WeMos D1 Mini Guide

# WeMos D1 Mini: <http://www.wemos.cc>

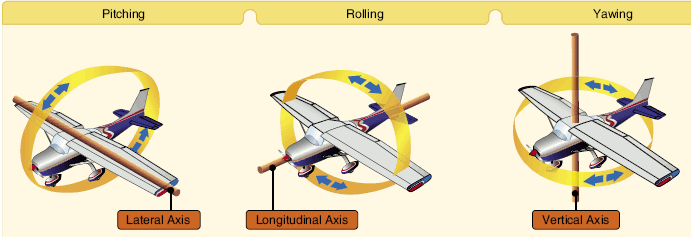
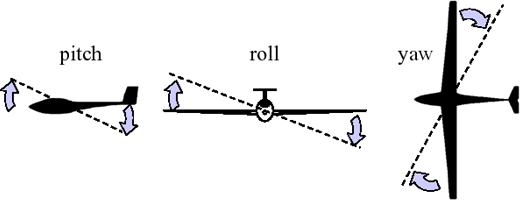
* Get Started in Arduino: <http://www.wemos.cc/tutorial/get_started_in_arduino.html>
* Download Driver CH340: <http://www.wemos.cc/downloads>
* Install WeMos D1 Mini Board via Board Manager Package Url
  + <http://arduino.esp8266.com/stable/package_esp8266com_index.json>
* p.s. no need for Python if you don’t plan to build binary from source code in github
* Configure WeMos: Freq. / Flash Size / Upload Speed / Port #
* Install Examples: <https://github.com/wemos/D1_mini_Examples.git>
  + Deep Sleep <https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/DeepSleep/Blink>
  + EEPROM <https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/EEPROM>
  + Hash (md5/sha1) <https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/Hash>
  + Ticker <https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/Ticker>
  + I2C Wire (SCL,SDA) <https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/Wire>
  + Servo <https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/Servo/Sweep>
  + [Config File /w SPIFFS & Json](https://github.com/wemos/D1_mini_Examples/tree/master/02.Special/ConfigFile)
* Power by battery
  + Direct Li-ion polymer battery 3.7V on ESP8266 5V pin
  + [Simultaneous Charging Powering Module](http://www.banggood.com/37V-Liion-Battery-Mini-USB-To-USB-A-Power-Apply-Module-p-928948.html) and here. USB 5V via cable or solder on ESP8266 5V pin
  + [WeMos Forum](http://forum.wemos.cc/tags/power)
* Current Consumption
  + Deep Sleep: 0.18mA
  + Wake: 70mA+

Forum

* <http://forum.wemos.cc>

# Esp8266

* Arduino, Setup & Install
  + Home: <https://github.com/esp8266/Arduino>
  + Install: via Board Manager <https://github.com/esp8266/Arduino#installing-with-boards-manager>
  + Supported Boards: <https://github.com/esp8266/Arduino/blob/master/doc/boards.md>
  + Documentation: <https://github.com/esp8266/Arduino#documentation>
    - File System SPIFFS:
      * ***data*** subfolder needs to be create at the current sketch folder
      * Upload everything in ***data***: Tools -> ESP8266 Sketch Data Upload
      * <https://github.com/esp8266/Arduino/blob/master/doc/filesystem.md>
      * [Examples](https://github.com/squix78/esp8266-projects/blob/master/arduino-ide/filesystem-example/filesystem-example.ino)
    - OTA: <https://github.com/esp8266/Arduino/blob/master/doc/ota_updates/readme.md>
  + Forum: <http://www.esp8266.com/viewforum.php?f=25>
  + PINS mapping:
    - IDE auto pick the corresponding .h file that match the selected ESP8288 module
    - <https://github.com/esp8266/Arduino/blob/master/variants/d1_mini/pins_arduino.h>
  + Libraries
    - General: <https://github.com/esp8266/Arduino/blob/master/doc/libraries.md>
    - [More](https://github.com/esp8266/Arduino/blob/master/doc/libraries.md#other-libraries-not-included-with-the-ide)
    - Source: <https://github.com/esp8266/Arduino/tree/master/libraries>
  + OTA Updates:
    - <https://github.com/esp8266/Arduino/blob/master/doc/ota_updates/readme.md>
    - Example ESP8266WebServer ‘s [WebUpdate Example](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266WebServer/examples/WebUpdate)
  + ESP API <https://github.com/esp8266/Arduino/blob/master/doc/libraries.md#esp-specific-apis>
* End User Wi-Fi Configuration
  + Wi-Fi Manager – [Easy WiFi Captive Portal](https://tzapu.com/esp8266-wifi-connection-manager-library-arduino-ide)
  + Example - <https://github.com/tzapu/WiFiManager/tree/master/examples>
    - Connect to AutoConnectAP Access Point
    - Point to ANY domain will auto redirect to the Configuration Portal
  + Clear cached SSID/Password on ESP8266: Use .resetSettings();
* Applications
  + [List Access Point /w Strength](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266WiFi/examples/WiFiScan)
  + [Https](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266WiFi/examples/HTTPSRequest)
  + [NTP Time Server Client](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266WiFi/examples/NTPClient)
  + [HttpClient /w Response](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266WiFi/examples/WiFiClient)
  + WebServer
    - [Link](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266WiFi/examples/WiFiWebServer)
    - REST API <https://github.com/marcoschwartz/aREST>
  + MQTT
    - Light weight - Homie: <https://github.com/marvinroger/homie-esp8266>
    - Full: <http://pubsubclient.knolleary.net>
    - Another Full: <https://github.com/Imroy/pubsubclient>
  + OLED Shield
    - Bitmap: <http://forum.wemos.cc/topic/123/d1-mini-oled-shield-display-wemos-logo>
    - ILI9341 <https://github.com/Links2004/Adafruit_ILI9341>
    - UTFT <https://github.com/gnulabis/UTFT-ESP8266>
    - TFT ST7735 <https://github.com/nzmichaelh/Adafruit-ST7735-Library>
  + Mobile Prototype:
    - Blynk
      * [Android/iPhone Blynk control WeMos](http://www.instructables.com/id/THE-2016-SUPER-NOOB-FRIENDLY-WAY-Control-an-Arduin/)
      * <https://github.com/blynkkk/blynk-library>
  + IoT
    - Azure IoT Hub:
      * Try this first: <https://github.com/arduino-libraries/AzureIoTHub>
      * Try this next: <http://www.radupascal.com/2016/04/03/esp8266-arduino-iot-hub>
        + <http://pubsubclient.knolleary.net>
      * Try this next: <https://www.hackster.io/glovebox/secure-sensor-streaming-over-https-to-azure-iot-hub-dba05d>
      * <https://github.com/gloveboxes/Arduino-ESP8266-Secure-Azure-IoT-Hub-Client>
      * References
        + <https://azure.microsoft.com/en-us/documentation/articles/iot-hub-mqtt-support>
        + <https://azure.microsoft.com/en-us/documentation/articles/iot-hub-csharp-csharp-getstarted>
    - Temboo: <https://temboo.com/arduino> ???
  + Ticker (timer /w callback)
    - <https://github.com/esp8266/Arduino/tree/master/libraries/Ticker>
    - <https://github.com/Toshik/TickerScheduler>
    - Task <https://github.com/Makuna/Task>
  + Memory
    - EEPROM 4K Flash <https://github.com/esp8266/Arduino/tree/master/libraries/EEPROM>
  + Communications
    - I2C Wire(SCL,SDA) (Lib Only) <https://github.com/esp8266/Arduino/tree/master/libraries/Wire>
    - SPI (MISO,MOSI, SCK) (Lib Only) <https://github.com/esp8266/Arduino/tree/master/libraries/SPI>
    - Software Serial using any PIN for TX/RX <https://github.com/plerup/espsoftwareserial>
  + Servo <https://github.com/esp8266/Arduino/tree/master/libraries/Servo>
  + MPU 6050 – 6DOF Accelerometer, Gyro, Temperature
    - Tutorial:
      * <http://42bots.com/tutorials/arduino-uno-and-the-invensense-mpu-6050-6dof-imu>
      * <http://diyhacking.com/arduino-mpu-6050-imu-sensor-tutorial>
      * Only Pitch & Roll is reliable!



* + - Libs
      * <https://github.com/jrowberg/i2cdevlib/tree/master/Arduino/MPU6050>
      * <https://github.com/jrowberg/i2cdevlib/tree/master/Arduino/I2Cdev>
      * Replace *#include <avr/pgmspace.h>* in

MPU6050.h, MPU6050\_6Axis\_MotionApps20.h, MPU6050\_9Axis\_MotionApps41.h

*#ifndef ESP8266*

*#include <avr/pgmspace.h>*

*#else*

*#include <pgmspace.h>*

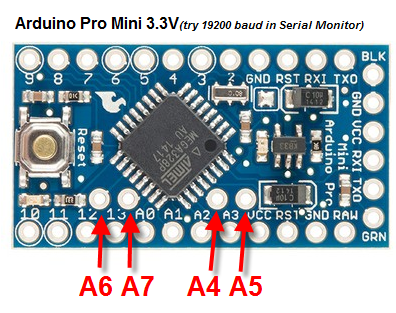
*#endif*

* + - * **INTERRUPT\_PIN: D4 doesn’t work!!! Try D7, D8!**
      * Alternatives
        + <http://www.esp8266.com/viewtopic.php?f=29&t=6641>
        + <http://www.esp8266.com/viewtopic.php?f=24&t=4475>
        + [~~http://www.esp8266.com/viewtopic.php?f=29&t=6999~~](http://www.esp8266.com/viewtopic.php?f=29&t=6999)
    - Modeling in 3D using Processing:
      * <http://diyhacking.com/arduino-mpu-6050-imu-sensor-tutorial>
      * <http://www.geekmomprojects.com/gyroscopes-and-accelerometers-on-a-chip>
  + MPU 9250
    - <http://www.lucidarme.me/?p=5057>
    - <http://playground.arduino.cc/Main/MPU-9150>
  + Pulse Sensor
    - ESP8266:
      * Pulse Sensor +ve pin to ESP8266 3.3V (if 3.3V, no Voltage Divider needed for A0)
      * Pulse Sensor GND to ESP8266 GND
      * Pulse Sensor Signal to A0 (**Max input 3.2V**)
      * <https://github.com/EnvironmentMonitor/Pulse-Sensor-ESP8266-ADC0>
        + Interrupt.ino: Scale down the Signal by - Signal=Signal\*0.9;
      * Processing Sketch [here](https://github.com/WorldFamousElectronics/PulseSensor_Amped_Processing_Visualizer) , have to manually change the Port Number.
    - Arduino: <https://github.com/WorldFamousElectronics/PulseSensor_Amped_Arduino>
  + OLED
    - <https://github.com/squix78/esp8266-oled-ssd1306>
    - <http://www.instructables.com/id/ESP8266-Weather-Widget>
  + GPS
    - Ublox Neo 7 VK2828U7G5LF
      * <https://github.com/rydepier/UBlox-NEO-7-GPS-and-Arduino>
      * [More](http://blog.squix.org/2016/05/esp8266-peripherals-ublox-gps-module.html?_ga=1.223952603.1515708376.1463111731)
      * <http://playground.arduino.cc/UBlox/GPS>
      * [Buy](http://www.aliexpress.com/item/VK2828U7G5LF-GPS-module-with-antenna-1-10Hz-fly-FLASH-TTL-level-control-RC-airplane/32472810827.html?spm=2114.13010208.99999999.261.prSpBM) $9
* Adafruit
  + Tutorial: [Link](https://learn.adafruit.com/adafruit-huzzah-esp8266-breakout/using-arduino-ide#connecting-via-wifi)
* Limited Pin Solution: <http://www.forward.com.au/pfod/ESP8266/GPIOpins/ESP8266_01_pin_magic.html>
* Web Server: <https://github.com/israellot/esp-ginx>
* Power up use PIN instead of USB: <http://forum.wemos.cc/topic/171/d1-mini-powered-by-5v-pin/3>

# Arduino

* Communication with Computer: Firmata <https://github.com/firmata/arduino>
* GSM: <https://www.arduino.cc/en/Reference/GSM>
  + SIM800L $4.45
    - <http://www.ayomaonline.com/programming/quickstart-sim800-sim800l-with-arduino>
    - <http://arduinodev.com/arduino-library-for-gprshttp-communication-with-sim800>
    - [Buy](http://www.aliexpress.com/item/Smallest-SIM800L-GPRS-GSM-Module-MicroSIM-Card-Core-BOard-Quad-band-TTL-Serial-Port/32284777313.html?spm=2114.13010208.99999999.261.lMWIty)
* I2C Wire (SCL,SDA): <https://www.arduino.cc/en/Reference/Wire>
* IMU: <https://github.com/arduino-libraries/MadgwickAHRS>
* LCD: <https://www.arduino.cc/en/Reference/LiquidCrystal>
* SD Card: <https://www.arduino.cc/en/Reference/SD>
* Servo: <https://www.arduino.cc/en/Reference/Servo>
* Serial on Digital pin: <https://www.arduino.cc/en/Reference/SoftwareSerial>
* SPI (MISO,MOSI, SCK): <https://www.arduino.cc/en/Reference/SPI>
* Stepper: <https://www.arduino.cc/en/Reference/Stepper>
* TFT: <https://www.arduino.cc/en/Reference/TFTLibrary>
* DHT: <https://github.com/adafruit/DHT-sensor-library>
* NeoPixel: <https://github.com/adafruit/Adafruit_NeoPixel>
* Plus a lot of Adafruit libraries …

# Arduino Pro Mini Projects – Tried! Let’s see if the code works in ESP8266?!





<https://cdn.sparkfun.com/datasheets/Dev/Arduino/Boards/ProMini8MHzv1.pdf>

## ILI9340 2.2” TFT SPI 320X240 3.3V

Mine is 9340, NOT 9341!

Install Libraries:

<https://github.com/adafruit/Adafruit-GFX-Library>

<https://github.com/adafruit/Adafruit_ILI9340>

I can use my Arduino Pro Mini which is **3.3V,**

**BUT use external 3.3V to power LED/VCC to avoid too much current drawn through Arduino Pro Mini**

SCK - Arduino Digital Pin 13  
SDO(MISO) - Arduino Digital Pin 12  
SDI(MOSI) - Arduino Digital Pin 11  
CS - Arduino Digital Pin 10  
D/C - Arduino Digital Pin 9   
RESET - Arduino Digital Pin 8  
LED - 3.3V external  
VCC - 3.3V external  
GND – GND

Ref: <http://www.instructables.com/id/Cheap-TFT-22-inch-Display-on-Arduino-ILI9340C-or-I/?ALLSTEPS>

## Pulse Sensor

Install Arduino Library:

<https://github.com/WorldFamousElectronics/PulseSensor_Amped_Arduino>

PulseSensor – Arduino Pin

+ (GREY) - 3.3V

- (WHITE) - GND

Data (PURPLE) - Analog 0

Install Processing Library:

<https://github.com/WorldFamousElectronics/PulseSensor_Amped_Processing_Visualizer>

Open file “PulseSensorAmpd\_Processing\_1dot1.pde” with Processing App

Change the code:

String portName = "COM5"; // specify the right port!

port = new Serial(this, portName, 115200);

Run Processing.

Tutorial:

* <http://pulsesensor.com/pages/code-and-guide>
* <http://pulsesensor.com/pages/pulse-sensor-speaker-tutorial>
* <http://pulsesensor.com/pages/pulse-sensor-amped-arduino-v1dot1>

Forum

<http://pulsesensor.proboards.com/>