Programming the ESP8266 WeMos-D1R2 Using Arduino Software/IDE

by jainrk in arduino

+ Collection   ✋ I Made it!   ♥ Favorite   📢 Share ▾

About This Instructable

👁 **212,544** views

♥ **91** favorites

jainrk   Follow   53

More by jainrk:

In this Instructable I will guide you through the steps needed to install, configure and program the WeMos-D1R2 board using the Arduino IDE.

WeMos-D1R2 is an ESP8266-12 based WiFi enabled microprocessor unit on a Arduino-UNO footprint. That means the board looks and works (in most cases) like an UNO. Apparently several shields, sensors and output devices that are manufactured for the Arduino platform will work on the WeMos-D1R2 with the added advantage of builtin WiFi.

There are two WeMos boards in the market.**If you are not careful you will end up with a D1 Board which is an older version.** You have to make sure you have the current version of the board WeMos-D1R2. I bought my WeMos-D1R2 from Banggood, I believe it is a Hong Kong based online retailer. The quality of the product is good and has a short delivery time, about two weeks to the US. They carry the genuine WeMos-D1R2. There are several older model WeMos-D1 being sold as WeMos-D1R2 to unsuspecting customers by several other vendors.

You will find several similarities between this Instructable and my previous one - Programming the ESP8266-12E using Arduino software/IDE because of the fact that the ESP8266-12 is the foundation of the WeMos-D1R2 board. In some cases I have copied and pasted the complete steps.

Step 1: Differences Between the I/O Pins.

Though the Arduino UNO and the WeMos-D1R2 are similar, there are a few differences in their pin assignment. The above illustration provides the mapping of the pins. In some situations programs written for the UNO will need to be modified a little to the proper pin assignments of the WeMos-D1R2. More on this when we write our first sketch.

Step 2: Getting Started - Connect the WeMos-D1R2 to Your Computer


The WeMos-D1R2 board comes without an USB cable. Make sure you have a data cable and not a ordinary charging cable. A data cable causes your Windows OS to react. It announces the attachment of a new hardware and tries to install the USB drivers. It either finds the driver on your system or it does not. If it does not then

you will need to download the USB drivers. The USB interface chip is the CH340G. You will need to install the drivers for this chip.

A Google search for the "CH340G drivers" finds several sites. You can download the Windows 7 drivers from here or the Windows 8 from here. Though I have not tried them, other operating systems can be downloaded from here. Some flavors of Windows operating system come with the drivers.

Step 3: Is the WeMos-D1R2 Happily Communicating With Your Computer?
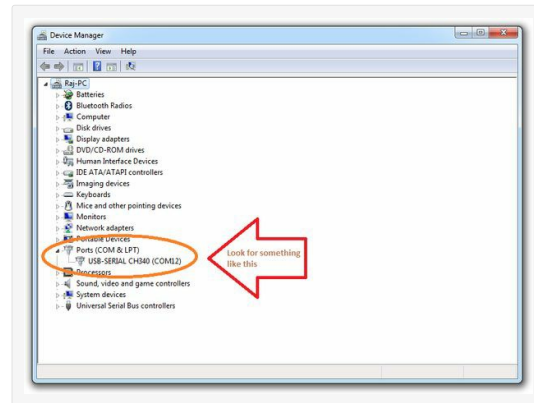
Lets find out if the WeMos-D1R2 and your computer are communicating with each other. Getting this step right is important for any further action. Open the *Device Manager* via *Control Panel| Hardware and Sound*.

## Step 4: Installing Arduino Software/IDE

I downloaded the most current Arduino software (Version 1.6.8) from here. It is a Windows installer exe file so double clicking on it will start the installation including the installation of several peripheral drivers. You can find detailed instructions to install the Arduino software here.

Once the Arduono software is installed, I tested the install by connecting an existing Arduino Uno that I had and uploaded the Blink sketch. All systems worked as they were supposed to.
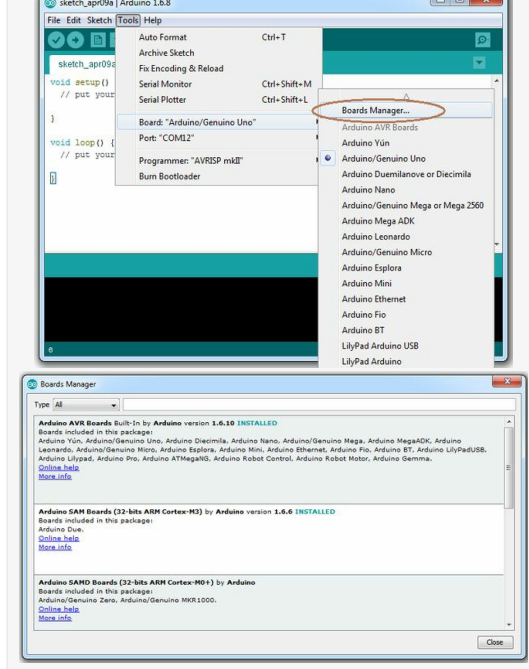
Step 5: Where to Find the Arduino IDE Preferences Dialog
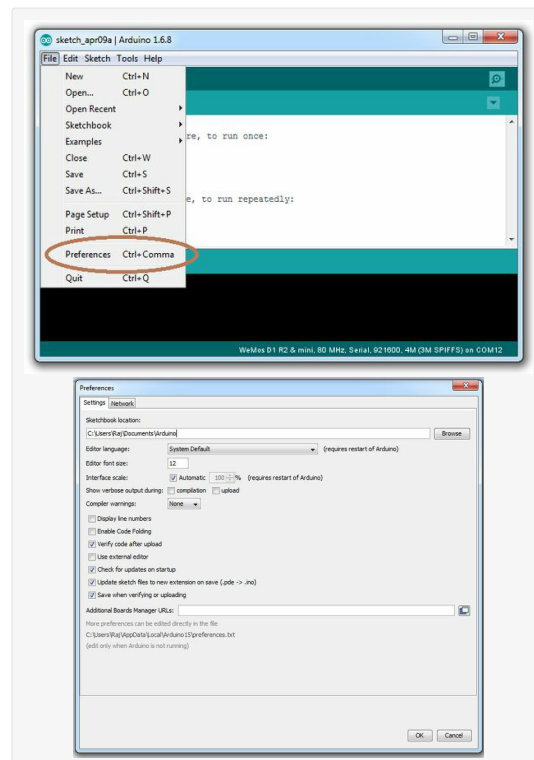
You will need to familiarize yourself with the *File| Preferences* dialog box. We will need this info later.
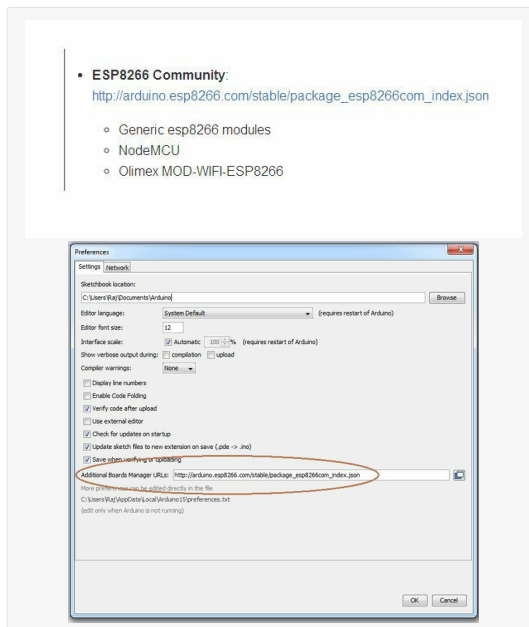
## Step 6: Where to Find the Arduino IDE Boards Manager Dialog
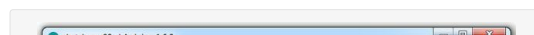
You will also need to know about the *Tools* | **Board:…** | **Boards Manager** dialog box. You have an older version of Arduino software if you cannot see **Board Manager** in the menu. Go update your software.

**Step 7: Telling Arduino Where to Find the Wemos-D1R2 Library**

The WeMos-D1R2 board can be added to the Arduino software/IDE by installing the necessary libraries. This community supported Github page: Unofficial list of 3rd party boards support has the information needed to get your Arduino software to support the WeMos-D1R2. Search/look for "*ESP8266*" on this webpage. Look for the URL shown in the image above. Copy and paste that URL into your *Preferences* dialog and select *OK*. Else you can copy the following and paste into your *Preferences* dialog and select OK:
http://arduino.esp8266.com/stable/package_esp8266com_index.json Either case do not click on the URL.

Step 8: Installing the WeMos-D1R2 Board Via the Board Manager
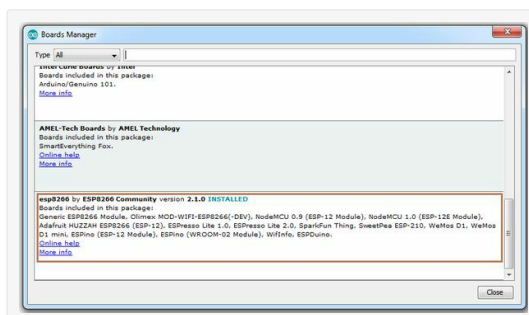
Open *Tools* | **Board**:|**Boards** *Manager* dialog box. Somewhere in there you will see the entry "***esp8266 of ESP8266 Community*** *version* ***2.1.0***" select that. The **Install** button will appear, click the Install button. Wait for a while… This process will take some time to download and complete. After the install it is a good idea to shut the Arduino program and restarted it.

Step 9: Determining the COM Port WeMos-D1R2 Shows Up On
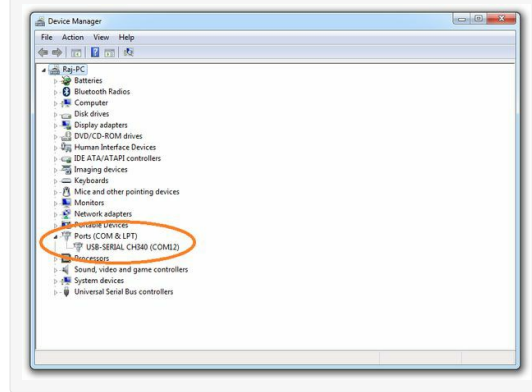
If not connected connect the Wemos-D1R2 board to your computer. Give it a couple of minutes to get to know the computer. Go to **Control Panel| Hardware and Sound| Device Manager** and click on **Ports (COM & LPT)**. There you will find the port number that your Wemos-D1R2 is connected on. In my case it is **COM12**. Make a note of that, we need this info later.

Step 10: Selecting the WeMos-D1R2 Board
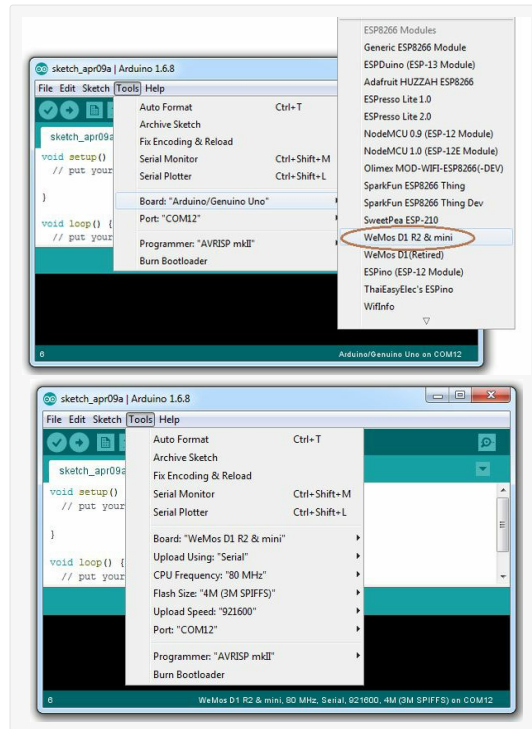
Go to **Tools | Board:...** scroll way down and select **WeMos D1 R2 & mini**. The **Tools** menu changes to the second image shown above.

Step 11: Configuring COM Port
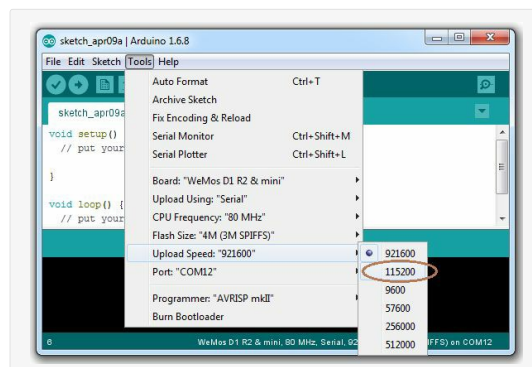
In a Step 9 we had determined the COM port WeMos-D1R2 appears on. To select the COM port, go to **Tools | Port:** and select the *COM port*, in my case it was **COM12**.

Step 12: Configuring COM Port Speed

To select the speed of communication between the WeMos-D1R2 and the computer. Go to **Tools | Upload Speed:** and select **115200**. We are ready to upload our first sketch.
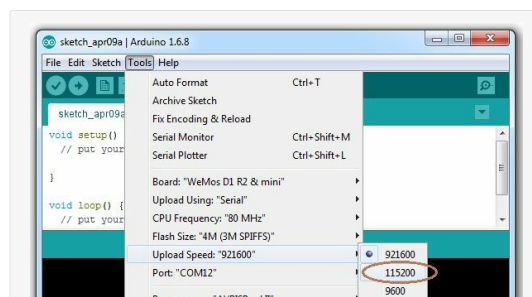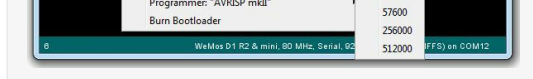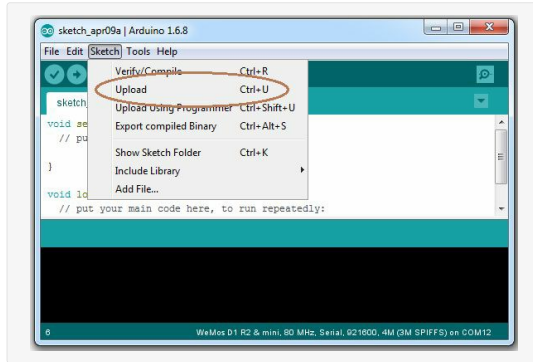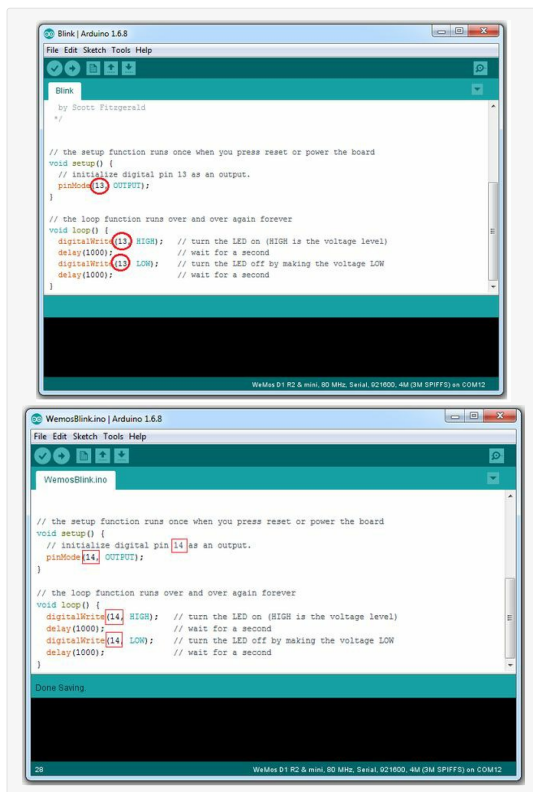
Step 13: Test Drive the Setup

Test drive the complete setup using the boiler plate sketch.
To upload the boiler plate sketch go to **Sketch | Upload** or use the shortcut key **Crtl+U** or click on the right arrow button next to the check mark. A successful compile and upload means all systems are working and we are ready to get to the real stuff.

Step 14: Trying the Blink Example

Load the packaged example **Blink**. To find it go to **File | Examples | 01.Basics | Blink.** Compile and upload as instructed in the previous step. Nothing happens. :(

The reason nothing happens is because the on board LED on the UNO is connected to pin 13. Refer to the table in Step 2. On the WeMos-D1R2 the on board LED is connected to pin 14.

Replace all instances of pin **13** with pin **14** and save the sketch as **WeMosBlink**. Compile and upload as instructed in the previous step. Viola the blue LED starts blinking.

Replace all instances of pin **13** with pin **2** and save sketch. Compile and upload as instructed in the previous step. The blue LED on the **ESP8266-12** module starts blinking.

Disconnect the WeMos-D1R2 from your computer and connect an external 5V power source. I connected it to the power bank that I use to charge my phone. The LEDs will start blinking.

We aren't WiFing yet. That will be in the next Instructable. Time permitting I will write one soon. If you feel motivated enough try adopting my previous Instructable Programming a HTTP Server on ESP-8266-12E to the WeMos-D1R2 and update me in the comments.

Happy IoTing.

Step 15: List of Other Instructables I Have Written

Programming the ESP8266 WeMos-D1R2 using Arduino software/IDE

Programming a HTTP Server on ESP-8266-12E

Programming the ESP8266-12E using Arduino software/IDE

Programming the ESP8266MOD ESP-12 module using the Witty Board and Arduino IDE

DIY Dual Cup Suction Lifter Temporary Car Roof Rack

Comments

I Made it! | Add Images | Post Comment

PeterJ155 2017-10-15 Reply

I think there is an error in the Blink Sketch.

If
you change the delays so that they are not the same, say 1000 &100
respectively, the LED flashes ON for 100 ms and is OFF for 1 sec.

void loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
delay(100); // wait for a 100 ms
}
NB this is with a D1 module, not the later D1R2

PeterJ155 2017-10-15 Reply

I think there is an error in the Blink Sketch.

If you change the delays so that they are not the same, say 1000 &100
respectively, the LED flashes ON for 100 ms and is OFF for 1 sec.

void loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
delay(100); // wait for a 100 ms
}

MariaDabukke 2017-08-03 Reply

Hi,

I have error like this when I upload blink code:

warning: espcomm_sync failed

error: espcomm_open failed

error: espcomm_upload_mem failed

error: espcomm_upload_mem failed

I have connect D3 and D8 to GND and use CH340 driver, but nothing change. How
to fix it?

> **lionel_m** ▸ MariaDabukke 2017-10-07 Reply
>
> Hi. Just in case it is of help tosomeone: I got the first two errors when I
> connected. Turned out I was trying to connect choosing the es8266 generic
> board. I hadn't seen the Wemos D1 board listed below (mine is a cheap
> wemos D1 clone). I dare say you're brighter than me, but this might help
> someone who is on my level!

---

rbmontes 2017-08-29 Reply

I have set up my wemos D1 R2 successfully with this tutorial! Thank you for the
instructions. Kudos!

MariaDabukke 2017-08-03 Reply

I have connect D3 and D8 to GND and use CH340 driver, but error like this always
appear:

warning: espcomm_sync failed

error: espcomm_open failed

error: espcomm_upload_mem failed

error: espcomm_upload_mem failed

Are there any other way to fix it?

---

kaihgr 2017-05-01 Reply

Great Instructable/very clear steps!

Some of us have had trouble uploading to the WeMos, and discovered that D3
and D8 may need to be pulled to ground during uploading only (not during
operation). See the thread at https://github.com/esp8266/Arduino/issues/2604

Thanks for the great teaching!

> **MariaDabukke** ▸ kaihgr 2017-08-03 Reply
>
> I have connect D3 and D8 to GND and use CH340 driver, but error like this
> always appear:
>
> warning: espcomm_sync failed
>
> error: espcomm_open failed
>
> error: espcomm_upload_mem failed
>
> error: espcomm_upload_mem failed
>
> Are there any other way to fix it?

MariaDabukke   2017-08-03   Reply

Hi,

I have connect D3 and D8 to GND, but I have error:

warning: espcomm_sync failed

error: espcomm_open failed

error: espcomm_upload_mem failed

error: espcomm_upload_mem failed

How to fix it? I have also tried use CH340 driver, but nothing change.

Damiend43   2017-01-16   Reply

Im super new to this and thank you very much for your help, its very precise and saved me a lot of nervous breakdown. Way to go.

I am trying to connect my wemos D1 mini to display data on a 1.8 screen tft (to get the weather) and all I get is a blank white screen when uploading example. Im not sure of my soldering skill. is there a way to know if the issue is hardware (soldering) or software (version issues and so on)?

TomK32 ▸ Damiend43   2017-01-17   Reply

White screen is a good first step, you just gotta make sure you match the pins.

I'm using ucglib and following did work for my D1 (I have a mini too but didn't try with that, yet):

Ucglib_ST7735_18x128x160_SWSPI ucg(/*sclk=*/ SCL, /*data=*/ SDA, /*cd=*/ D11 , /*cs=*/ D10, /*reset=*/ D12);

and wire the five pins scl, sda, cd (rs on my display), cs and rs to the correct pins.

btw, you know http://wttr.in ?

Damiend43 ▸ TomK32   2017-01-17   Reply

I am trying this (well at least trying to run examples for now) :

https://www.instructables.com/id/Art-Deco-Weather-F...

Just a blank screen, with any library I tried.

---

slarti.fartfast ▸ Damiend43   2017-05-17   Reply

It may be a bit late, but I think the problem is that it looks like TomK32 is using an I2C screen (scl/sda) not SPI (sck/mosi/miso/ce)

ucglib works fine for spi, on my ILI9341 screen to the ESP8266 I used

sck=d13 mosi=d11 miso=d12 (those are the esp8266 hardware spi default) then ce=d2 cs=d8 d/c=d4 reset=d0

the screens are sensitive to power upset on boot, mine was stuck in white screen mode till i put a hard reset into the code.

TomK32 ▸ Damiend43   2017-01-18   Reply

it's not so much about the library as the correct pinout.

Glumgad made it!   2017-04-30   Reply

Thank you for the detailed explanation.

I wish I read it BEFORE I bought the old version)))

---

lvod8 made it!   2016-12-01   Reply

Excelent tutorial, I've used pin 2 for the D1 mini
One thing I've noticed is that the LED is ON when output is LOW

---

jainrk ▸ lvod8   2017-04-23   Reply

That is correct. Low=ON

Gadh31 ▸ lvod8   2017-04-23   Reply

Exactly the same for me on my D1 : pin 2 LED is ON when output is LOW.

Gadh31   2017-04-23   Reply

Thank you, very good tuto, work fines (except pin 2 for me, on my D1, which is ON when OUTPUT is LOW).

AnandM51   2017-04-05   Reply

thanks a lot sir,you article was like a diamond in an ocean!

---

brainfarth   2017-03-19   Reply

Thanks a bunch! If only I had found this article Hours ago...

TheerapongSanthaveesuk   2017-02-28   Reply

nice work!

KS10   2017-02-22   Reply

excellent tutorial. keep posting good one.

aryes1   2016-12-27   Reply

Compiled file is HUGE. Blink is 222k. Seems to be adding all possible functions even if they are not used.

isdubkov ▸ aryes1   2017-02-10   Reply

kekeke. There is a competition in Russia who writes the smallest blink on Arduino or AVR, the ex-top result was 2 bytes, and now is 0 (zero) bytes (blinking via FUSES). So blink with code size 222k seems ridiculous.

TomK32 ▸ aryes1   2017-01-17   Reply

Sure, but 4M on the wemos, who cares, right? I have some smaller esp8266 with 8M, just in case :D

tunaip made it!   2017-02-07   Reply

Excellent.

tunaip   2017-02-06   Reply

Great tutorial, simple and "to the point". Moving on to your next Wemo's D1 tutorial. Thank you.

DavidH818   2016-12-04   Reply

Couldn't find a pin 13 listed in any of the program lines under file/examples/basics/blink, DID find it under file/examples/digital/blink without delay, changed the pin number 13 to a 14, uploaded it and got an onboard led to blink. Little errors in instruction and programming could easily cause my noob self to chuck the board as a bricked unit. Although I do agree that experience is what you get when things go wrong. Seems like when you select the wemos d1 board in board manager...then it should load up the sketch examples for that specific board....especially allowing for the different from UNO pinouts and onboard led locations. Oh well...now it is time to try some 8266 wifi stuff...glutton fpr punishment here! Thank you for this instructable...it really did help over all.

TomK32 ▸ DavidH818   2017-01-17   Reply

my pro-tip: use D13, D14 instead of 13, 14. There's a header file that defines those to the correct interal pins say D6 becomes pin 12.

https://github.com/esp8266/Arduino/blob/master/variants/d1_mini/pins_arduino.h

bbuldoc   2017-01-05   Reply

Thank you very much.

johnip4   2016-12-09   Reply

I just got a Wemos D1. I was able to get the web server working without any problems. I'm an OK Arduino programmer but a complete NOOB on the Wemos. Is there a reference I can look to in order to better understand the wifi and web commands?
Thanks

Tvixen   2016-12-02   Reply

Hi there

Thanks for a great tutorial.

Does this one WeMos-D1R2 only control one on/off function, or can i control more in/outputs on the same ip and port ?

To be more exact. Can I control different devices with only one WeMos-D1R2 ?

Thanks in advance.

Ralphxyz   2016-11-20   Reply

Hope someone is still monitoring this thread.

I ran the blink code and the LED blinks rapidly BUT then it stops!!

The On led is now on and the SCK led is slowly blinking but the led on Pin 14 no longer blinks!!

flyingsparkie   2016-10-25   Reply

Brilliant tute, uploading to my WeMos before this, I was getting header, exit code 1 errors. I renamed the arduino15 to something different and loaded the IDE up, copied the link to the preferences etc...loaded the blink.....YAY!! it's working again.

Thanks a mil.

JurjunKoning   2016-10-19   Reply

I'm blinking away! Awesome get started tutorial.

dupborges   2016-10-07   Reply

thanks for the tutorial. It helps me a lot

DanielA384   2016-10-01   Reply

Hi, i tried to upload a sketch which was working for arduino mega, but i got a
compiler error in an ISR declaration: ISR(TIMER3_COMPA_vect)

Can i use timer interrupts with WeMos?

Regards, Daniel

Erion   2016-05-18   Reply

I felt motivated and i tried your previous instructable on my Wemos D1(retired). It
work perfect, the only thing i had to change were the led pin assingment, thank you
very much! Made me very happy when i got things to work! Hope to see more of
your tutorials, greetings from Brazil!

jainrk ▶ Erion   2016-05-19   Reply

Erion, thank you for the update and kind words.

killeriq   2016-04-14   Reply

Hello,

What is the difference between D1 vs D1 R2 version?

I wrote to Wemos seller on Ali and he mention "R2 is compatible with nodemcu".
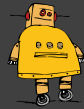
Thanks

jainrk ▶ killeriq   2016-04-25   Reply

I believe it has to do with the pull-up resistors. There could be more. I will
need to fire up my D1R1 to know more.

⬇ More Comments

Newsletter

Let your inbox help you discover our best
projects, classes, and contests. Instructables
will help you learn how to make anything!

[enter email]   I'm in!

About Us
Who We Are
Advertise
Contact
Jobs
Help

Find Us
f Facebook
▶ Youtube
🐦 Twitter
📌 Pinterest
g+ Google+

Resources
For Teachers
Residency Program
Gift Premium Account
Forums
Answers
Sitemap

© 2017 Autodesk, Inc.   Terms of Service | Privacy Statement | Legal Notices & Trademarks | Mobile Site   ▲ AUTODESK.