SAKARYA ÜNİVERSİTESİ
Bilgisayar ve Bilişim Bilimleri Fakültesi
Bilgisayar Mühendisliği Bölümü

BSM 451
INTERNET OF THINGS AND APPLICATIONS

Frequently Used Wireless Technologies in IOT Applicaiton (WiFi – ESP8266)

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ESP8266- WiFi Module

It is a low power (3.3v) WiFi module developed by Espressif Systems.

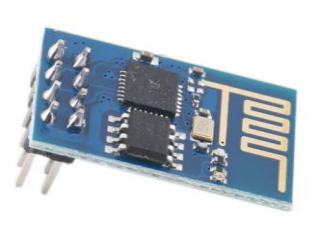
Supports IEEE 802.11 b/g/n wireless local area network standards.

With serial communication, wireless local area network and wireless internet are connected.

It has a TCP / IP protocol stack.

There are many ready-made cards such as Ardunio which has ESP8266 WiFi module as well as microprocessor systems and serial communication interface.

With the ESP8266 WiFi module, it can be connected to wireless networks, as well as creating its own network with the module and connecting other devices to this network.



IEEE 802.11 Standart

- IEEE 802.11 provides Ethernet connections over wireless local area networks.

Standart	Başlangıç Tarihi	Çalışma Frekansı (GHz)	Band Genişliği (MHz)	Veri İletim Hızı (Mbit/s)	Modülasyon	Kapalı Alanda Kapsama (m)	Açık Alanda Kapsama (m)
802.11	Haziran 1997	2.4	20	1 / 2	FHSS, DSSS	20	100
802.11a	Eylül 1999	5	20	6/9/12/18 24/36/48/54	OFDM	35	120
802.11b	Eylül 1999	2.4	20	1 /2 / 5.5 /11	DSSS	35	140
802.11g	Haziran 2003	2.4	20	6/9/12/18 24/36/48/54	OFDM / DSSS	38	140
802.11n	Ekim 2009	2.4 / 5	20	7.2/14.4/21.7/28.9 43.3/57.8/65/72.2	OFDM	70	250
			40	15/30/45/60 90/120/135/150			
802.11ac	2011 geliştirilmeye başlandı (Ocak 2014 onaylandı)	5	20	87,6	OFDM (256-QAM)	70	250
			40	200			
			80	433,3			
			160	866,7			
802.11ad	2009 (2012'de onaylandı)	2.4 / 5 / 60	160	7 000	OFDM	60	100

ESP8266 and AT Set Command

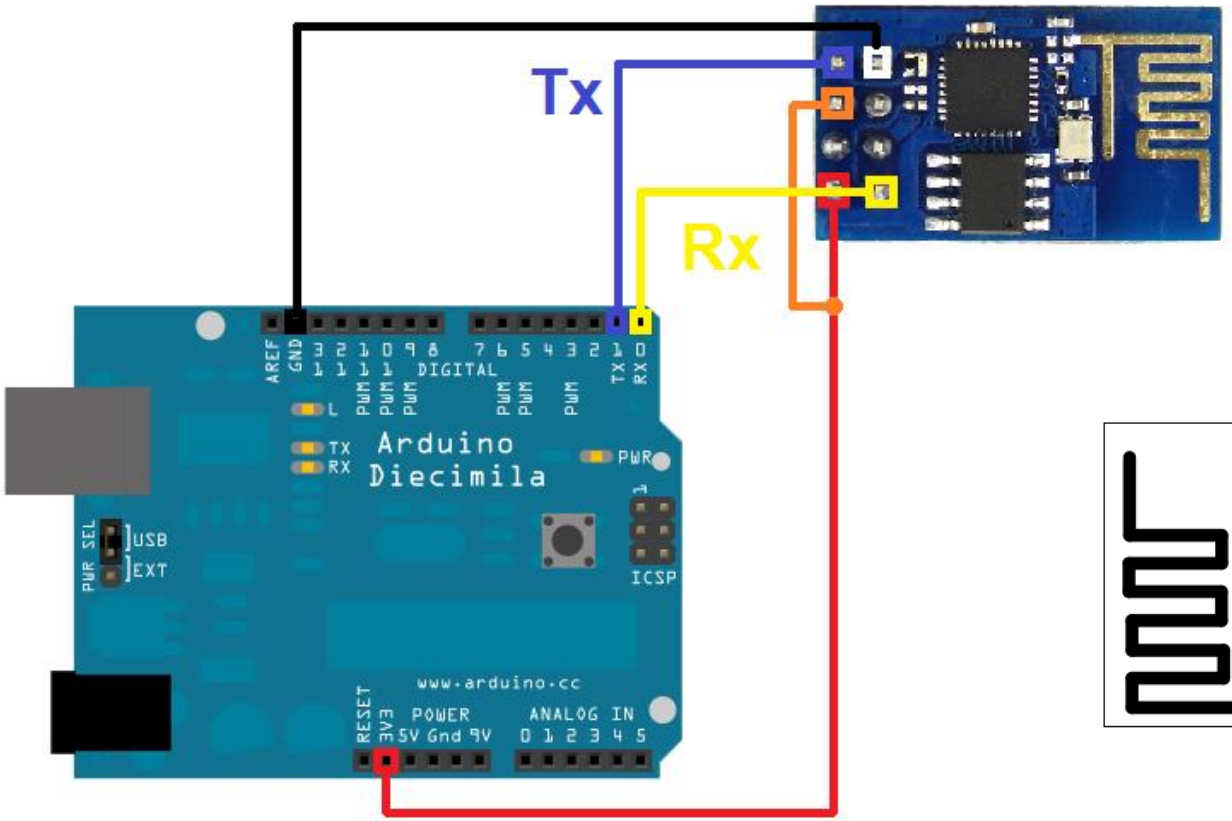
- AT Command Set, short for 'ATtention', is a standard developed by 'Hayes' telecommunication company.
- AT Command Set is used for communication of devices with technology such as fax, modem, WiFi integrations (ESP8266 etc), GSM / GPRS etc.
- All commands start with 'AT'. About 4 seconds after each AT command is sent, result code information is received.
- Only the ESP module is sent an AT and it is questioned whether it is ready for communication. If The OK is transmitted result is ready.
- With the ESP module, serial commands are used for communicating since Arduino cards are connected from the serial interface.

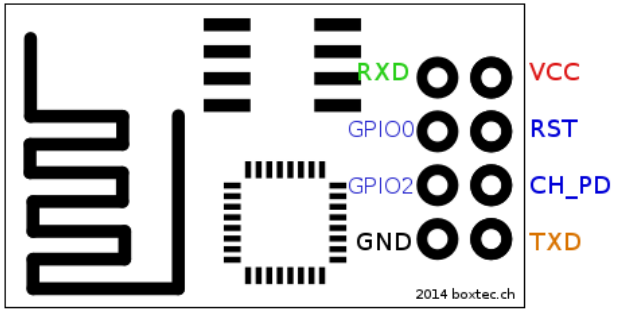
Sample: Serial.println (" AT ");

ESP8266 AT Commands examples

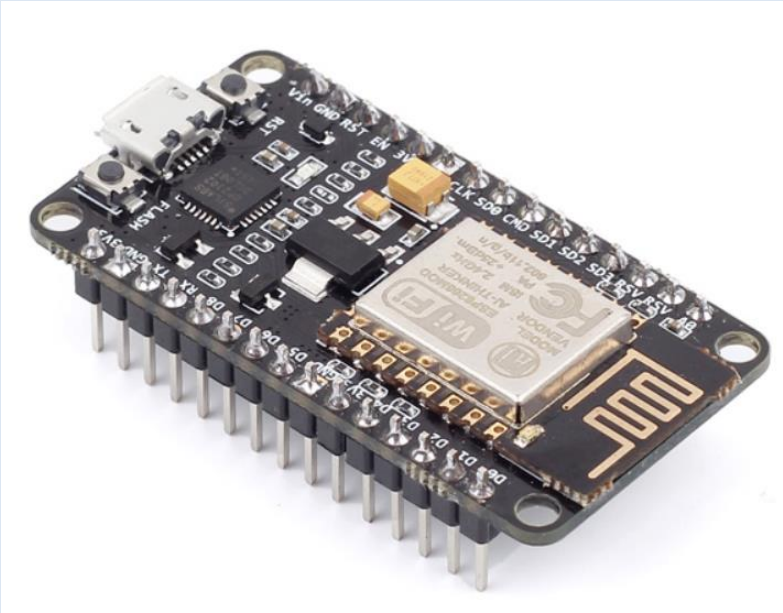
- AT + GMR: gives the installed firmware version.
- AT + CIFSR: ESP's local IP information within the network
- AT + CWMODE: Represents the link mode of the Esp module. (Mode: 1 Static, Mode: 2 AP Mode: 3 both)
- AT + CWJAP = " wifi_name ", " wifi_safe " connect to wireless network
- AT + CIPSTATUS: Displays TCP / IP connection status.
- AT + RST: Reset the module

How to connect the ESP8266 Module to Ardunio Card?





Ardunio Cards with ESP8266 WiFi Module



References

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- www.esp8266.com
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- AT Command Test Software, http://m2msupport.net/m2msupport/module-tester