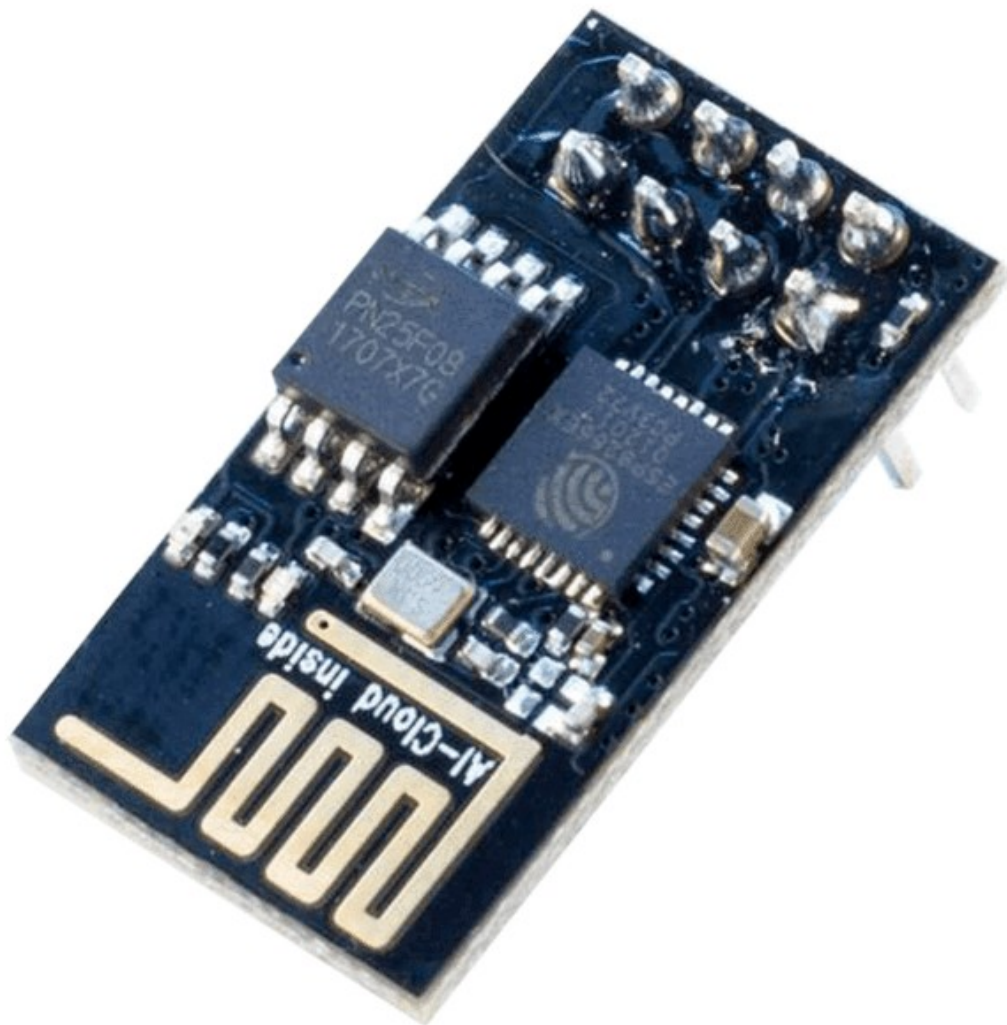


## ESP8266-01S Modul Datenblatt



### Contents:

1. Description
2. Specifications
3. Pin Configuration
4. Schematics Diagram
5. Wiring Diagram
6. Programming
7. ESP8266-01S with Arduino IDE

### 1. Description

ESP-01 WiFi module is developed by Ai-thinker Team. Core processor ESP8266 in smaller sizes of the module encapsulates Tensilica L106 integrates ultra low power 32-bit bit MCU micro, with the 16 16-bit short mode. Clock speed support 80MHz, 160MHz, supports the RTOS, integrated Wi-Fi MAC/BB/RF/PA/LNA, /BB/RF/PA/LNA, on on-board antenna.

The module supports standard IEEE802.11 b/g/n agreement, complete TCP/IP protocol stack. Users can use the add modules to an existing device networking, or building a separate network controller.

ESP8266 is high integration wireless SOCs, designed for space and power. It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.

ESP8266EX offers a complete and self-contained Wi-Fi networking solution. It can be used to host the application or to offload Wi-Fi networking functions from another application processor.

When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications.

Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any microcontroller based design with simple connectivity (SPI/SDIO or I2C/UART interface).

ESP8266EX is among the most integrated WiFi chip in the industry. It integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules. It requires minimal external circuitry, and the entire solution, including front-end module. It is designed to occupy minimal PCB area.

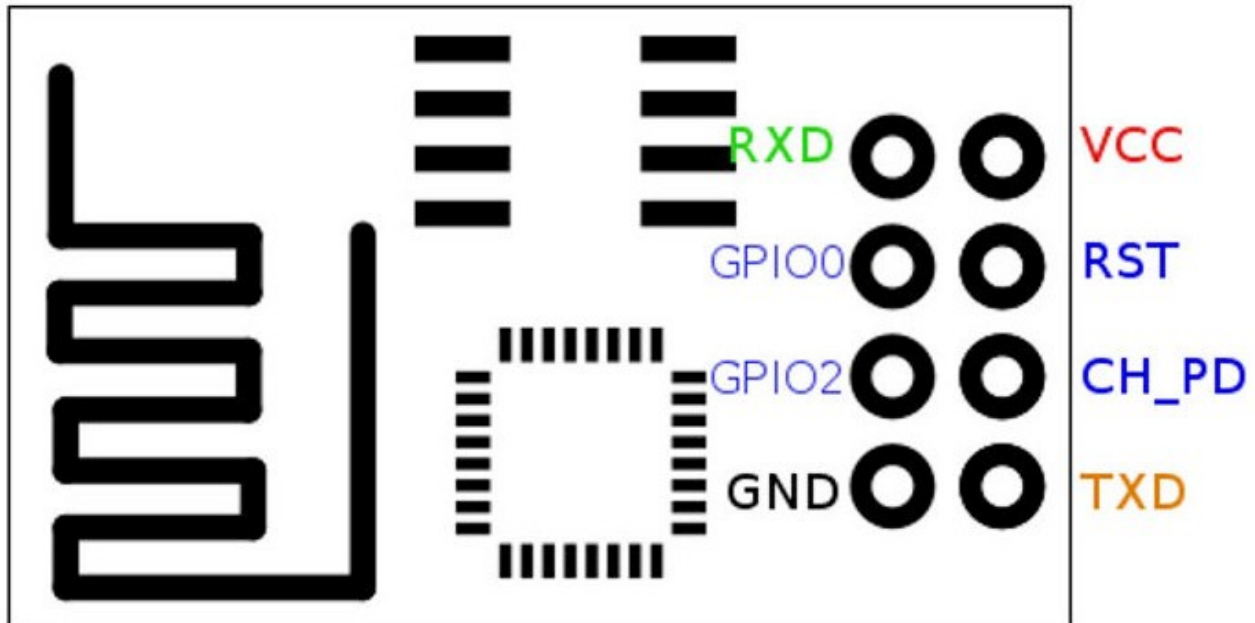
ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor, with on-chip SRAM, besides the Wi-Fi functionalities. ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs. Codes for such applications are provided in the examples in the SDK.

Espressif Systems' Smart Connectivity Platform (ESCP) demonstrates sophisticated system level features include fast sleep/wake context switching for energy-efficient VoIP, adaptive radio biasing, for low-power operation, advanced signal processing, and spur cancellation and radio co-existence features for common cellular, Bluetooth, DDR, LVDS, LCD interference mitigation.

## 2. Specifications

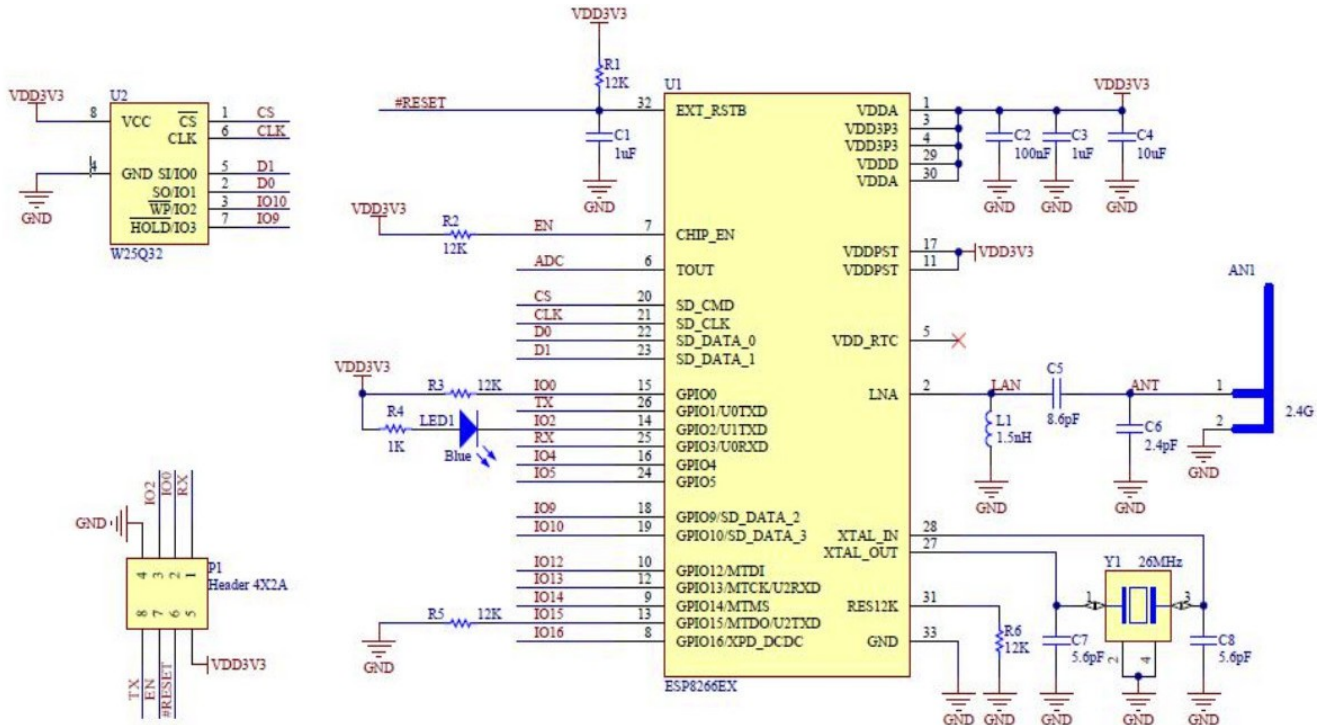
- » 802.11 b/g/n
- » Integrated low power 32-bit MCU
- » Integrated 10-bit ADC
- » Integrated TCP/IP protocol stack
- » Integrated TR switch, balun, LNA, power amplifier and matching network
- » Integrated PLL, regulators, and power management units
- » Supports antenna diversity
- » Wi-Fi 2.4 GHz, support WPA/WPA2
- » Support STA/AP/STA+AP operation modes
- » Support Smart Link Function for both Android and iOS devices
- » Support Smart Link Function for both Android and iOS devices
- » SDIO 2.0, (H) SPI, UART, I2C, I2S, IRDA, PWM, GPIO
- » STBC, 1x1 MIMO, 2x1 MIMO
- » A-MPDU & A-MSDU aggregation and 0.4s guard interval
- » Deep sleep power <10uA, Power down leakage current < 5uA
- » Wake up and transmit packets in <2ms
- » Standby power consumption of <1.0mW (DTIM3)
- » +20dBm output power in 802.11b mode
- » Operating temperature range -40°C ~ 125°C

### 3. Pin Configuration



VCC	+3.3V power supply
GND	Ground (0V)
GPIO0	General Purpose Input/Output pin 0
GPIO2	General Purpose Input/Output pin 2
CH_PD	Chip Enable
RST	Reset
RX	Receive line of Serial Interface
TX	Transmit line of Serial Interface

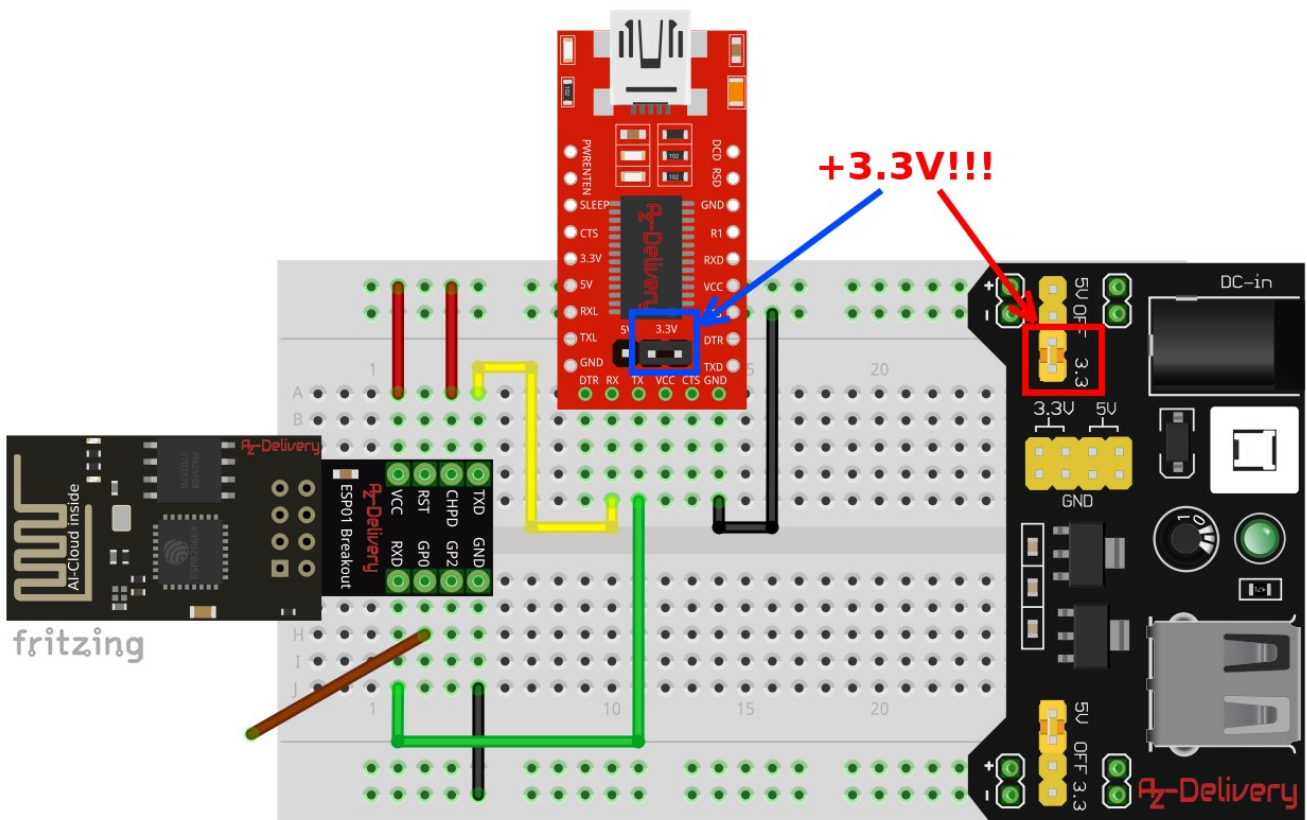
## 4. Schematics Diagram



GPIO15	GPIO0	GPIO2	
1	X	X	SDIO/SPI WIFI
0	0	1	Uart Download
0	1	1	Flash Boot



### 5. Wiring Diagram



**Just make sure that both FTDI adapter and MB102 power supply run on +3.3V, NOT +5V. If any of them runs on +5V IT WILL DESTROY ESP-01S!!!**

<b>ESP8266-01S pin</b>	>	<b>FTDI, MB102 pin</b>	
GND	>	GND [on both FTDI and MB102]	<b>Black wire</b>
VCC	>	+3.3V [MB102 pin]	<b>Red wire</b>
CHPD	>	+3.3V [MB102 pin]	<b>Red wire</b>
TXD	>	RX [FTDI pin]	<b>Yellow wire</b>
RXD	>	TX [FTDI pin]	<b>Green wire</b>
GPIO0 - Normal mode	>	unconnected [image above]	<b>Brown wire</b>
GPIO0 - Program mode	>	GND [MB102 pin]	<b>Brown wire</b>



### 6. Programming

There are different ways to program the ESP8266, for example a method using the Arduino IDE. This is really easy for beginners, and it's a very familiar environment if you've used Arduino boards before.

Just keep in mind that you are not limited to this option. There is also an official SDK available to program it in real C, this is very useful if you want to optimize your code or do some advanced tricks that aren't supported by the Arduino IDE. Another possibility is to flash it with a LUA interpreter, so you can upload and run LUA scripts. Or maybe you're more familiar with Python? Then you should check out the MicroPython firmware to interpret MicroPython scripts. And many others.

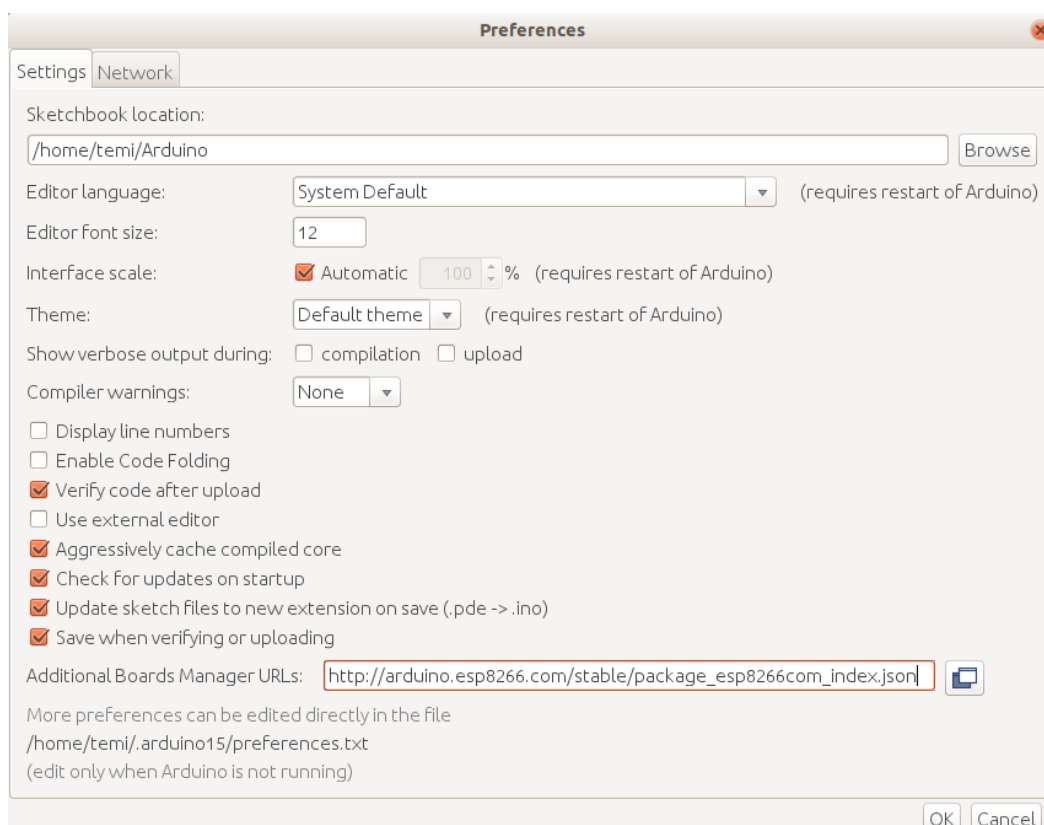
## 7. ESP8266-01S with Arduino IDE

The first step is to download and install the Arduino IDE. If you are using it already, great, if not, go on <https://www.arduino.cc/en/Main/Software> and download and install it.

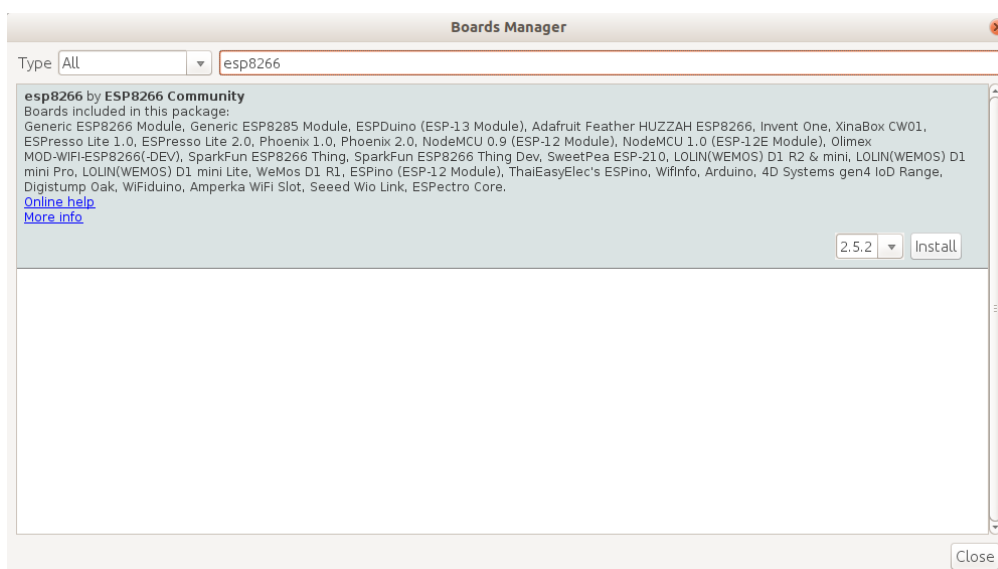
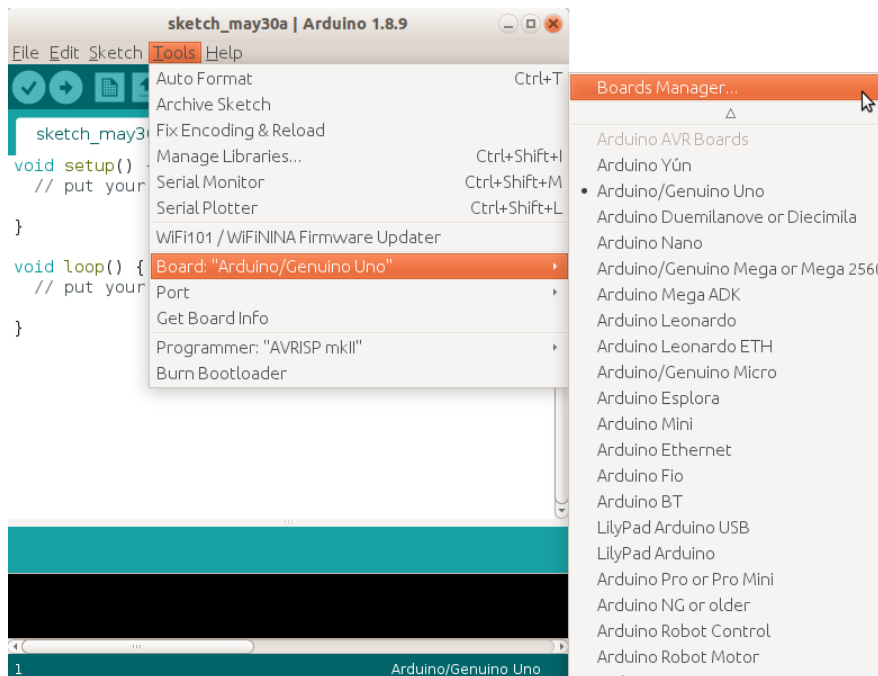
To program the ESP8266-01S, you'll need a plugin for the Arduino IDE, it can be downloaded from GitHub <https://github.com/esp8266/Arduino> manually, but it is easier to just add the URL in the Arduino IDE. Open the IDE, go to *File* > *Preferences*, paste the URL:

[http://arduino.esp8266.com/stable/package\\_esp8266com\\_index.json](http://arduino.esp8266.com/stable/package_esp8266com_index.json)

into the "*Additional Board Manager*" URLs field. (You can add multiple URLs, separating them with commas.)

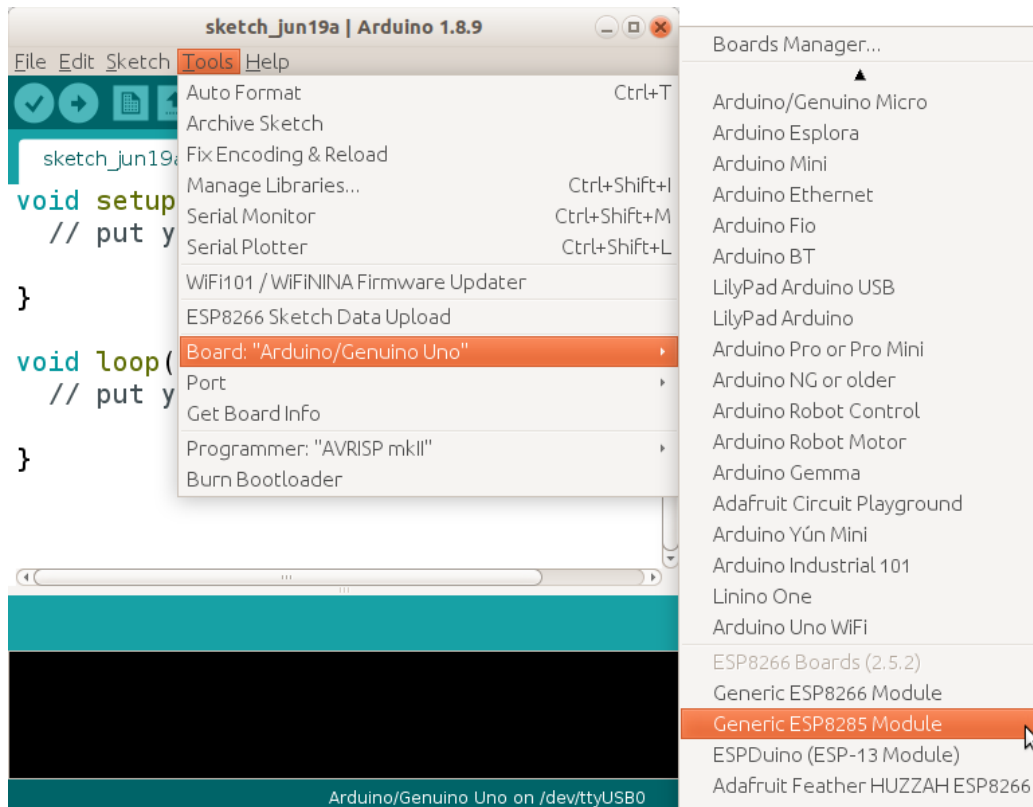


Then go to *Tools > Board > Board Manager* and search for "esp8266". Select the newest version, and click install. After this many sketch examples, and boards will be installed.

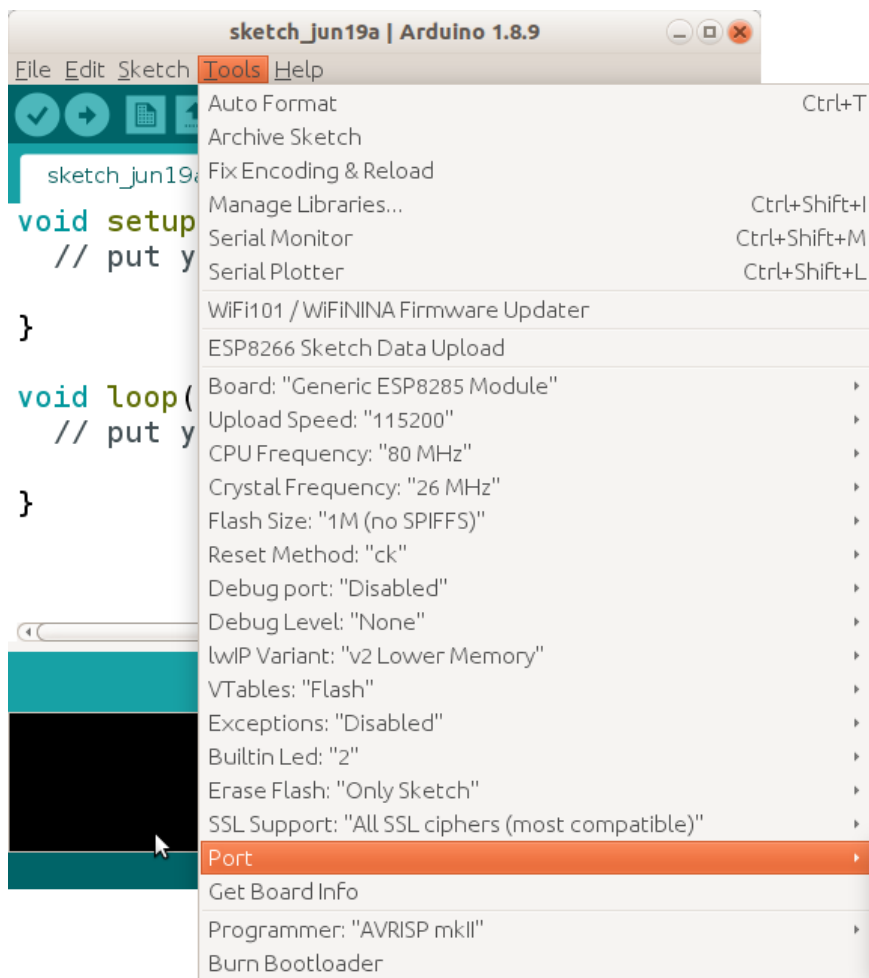


Now we have to setup which board to program.

Go to *Tools > Board > {board name}* and choose *"Generic ESP8266 Module"*.



When you choose this board there are some other options you can setup too. When you open drop down menus "Tools" after you choose "Generic ESP8266 Module", there will be several options which you can setup. For purpose of this datasheet leave it as it is, because we won't go into details with it. Just choose port on which your board is connected.



And you are ready to create sketches and compile them for programming the ESP8266-01S.