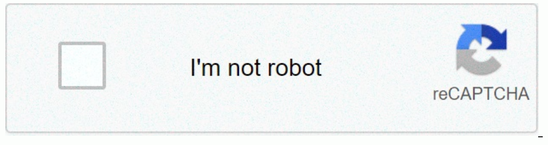

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Esp8266mod datasheet pdf

ESP8266ESP-01 module by Ai-ThinkerManufacturerEspressif SystemsType32-bit microcontrollerCPU@ 80 MHz (standard) or 160MHzMemory32 KiB instruction, 80 KiB user dataInput16 GPIO pinsPower3.3 V DCSuccessorESP32 The ESP8266 is a cheap Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems[1] in Shanghai, China. The chip first came to the attention of Western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and create simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands accepted. [2] The very low price and the fact that there were very few external components on the module, which suggested that it could eventually be very cheap in volume, attracted many hackers to examine the module, chip, and software on it, as well as to translate the Chinese documentation. [3] The ESP8285 is an ESP8266 with 1 MiB built-in flash, allowing the construction of single-chip devices that are able to connect to Wi-Fi. [4] The successor to these microcontroller chips is the ESP32, released in 2016. Features ESP-01 module wireframe Processor: L106 32-bit RISC microprocessor core based on the Tensilica Xtensa Diamond Standard 106Micro running at 80 MHz[5] Memory: 32 KiB instruction RAM 32 KiB instruction cache cache RAM 8 0 KiB user data RAM 16 KiB ETS system data RAM External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB usually included) IEEE 802.11 b/g/n Wi-Fi Integrated TR switch, balun, LNA, power amplifier and matching network WEP or WPA/WPA2 authentication, or open networks 16 GPIO pins SPI I²C (software implementation)[6] I²S interfaces with DMA (sharing pins with GPIO) UART on special pins, plus a only-sending UART can be enabled on GPIO2 10-bit ADC (sequential approach ADC) Pinout from ESP-01 ESP-01 module pinout The pinout is as follows for the common ESP-01 module : VCC, Voltage (+3.3 V; can be up to 3.6V) SND, Ground (0 V) RX, Get data bit X TX, Transmit data bit X CH_PD, Chip power-down RST, Reset GPIO 0, General-purpose input/output No. 0 GPIO 2, General-purpose input/output No. 2 ESP8266 That shot SDK's In October 2014, Espressif Systems released a software development kit (SDK) for direct programming of the chip, removing the need for a separate microcontroller. [7] Since then there have been many official SDK versions of Espressif; Espressif maintains two versions of the SDK - one that is based on FreeRTOS and the other based on callbacks. [8] An alternative to Espressif's official SDK is the open-source ESP-Open-SDK[9] which is based on the GNU Compiler (GCC) toolchain, maintained by Max Filippov. [10] Another alternative is Mikhail Grigorev's Unofficial Development Kit. [11] [12] Other SDCs, mostly open-source, are: Arduino — A C++-based C++-based With this core, the ESP8266 CPU and its Wi-Fi components can be programmed like any other Arduino device. The ESP8266 Arduino Core is available through GitHub. ESP8266 BASIC — An open-source BASIC-like interpreter tailored to the Internet of Things (IoT). Self-hosting browser-based development environment. ESP Easy - Developed by home automation enthusiasts. ESPHome - ESPHome is a system to control your ESP8266/ESP32 by simple but powerful configuration files and remotely controlled them through home automation systems. Tasmota - open-source firmware, very popular with domotics enthusiasts. ESP-Open-RTOS — Open-source FreeRTOS-based ESP8266 software framework. ESP-Open-SDK — Free and open (as many) integrated SDK as possible for ESP8266/ESP8285 chips. Espruino – An actively maintained JavaScript SDK and firmware, closely emulate Node.js. Supports a few MCUs, including the ESP8266. ESPurna — Open-source ESP8285/ESP8266 firmware. Candid - Port of Jones Forth to the ESP8266 microcontroller. MicroPython — A Port from MicroPython (an implementation of Python for embedded devices) to the ESP8266 platform. Moddable SDK - contains JavaScript language and library support for the ESP8266 Mongoose OS - an open-source operating system for connected products. Supports ESP8266 and ESP32. Develop in C or JavaScript. [13] NodeMCU — A lua-based firmware. PlatformIO - A cross-platform IDE and unified debugger, which sits on top of Arduino code and libraries. Punyforth — Forth-inspired programming language for the ESP8266. Sming - An actively developed asynchronous C/C++ framework with excellent performance and multiple network functions. uLisp - A version of the Lisp programming language that is specifically designed to run on processors with a limited amount of RAM. ZBasic for ESP8266 — A subset of Microsoft's widely used Visual Basic 6, which has been modified as a control language for the ZX microcontroller family and the ESP8266. Zerynth — IoT framework for programming ESP8266[14] and other microcontrollers in Python. Espressif modules ESP-WROOM-02 This is the series esp8266-based modules made by Espressif: Name Active Pins Pitch Form factor LEDs Antenna Shielded Dimensions (mm) Notes ESP-WROOM-ING 02[15] 18 1.5 mm 2×9 castellated No TRACE OF PCB Yes 18 × 20 FCC ID 2AC7Z-ESPWROOM02. ESP-WROOM-02D[16] 18 1.5 mm 2×9 castellated No TRACE OF NO PCB Yes 18 × 20 FCC ID 2AC7Z-ESPWROOM02D. Review of ESP-WROOM-02 compatible with both 150-mil and 208-mil flash memory chips. ESP-WROOM-02U[16] 18 1.5 mm 2×9 castellated No U.FL socket Yes 18 × 20 Differs from ESP-WROOM-02D in which a U.FL compatible socket antenna connector contains. ESP-WROOM-S2[17] 20 1.5 mm 2×10 castellated No PCB track Yes 16 × 23 FCC ID 2AC7Z-ESPWROOMS2. In the table above (and the two tables that follow) Active Pins contain the GPIO and ADC pins that allow external devices to be attached to the ESP8266 MCU The Pitch is the space between pins on the ESP8266 module, which is important to know the device is used on a breadboard. The Form factor also describes the module packaging as 2 × 9 DIL, meaning two rows of 9 pins ranked Dual In Line, like the pins of DIP ICs. Many ESP-xx modules contain a small led on board that can be programmed to blink and thus indicate activity. There are several antenna options for ESP-xx boards, including a track antenna, an onboard ceramic antenna, and an external connector that connects an external Wi-Fi antenna. Since Wi-Fi communications generates a lot of RFI (Radio Frequency Interference), government agencies like the FCC like shielded electronics to minimize interference with other devices. Some of the ESP-xx modules come housed in a metal box with an FCC seal of approval stamped on it. First and second world markets will likely require FCC approval and shielded Wi-Fi devices. [quote needed] Ai-Thinker modules Ai-Thinker ESP8266 modules (ESP-12F, black color) soldered to breakout boards (white color) This is the first series of modules made with the ESP8266 by the third manufacturer Ai-Thinker and remains the most available. [18] They are collectively referred to as ESP-xx modules. To form a workable development system, they need additional components, notably a serial TTL-to-USB adapter (also called a USB-to-UART bridge) and an external 3.3 volt power supply. Novice ESP8266 developers are encouraged to consider larger ESP8266 Wi-Fi development boards, such as the NodeMCU, which includes the USB-to-UART bridge and a Micro-USB connector in conjunction with a 3.3 volt power controller already built into the board. When project development is complete, these components are not needed and these cheaper ESP-xx modules are a lower current, smaller footprint option for production runs. In the Notes column, the flash memory formats apply to the specified module and all of the following in the table. Exceptions that apply to one module are displayed in (). Name Active pins Pitch Form factor LEDs Antenna Shielded Dimensions (mm) Notes ESP-01 6 0.1 in 2×4 DIL Yes PCB trace No 14.3 × 24.8 512 KiB Flash and blue PCB from a generic manufacturer. 1 MiB Flash, AI-Cloud and black PCB from AI-Thinker. ESP-01S 6 0.1 in 2×4 DIL Yes PCB trace no ×. 16 1.6 mm 2×9 edge connector No PCB trace Yes 18.0 × 18.0 Uses ESP8285 (1 MiB built-in flash). ESP-02 6 0.1 in 2×4 in castellated No U.FL socket No 14.2 × 14.2 ESP-03 10 2 mm 2×7 castellated No Ceramic No 17.3 × 12.1 ESP-04 10 2×4 No None No 14.7 × 12.1 ESP-05 3 0.1 in 1×5 SIL No U.FL socket No 14.2 × 14.2 ESP-06 11 miscellaneous 4×3 dice No No Yes No 14.2 × 14.7 Un fcc approved. ESP-07 14 2 mm 2×8 pinhole Yes Ceramic + U.FL socket Yes 20.0 × 16.0 Not FCC approved. ESP-07S 14 2 mm 2×8 pinhole No U.FL socket Yes 17.0 × 16.0 FCC and CE approved. 10 2 mm 2×7 castellated No None Yes 17.0 × 16.0 Niet FCC goedgekeurd. ESP-09 10 diverse 4×3 dobbelstenen No No No No 10.0 × 10.0 ESP-10 3 2 mm 1×5 castellated No No No No No × 10.0 ESP-11 6 1× 1×8 pinhole No Ceramic No Ceramic No 17.3 × 12.1 ESP-12 14 2 mm 2×8 castellated Yes PCB trace Yes 24.0 × 16.0 FCC and approved CE. [19] ESP-12E 20 2 mm 2×8 castellated Yes PCB track Yes 24.0 × 16.0 4 MiB flash. ESP-12F 20 2 mm 2×8 castellated Yes PCB trace Yes 24.0 × 16.0 FCC and CE approved. Improved antenna performance. ESP-12S 14 2 mm 2×8 castellated Yes PCB trace Yes 24.0 × 16.0 FCC approved. [20] ESP-13 16 1.5 mm 2×9 castellated No PCB track Yes W18.0 × L20.0 Marked as the FCC. Shielded module is placed sideways, compared to the ESP-12 modules. ESP-14 22 2 mm 2×8 castellated +6 Yes PCB trace Yes 24.3 × 16.2 Usually advertised with AI Cloud Inside. Other signs The reason for the popularity of many of these boards compared to the previous ESP-xx modules is the inclusion of an on-board USB-to-UART bridge (such as the Silicon Labs' CP2102 or the WCH CH340G) and a Micro-USB connector, combined with a 3.3-volt controller to both supply power to the board and host connectivity to the (software development) computer - commonly referred to as the console, making it a simple development platform. With previous ESP-xx modules, these two items (the USB-to-serial adapter and the regulator) had to be purchased separately and connected to the ESP-xx circuit. Modern ESP8266 boards like the NodeMCU are easier to work with and offer more GPIO pins. Most of the signs listed here are based on the ESP-12E module, but new modules are seemingly introduced every few months. Name Active pins Pitch Form factor LEDs Antenna Shielded Dimensions (mm) Notes Bolt IoT 14 0.1 in 2×14 DIL Yes PCB trace Yes 30 × 40 Comes with a built-in SD card and features such as Lib-Discovery and Fail Safe Mode. Has its own cloud for IoT. Olimex MOD-WIFI-ESP8266[21] 2 0.1 in UEXT module Yes PCB trace No ? Only RX/TX is connected to the UEXT connector. Olimex MOD-WIFI-ESP8266-DEV[22] 20 0.1 in 2×11 DIL + castellated Yes PCB trace No 33 × 23 All available GPIO pins are connected, also has pads for soldering UEXT connector (with RX/TX and SDA/SCL signals). NodeMCU DEVKIT 14 0.1 in 2×15 DIL Yes PCB trace Yes 49 × 24.5 Uses the ESP-12 module; including USB to serial interface. Adafruit Huzzah ESP8266 breakout[23] 14 0.1 in 2×10 DIL Yes PCB trace Yes 25 × 38 Uses the ESP-12 module. SparkFun ESP8266 Thing[24] WRL-13231 12 0.1 in 2×10 DIL Yes PCB trace + U.FL socket No 58 × 26 FTDI serial header, Micro-socket USB for power, includes Li-ion battery charger. KNEWRON Technologies smartWIFI[25] 12 0.1 in 2×20 DIL Yes 1 RGB PCB trace Yes 25.4 × 50.8 CP2102 USB bridge, including battery charger, micro-USB connection for power and battery charging, 1 RGB LED and USER/Reflash button. ArduCAM ESP8266 UNO[26] 12+ 0.1 in Arduino Uno Ja PCB trace Yes 53.4 × 68.6 Uses the ESP8266MOD module from the AI Thinker and features Micro USB port, camera pens and uSD card on the same board. Fully compatible with Arduino Uno shields. DoIT ESPduino[27] 12 0.1 in Arduino Uno Ja PCB trace Yes 53.4 × 68.6 Applications ESP-WROOM-02 (ESP-13) module and USB Type B port. Fully compatible with Arduino Uno shields. WeatherPlus - SwitchDoc Labs[28] 26+Grove 0.1 in Custom Yes PCB trace Yes 86.0 × 50.0 Uses the AI Thinker Model ESP8266MOD (ESP-13) module and FTDI for programming and Mini USB power port. Fully compatible with Adafruit Huzzah software. Includes BMP280 Barometer, ADS1115 and Grove I2C connectors. Plugs for Anemometer/Wind Vane/Rain Bucket. WeMos[29] D1[30] 12 0.1 in Arduino Uno Ja PCB trace Yes 53.4 × 68.6 Uses the ESP-12F module and Micro-USB connection. Discontinued in favor of WeMos D1 R2. WeMos[29] D1 R2[31] 12 0.1 in Arduino Uno Ja PCB trace Yes 53.4 × 68.6 Uses ESP-12F module and has Micro-USB connection. WeMos[29] D1 mini[32] 12 0.1 in 2×8 DIL Yes PCB trace Yes 25.6 × 34.2 Uses ESP-12S module and has Micro-USB connection. WeMos[29] D1 mini Lite[33] 12 0.1 in 2×8 DIL Yes PCB trace Yes 25.6 × 34.2 Based on the ESP8285, an ESP8266 with 1 MiB flash built in; has a Micro-USB connection. WeMos[29] D1 mini Pro[34] 12 0.1 in 2×8 DIL Yes Ceramic and U.FL socket Yes 25.6 × 34.2 Uses ESP8266EX chip; Has a Micro-USB connection, U.FL antenna connector and 16 MiB flash. ESPert ESPresso Lite[35] 16 0.1 in 2×8 DIL Ja PCB trace Yes 26.5 × 57.6 Uses the ESP-WROOM-02 module. Produced in limited quantity as a beta version. ESPert ESPresso Lite V2.0[36] 24 0.1 in 2×10 DIL Ja PCB trace Yes 28 × 61 Enhanced version of ESPresso Lite. In-Circuit ESP-ADC[37] 18 0.1 in 2×9 DIL No U.FL socket Yes 22.9 × 14.9 Uses ESP8266EX chip. Watterott ESP-WROOM02-Breakout[38] 14 0.1 in 2×10 DIL Yes PCB trace Yes 40.64 × 27.94 Uses the Espressif ESP-WROOM-02 module. Geek Wave Solution IOT WROOM-02 Dev. Board[39] 20 0.1 in ? Yes PCB trace Yes 93.80 × 80.02 Development board with Espressif ESP-WROOM-02 module and four relays. Witty 2-part council[40] 20 0.1 in ? Yes PCB trace Yes? Development board with Espressif ESP8266 ESP-12E and separate board for CH340G USB interface. See also ESP32 - the successor product of Espressif Internet of things MCU (microcontroller unit) References ^ ESP8266 Overview. Espressif Systems. Retrieved 2017-10-02. ^ Brian Benchoff (August 26, 2014). New Chip Alert: The ESP8266 WiFi Module (It's $5). Mr. Hackaday. Retrieved 2015-06-24. ^ Brian Benchoff (September 6, 2014). The current state of esp8266 development. Mr. Hackaday. 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