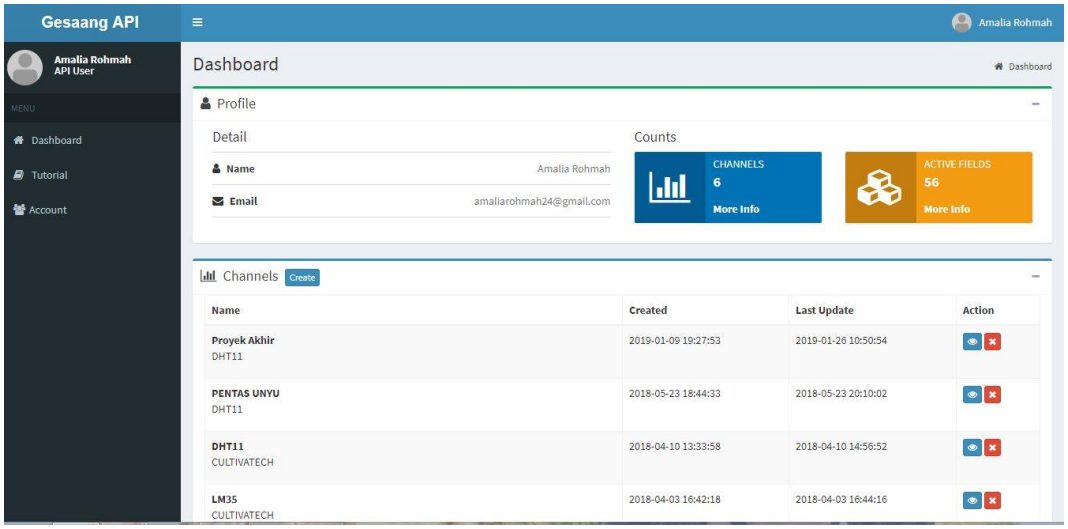
Lampiran 4. Program

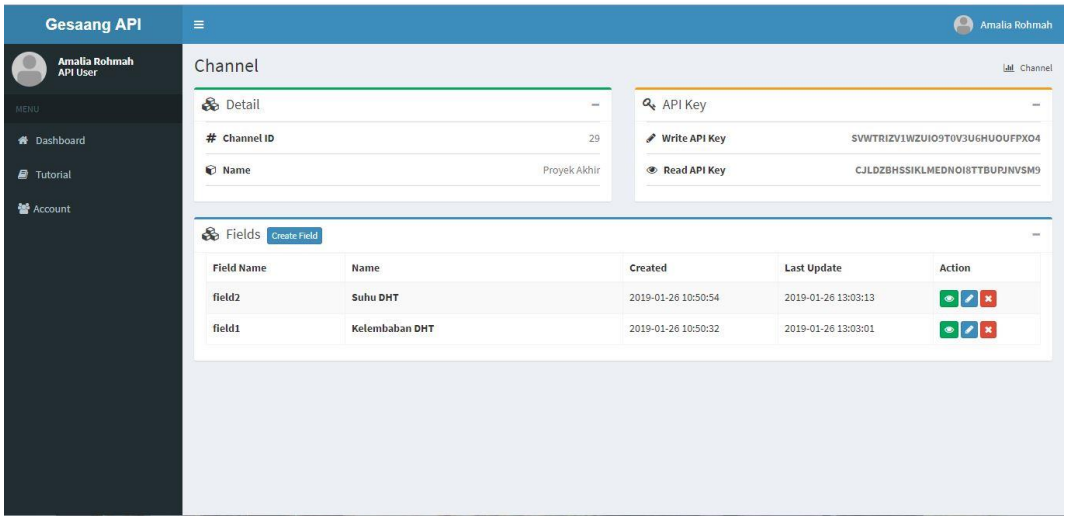
```
#include <Adafruit_Sensor.h>
#include <ESP8266WiFiMulti.h>
#include <ESP8266HTTPClient.h>
ESP8266WiFiMulti WiFiMulti;

#include "DHT.h"
#define DHTPIN D2     //sesuaikan dengan Pin apa yang digunakan. Misal saya gunakan pin D2
#define DHTTYPE DHT11   // DHT 11
DHT dht(DHTPIN, DHTTYPE);

      float h = 0;  //Pembacaan untuk data kelembaban
      float t = 0;  //Pembacaan dalam format celcius (c)
      float f = 0;  //pembacaan dalam format Fahrenheit

int     analogVal = 0; // variable untuk menyimpan nilai analog
float   mVolt     = 0; // dari nilai analog kita ubah ke satuan mVolt
float   celsius   = 0; // dari mVolt kita akan dapat nilai Celsiusnya
String  API       = "SVWTRIZV1WZUIO9T0V3U6HUOUFPXO4";  // silahkan ganti sendiri dengan Write API Key anda
int     relay     = D6;
int     merah     = D8;
int     putih     = D7;
float     batas_suhu     = 28;
float     batas_kelembaban = 70;
void setup()
{
   Serial.begin(4800);
   Serial.println("DHTxx test!");
   dht.begin();
   WiFiMulti.addAP("Redmi", "qwerty12");          // set Wifi SSID dan passwordnya
   Serial.print("Connecting to... ");
}

void loop()
{
   Serial.print(".");  // tunggu koneksi Wifi
   if((WiFiMulti.run() == WL_CONNECTED))
   {
      Serial.println("WiFi Connected");
      delay(2000); //menunggu beberapa detik untuk pembacaan ==> pembacaan sensor membutuhkan waktu 250ms
```

```
      h = dht.readHumidity();   //Pembacaan untuk data kelembaban
      t = dht.readTemperature();   //Pembacaan dalam format celcius (c)
      f = dht.readTemperature(true);   //pembacaan dalam format Fahrenheit

      if (isnan(h) || isnan(t) || isnan(f)) //mengecek pembacaan apakah terjadi
kegagalan atau tidak
       {
        Serial.println("Failed to read from DHT sensor!");
        return;
       }

        float hif = dht.computeHeatIndex(f, h);   // Compute heat index in
Fahrenheit (the default)
        float hic = dht.computeHeatIndex(t, h, false);   // Compute heat index in
Celsius (isFahreheit = false)
        Serial.print("Humidity: ");
        Serial.print(h);
        Serial.print(" %\t");
        Serial.print("Temperature: ");
        Serial.print(t);
        Serial.print(" *C ");
        Serial.print(f);
        Serial.print(" *F\t");
        Serial.print("Heat index: ");
        Serial.print(hic);
        Serial.print(" *C ");
        Serial.print(hif);
        Serial.println(" *F");

        String latitude_n   = "-7,5809028"; // anda bisa mengatur sendiri bagian
ini sesuai keinginan ada
        String longitude_n  = "110,830694"; // anda bisa mengatur sendiri
bagian ini sesuai keinginan ada
        String device_n     = "TA_Amel"; // anda bisa mengatur sendiri bagian
ini sesuai keinginan ada

        HTTPClient http;

        String url      =
"http://gesaangapi.ngeartstudio.com/api/channels/update?api_key=";
        String field1   = "&field1=";
        String field2   = "&field2=";
        String field3   = "&field3=";
        String field4   = "&field4=";
        String latitude = "&latitude=";
        String longitude= "&longitude=";
```

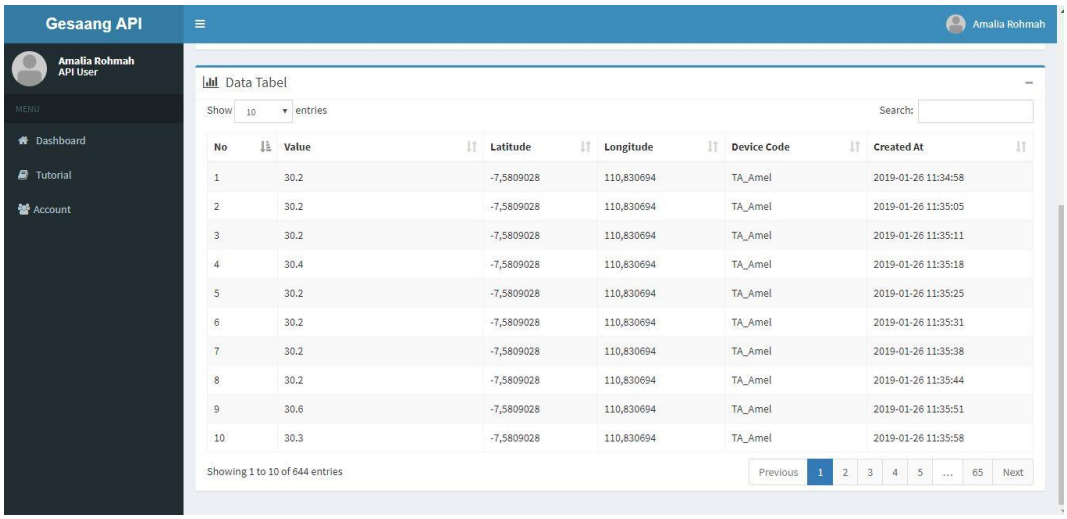
```
        String device   = "&device_code=";

        String urls     = url + API + field1 + h + field2 + t + field3 +  f + field4 +
celsius + latitude + latitude_n + longitude + longitude_n + device + device_n; //
url lengkap yang akan dikirim ke server
        Serial.println (urls);

        http.begin(urls);               // panggil API
        int httpCode = http.GET();      // ambil status HTTP Header

        if(httpCode > 0)                // httpCode akan bernilai negatif bila error
          {
          Serial.printf("[HTTP] GET... code: %d\n", httpCode);              // cetak
httpCode ke Serial, 200 berarti sukses
          }
        else
          {
          Serial.printf("[HTTP] GET... failed, error: %s\n",
http.errorToString(httpCode).c_str());
          }
        http.end();     // tutup koneksi HTTP
   }
   delay(4000);       // beri jeda pengiriman data setiap 4 detik

      if ((t >= batas_suhu) || (h <= batas_kelembaban))
     {
      pinMode(relay, HIGH);
      //pinMode(merah, HIGH);
      //pinMode(putih, HIGH);
      Serial.println("relay ON");
     }
   else if ((t < batas_suhu) || (h > batas_kelembaban))
     {
      pinMode(relay, LOW);
      //pinMode(merah, LOW);
      //pinMode(putih, HIGH);
      Serial.println("relay OFF");
     }


}
```

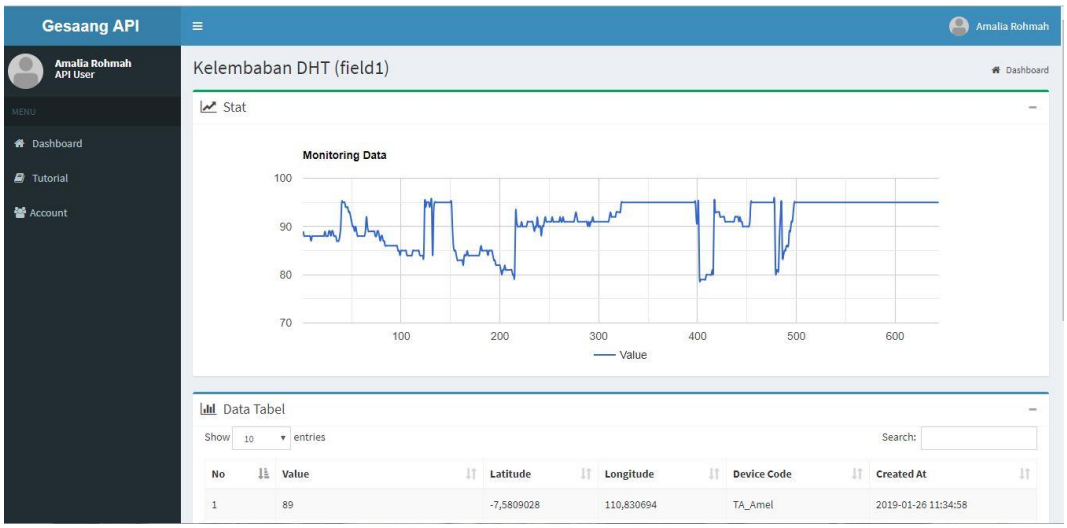
Lampiran 5. Tampilan Web

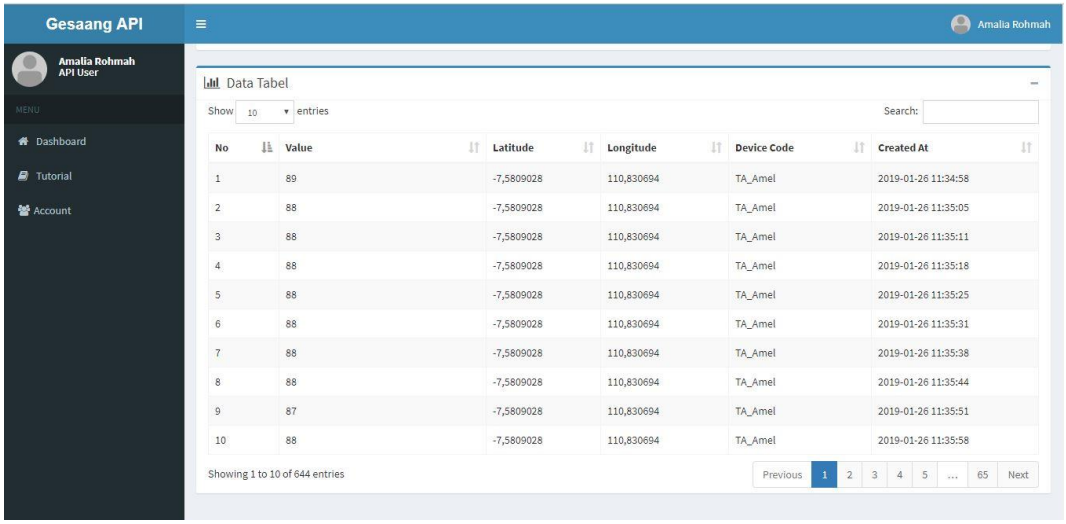





Gesaang API
Amalia Rohmah
API User
MENU
Dashboard
Tutorial
Account
Amalia Rohmah
Suhu DHT (field2)
Dashboard
Stat
Monitoring Data
40
35
30
25
100
200
300
400
500
600
Value
Data Tabel
Show 10 entries
Search:
No
Value
Latitude
Longitude
Device Code
Created At
1
30.2
-7,5809028
110,830694
TA_Amel
2019-01-26 11:34:58


Gesaang API
Amalia Rohmah
API User
MENU
Dashboard
Tutorial
Account
Amalia Rohmah
Data Tabel
Show 10 entries
Search:
No
Value
Latitude
Longitude
Device Code
Created At
1 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:34:58
2 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:05
3 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:11
4 30.4 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:18
5 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:25
6 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:31
7 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:38
8 30.2 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:44
9 30.6 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:51
10 30.3 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:58
Showing 1 to 10 of 644 entries
Previous 1 2 3 4 5 ... 65 Next


Gesaang API
Amalia Rohmah
API User
MENU
Dashboard
Tutorial
Account
Amalia Rohmah
Kelembaban DHT (field1)
Dashboard
Stat
Monitoring Data
100
90
80
70
100
200
300
400
500
600
Value
Data Tabel
Show 10 entries
Search:
No
Value
Latitude
Longitude
Device Code
Created At
1
89
-7,5809028
110,830694
TA_Amel
2019-01-26 11:34:58


Gesaang API
Amalia Rohmah
Amalia Rohmah
API User
MENU
Dashboard
Tutorial
Account
Amalia Rohmah
Data Tabel
Show 10 entries
Search:
No
Value
Latitude
Longitude
Device Code
Created At
1 89 -7,5809028 110,830694 TA_Amel 2019-01-26 11:34:58
2 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:05
3 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:11
4 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:18
5 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:25
6 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:31
7 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:38
8 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:44
9 87 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:51
10 88 -7,5809028 110,830694 TA_Amel 2019-01-26 11:35:58
Showing 1 to 10 of 644 entries
Previous 1 2 3 4 5 ... 65 Next

Lampiran 6. Dokumentasi

Lampiran 7. Datasheet Modul Wifi ESP8266

2. Pin Definitions

Figure 2-1 shows the pin layout for 32-pin QFN package.

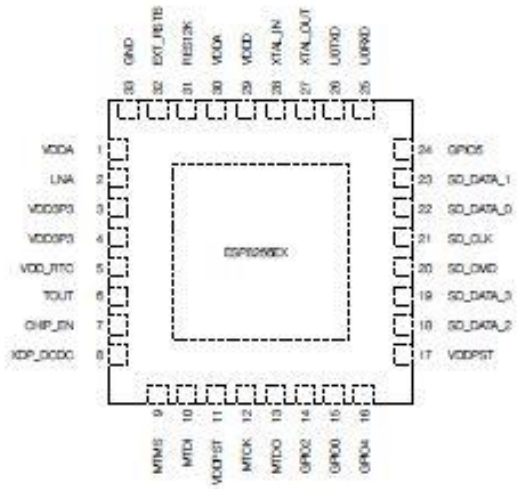


Figure 2-1. Pin Layout (Top View)

Table 2-1 lists the definitions and functions of each pin.

Table 2-1. ESP8266EX Pin Definitions

Pin	Name	Type	Function
1	VDDA	P	Analog Power 2.5V ~ 3.6V
2	LNA	I/O	RF antenna interface Chip output impedance=39+j6 Ω. It is suggested to retain the π type matching network to match the antenna.
3	VDD3P3	P	Amplifier Power 2.5V ~ 3.6V
4	VDD3P3	P	Amplifier Power 2.5V ~ 3.6V
5	VDD_RTC	P	NC (1.1V)
6	TOUT	I	ADC pin. It can be used to test the power supply voltage of VDD3P3 (Pin3 and Pin4) and the input power voltage of TOUT (Pin 6). However, these two functions cannot be used simultaneously.

1.3. Applications

- Home appliances
- Home automation
- Smart plugs and lights
- Industrial wireless control
- Baby monitors
- IP cameras
- Sensor networks
- Wearable electronics
- Wi-Fi location-aware devices
- Security ID tags
- Wi-Fi position system beacons

1.2. Specifications

Table 1-1. Specifications

Categories	Items	Parameters
Wi-Fi	Certification	Wi-Fi Alliance
	Protocols	802.11 b/g/n (HT20)
	Frequency Range	2.4G ~ 2.5G (2400M ~ 2483.5M)
	TX Power	802.11 b: +20 dBm
		802.11 g: +17 dBm
		802.11 n: +14 dBm
	Rx Sensitivity	802.11 b: -91 dbm (11 Mbps)
		802.11 g: -75 dbm (54 Mbps)
		802.11 n: -72 dbm (MCS7)
	Antenna	PCB Trace, External, IPEX Connector, Ceramic Chip
Hardware	CPU	Tensilica L106 32-bit processor
	Peripheral Interface	UART/SDIO/SPI/I2C/I2S/IR Remote Control
		GPIO/ADC/PWM/LED Light & Button
	Operating Voltage	2.5V ~ 3.6V
	Operating Current	Average value: 80 mA
	Operating Temperature Range	-40°C ~ 125°C
	Package Size	QFN32-pin (5 mm x 5 mm)
	External Interface	-
Software	Wi-Fi Mode	Station/SoftAP/SoftAP+Station
	Security	WPA/WPA2
	Encryption	WEP/TKIP/AES
	Firmware Upgrade	UART Download / OTA (via network)
	Software Development	Supports Cloud Server Development / Firmware and SDK for fast on-chip programming
	Network Protocols	IPv4, TCP/UDP/HTTP
	User Configuration	AT Instruction Set, Cloud Server, Android/iOS App

Note:

The TX power can be configured based on the actual user scenarios.

1. Overview

Espressif's ESP8266EX delivers highly integrated Wi-Fi SoC solution to meet users' continuous demands for efficient power usage, compact design and reliable performance in the Internet of Things industry.

With the complete and self-contained Wi-Fi networking capabilities, ESP8266EX can perform either as a standalone application or as the slave to a host MCU. When ESP8266EX hosts the application, it promptly boots up from the flash. The integrated high-speed cache helps to increase the system performance and optimize the system memory. Also, ESP8266EX can be applied to any microcontroller design as a Wi-Fi adaptor through SPI/SDIO or UART interfaces.

ESP8266EX integrates antenna switches, RF balun, power amplifier, low noise receive amplifier, filters and power management modules. The compact design minimizes the PCB size and requires minimal external circuitries.

Besides the Wi-Fi functionalities, ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor and on-chip SRAM. It can be interfaced with external sensors and other devices through the GPIOs. Software Development Kit (SDK) provides sample codes for various applications.

Espressif Systems' Smart Connectivity Platform (ESCP) enables sophisticated features including:

- Fast switch between sleep and wakeup mode for energy-efficient purpose;
- Adaptive radio biasing for low-power operation
- Advance signal processing
- Spur cancellation and RF co-existence mechanisms for common cellular, Bluetooth, DDR, LVDS, LCD interference mitigation

1.1. Wi-Fi Key Features

- 802.11 b/g/n support
- 802.11n support (2.4 GHz), up to 72.2 Mbps
- Defragmentation
- 2 x virtual Wi-Fi interface
- Automatic beacon monitoring (hardware TSF)
- Support Infrastructure BSS Station mode/SoftAP mode/Promiscuous mode
- Antenna diversity

Pin	Name	Type	Function
7	CHIP_EN	I	Chip Enable High: On, chip works properly Low: Off, small current consumed
8	XPD_DCDC	I/O	Deep-sleep wakeup (need to be connected to EXT_RSTB); GPIO16
9	MTMS	I/O	GPIO 14; HSPI_CLK
10	MTDI	I/O	GPIO 12; HSPI_MISO
11	VDDPST	P	Digital/IO Power Supply (1.8V ~ 3.6V)
12	MTCK	I/O	GPIO 13; HSPI_MOSI; UART0_CTS
13	MTDO	I/O	GPIO 15; HSPI_CS; UART0_RTS
14	GPIO2	I/O	UART TX during flash programming; GPIO2
15	GPIO0	I/O	GPIO0; SPI_CS2
16	GPIO4	I/O	GPIO4
17	VDDPST	P	Digital/IO Power Supply (1.8V ~ 3.6V)
18	SDIO_DATA_2	I/O	Connect to SD_D2 (Series R: 200Ω); SPIHD; HSPIHD; GPIO9
19	SDIO_DATA_3	I/O	Connect to SD_D3 (Series R: 200Ω); SPIWP; HSPIWP; GPIO10
20	SDIO_CMD	I/O	Connect to SD_CMD (Series R: 200Ω); SPI_CS0; GPIO11
21	SDIO_CLK	I/O	Connect to SD_CLK (Series R: 200Ω); SPI_CLK; GPIO6
22	SDIO_DATA_0	I/O	Connect to SD_D0 (Series R: 200Ω); SPI_MISO; GPIO7
23	SDIO_DATA_1	I/O	Connect to SD_D1 (Series R: 200Ω); SPI_MOSI; GPIO8
24	GPIO5	I/O	GPIO5
25	U0RXD	I/O	UART Rx during flash programming; GPIO3
26	U0TXD	I/O	UART TX during flash programming; GPIO1; SPI_CS1
27	XTAL_OUT	I/O	Connect to crystal oscillator output, can be used to provide BT clock input
28	XTAL_IN	I/O	Connect to crystal oscillator input
29	VDDD	P	Analog Power 2.5V ~ 3.6V
30	VDDA	P	Analog Power 2.5V ~ 3.6V
31	RES12K	I	Serial connection with a 12 kΩ resistor and connect to the ground
32	EXT_RSTB	I	External reset signal (Low voltage level: active)

Note:

1. *GPIO2, GPIO0, and MTDO are used to select booting mode and the SDIO mode;*
2. *U0TXD should not be pulled externally to a low logic level during the powering-up.*

Lampiran 8. Datasheet Sensor DHT11

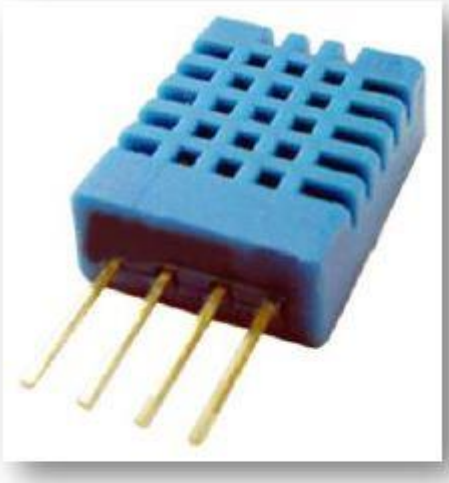
DHT 11 Humidity & Temperature Sensor

1. Introduction

DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness.

Detailed Specifications:

Parameters	Conditions	Minimum	Typical	Maximum
Humidity				
Resolution		1%RH	1%RH	1%RH
			8 Bit	
Repeatability			±1%RH	
Accuracy	25℃		±4%RH	
	0-50℃			±5%RH
Interchangeability	Fully Interchangeable			
Measurement Range	0℃	30%RH		90%RH
	25℃	20%RH		90%RH
	50℃	20%RH		80%RH
Response Time (Seconds)	1/e(63%)25℃, 1m/s Air	6 S	10 S	15 S
Hysteresis			±1%RH	
Long-Term Stability	Typical		±1%RH/year	
Temperature				
Resolution		1℃	1℃	1℃
		8 Bit	8 Bit	8 Bit
Repeatability			±1℃	
Accuracy		±1℃		±2℃
Measurement Range		0℃		50℃
Response Time (Seconds)	1/e(63%)	6 S		30 S



Each DHT11 element is strictly calibrated in the laboratory that is extremely accurate on humidity calibration. The calibration coefficients are stored as programmes in the OTP memory, which are used by the sensor's internal signal detecting process. The single-wire serial interface makes system integration quick and easy. Its small size, low power consumption and up-to-20 meter signal transmission making it the best choice for various applications, including those most demanding ones. The component is 4-pin single row pin package. It is convenient to connect and special packages can be provided according to users' request.

2. Technical Specifications:

Overview:

Item	Measurement Range	Humidity Accuracy	Temperature Accuracy	Resolution	Package
DHT11	20-90%RH 0-50 ℃	±5%RH	±2℃	1	4 Pin Single Row

3. Typical Application (Figure 1)

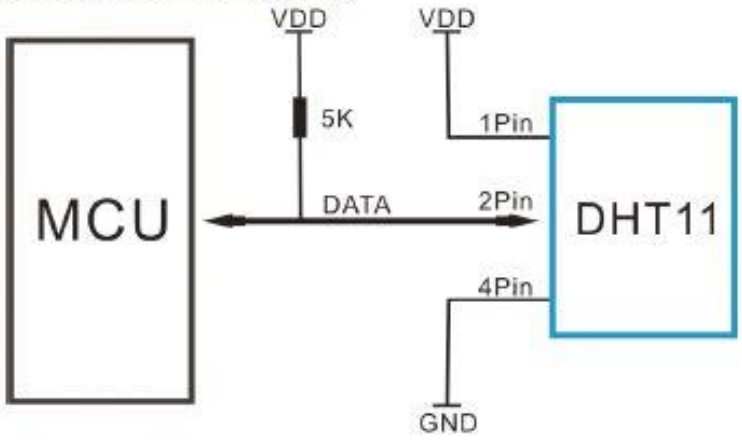


Figure 1 Typical Application

Note: 3Pin – Null; MCU = Micro-computer Unite or single chip Computer

When the connecting cable is shorter than 20 metres, a 5K pull-up resistor is recommended; when the connecting cable is longer than 20 metres, choose a appropriate pull-up resistor as needed.

4. Power and Pin

DHT11's power supply is 3-5.5V DC. When power is supplied to the sensor, do not send any instruction to the sensor in within one second in order to pass the unstable status. One capacitor valued 100nF can be added between VDD and GND for power filtering.

5. Communication Process: Serial Interface (Single-Wire Two-Way)

Single-bus data format is used for communication and synchronization between MCU and DHT11 sensor. One communication process is about 4ms.

Data consists of decimal and integral parts. A complete data transmission is **40bit**, and the sensor sends **higher data bit** first.

Data format: 8bit integral RH data + 8bit decimal RH data + 8bit integral T data + 8bit decimal T data + 8bit check sum. If the data transmission is right, the check-sum should be the last 8bit of "8bit integral RH data + 8bit decimal RH data + 8bit integral T data + 8bit decimal T data".