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## RF 315/433 MHz Transmitter-receiver Module and Arduino

by Mohannad

Rawashdeh (/member/Mohannad+Rawashdeh/)

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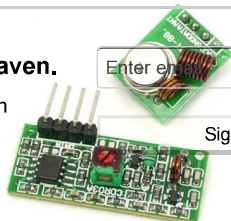


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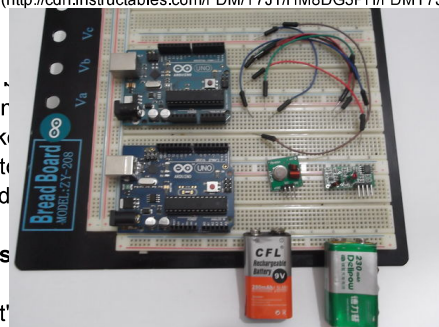


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Every  
receiver r  
tasks , lik  
decided to  
it with ardu

Materials

at first let



(http://cdn.instructables.com/FAHZB5T/HM8DG3PG/FAHZB5THM8DG3PG.LARGE.jpg)

1) 2 Arduino Board "I used Uno"

2) RF 315MHz or 433MHz transmitter-receiver module .

3) jumper wire .

4) BreadBoard .

5) External Power supply (9V Battery \*2) "Optional" .

simple RF Transmitter  
r cars , or to control simple  
nd What I need , So i  
r and How we can connect

### About This Instructable

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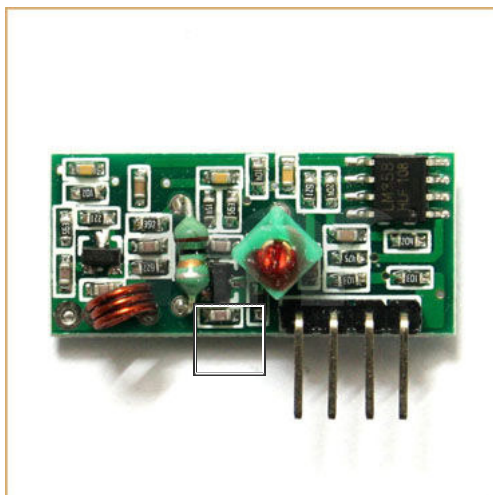
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## Step 1: Module Specification



(http://cdn.instructables.com/F8T43EW/HM8DG3Q4/F8T43EW/HM8DG3Q4.LARGE.jpg)



(http://cdn.instructables.com/FU4/UJYA/HM8DG3Q3/FU4UJYA/HM8DG3Q3.LARGE.jpg)

This module has a specification for :

#### Transmitter :

Working voltage: 3V - 12V fo max. power use 12V  
Working current: max Less than 40mA max , and min 9mA  
Resonance mode: (SAW)  
Modulation mode: ASK  
Working frequency: Eve 315MHz Or 433MHz  
Transmission power: 25mW (315MHz at 12V)  
Frequency error: +150kHz (max)  
Velocity : less than 10Kbps

So this module will transmit up to 90m in open area .

#### Receiver :

Working voltage: 5.0VDC +0.5V

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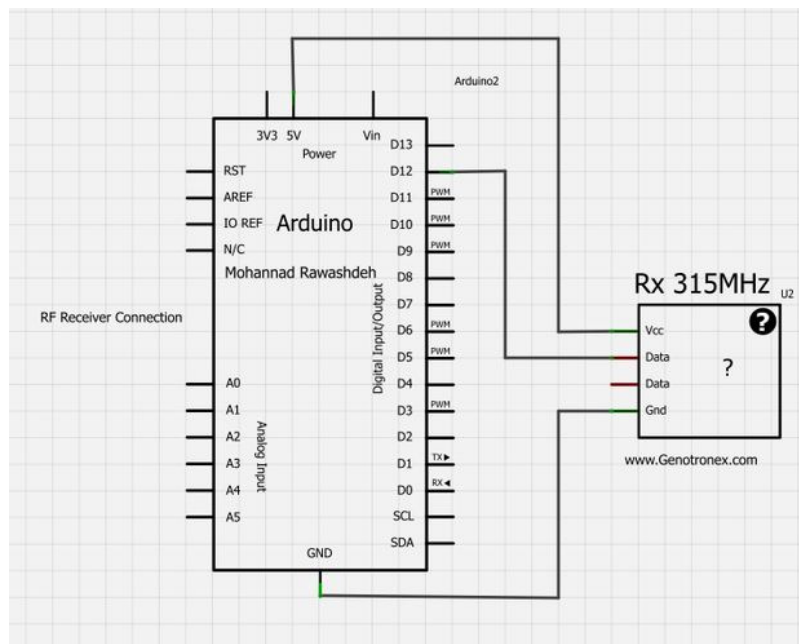
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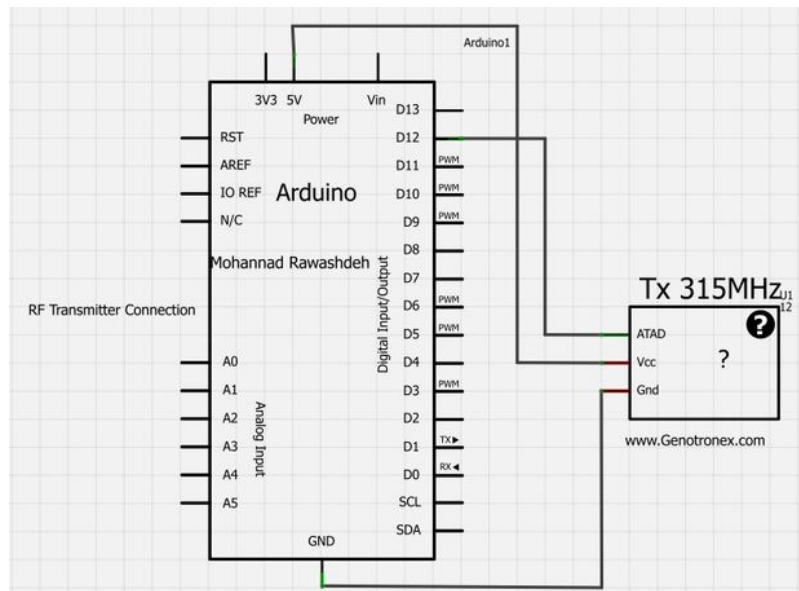
Working current:  $\leq 5.5\text{mA}$  max  
 Working method: OOK/ASK  
 Working frequency: 315MHz-433.92MHz  
 Bandwidth: 2MHz  
 Sensitivity: excel  $-100\text{dBm}$  ( $50\Omega$ )  
 Transmitting velocity:  $< 9.6\text{Kbps}$  (at 315MHz and  $-95\text{dBm}$ )

the use of an optional antenna will increase the effectiveness of your wireless communication. A simple wire will do the trick.

## Step 2: Schematics



(<http://cdn.instructables.com/FIT/MUZG/HM8DG0TF/FITMUZGHM8DG0TF.LARGE.jpg>)



(<http://cdn.instructables.com/FZHIW05/HM8DG0TI/FZHIW05HM8DG0TI.LARGE.jpg>)

the connection for the module is very easy .

for Transmitter :

Vcc >>>>5V

ATAD>>>D12"You can change it as you like from Software" .

Gnd >>> Gnd

Receiver :

Vcc>>>5V  
Data>>>D12  
Gnd>>>Gnd

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**particalman** (/member/particalman/)

5 days ago

Reply

Great project for my final communications lab

(/member/particalman/)



**MakisB1** (/member/MakisB1/)

12 days ago

Reply

Is there any way to connect multiple transmitters to one receiver ?

(/member/MakisB1/)



**WernerM2** (/member/WernerM2/)

13 days ago

Reply

I was wondering if anyone know how to change or manipulate the frequency because there are a very popular gate motor remote control on the market that interacts with this RF sender .....



**shinyshinyshiny** (/member/shinyshinyshiny/)

15 days ago

Reply

Doesn't compile.

(/member/shinyshinyshiny/)

VirtualWire.h:14:20: fatal error: wiring.h: No such file or directory

Where does this file come from?



**shinyshinyshiny** (/member/shinyshinyshiny/) shinyshinyshiny

15 days ago

Reply

better into (and newer versions) of the VirtualWire

(/member/shinyshinyshiny/)

library are here:  
[https://www.pjrc.com/teensy/td\\_libs\\_VirtualWire.htm](https://www.pjrc.com/teensy/td_libs_VirtualWire.htm)



**Gyalu** (/member/Gyalu/)

19 days ago

Reply

Hi Mohannad,

(/member/Gyalu/)

Thank you for the instructions, I built my RF project according to the info you shared.

I have an outdoor unit with a DHT22 thermometer and the transmitter unit and an indoor unit with a receiver, a real time clock and an LCD display and I send the measured temperature and humidity values through the RF transmitter to the indoor unit and show them on the LDC. Usually it works properly.

But after a certain time the received string starts to be shorter and I lose first some chars from the humidity value later the whole humidity and some chars from the temperature also. During this I am monitoring the the sent string through the serial monitor and it is correct.

Have you ever detected this issue? Do you have any suggestion / solution to do it?

THX, Gyalu



sitiirani (/member/sitiirani/)

22 days ago

[Reply](#)

(/member/sitiirani/)

Hi. Can I use RF transmitter and connected to arduino to communicate with smartphone ?



NiyatiK (/member/NiyatiK/)

1 month ago

[Reply](#)

(/member/NiyatiK/)

I am using RF module of 434MHz. I am sending small text from transmitter to receiver, for that i am using virtual wire library. After receiving the text at receiver site I want to play small audio file. I am using PCM library for playing sound file on arduino, because my audio file is very small and i don't want to use external memory, but the problem is when I import virtual wire and PCM in same code at receiver it is throwing error. I am beginner in arduino so I am not getting why it is not allowing both library together. I am using arduino leonardo at transmitter site and Uno as receiver. Is there any solution through which I can play my audio file at receiver without using sd card?



gmt918 (/member/gmt918/)

3 months ago

[Reply](#)

(/member/gmt918/)

Hi, this is a good intractable but there is a way easier way to use these modules. Instead of using Virtual Wire library, all you have to do is plug the data pin from the receiver module into the rx (0) pin on your arduino, and plug the data pin from your transceiver module into the tx (1) pin on your other arduino. There is no external library needed for this. Here is the code for the receiver:

```
//receiving rx code
int incomingByte = 0;

void setup(){
  //2400 baud for the 434 model
  Serial.begin(2400); }

void loop(){
  // read in values, debug to computer
  if (Serial.available() > 0) {
    incomingByte = Serial.read();
    Serial.println(incomingByte, DEC);
  }
  incomingByte = 0;
}
```

Note\*\*\*\*When uploading this code to your arduino, you need to disconnect the wire from the rx pin or it won't upload.

Here is the code for the transceiver:

```
//sending tx code
byte counter;

void setup(){
  //2400 baud for the 434 model
  Serial.begin(2400);
  counter = 5;
}

void loop(){
  //send out to transmitter
  Serial.write(counter);
  delay(10);
}
```



Note\*\*\*\*You need to disconnect the wire from the tx pin and reconnect it later when uploading your code to the arduino.

Note\*\*\*\*This is not my code. I got it from another website.

Hope this helps everybody.



**uolengineer (/member/uolengineer/)** gmt918

1 month ago

[Reply](#)

(/member/uolengineer/)

code does not work...because after uploading the code in arduino that is connected with transmitter ,the transmitter led glow but after disconnect the arduino from pc and give it external power supply the transmitter led will not glowing ,and i think the transmitter will not send any data...kindly tell me the solution.



**gmt918 (/member/gmt918/)** uolengineer

1 month ago

[Reply](#)

(/member/gmt918/)

Try unplugging both the tx and rx wires when uploading. It should work then. Sorry about that. Plug those wires back in later.



**ahmmmed.hmedat (/member/ahmmmed.hmedat/)** gmt918

2 months ago

[Reply](#)

(/member/ahmmmed.hmedat/)

what project to help this code ??



**gocreeps1433 (/member/gocreeps1433/)**

6 months ago

[Reply](#)

(/member/gocreeps1433/)

ERROR help!

transmitter.pde: In function 'void setup()':  
transmitter:19: error: 'vw\_set\_ptt\_inverted' was not declared in this scope  
transmitter:20: error: 'vw\_setup' was not declared in this scope  
transmitter.pde: In function 'void loop()':  
transmitter:28: error: 'vw\_send' was not declared in this scope  
transmitter:29: error: 'vw\_wait\_tx' was not declared in this scope



**robot3112 (/member/robot3112/)** gocreeps1433

5 months ago

[Reply](#)

(/member/robot3112/)

library would be in wrong place. I had the same problem, I deleted the library downloaded it once more and it worked.



**gocreeps1433 (/member/gocreeps1433/)** robot3112

4 months ago

[Reply](#)

(/member/gocreeps1433/)

Thanks man. It Worked! Sir can i Have your email? I would like to asked some questions regarding programming wireless communicaiton. I hope it's okay, thanks.



**uolengineer (/member/uolengineer/)** gocreeps1433

1 month ago

[Reply](#)

(/member/uolengineer/)

how you resolve this problem, because i have face same problem...please help me even i replaced the library with a new one.but same problem



**robot3112 (/member/robot3112/)** gocreeps1433

4 months ago

[Reply](#)

(/member/robot3112/)

you could send a private message on instructables itself.



**Arnod (/member/Arnod/)** gocreeps1433

5 months ago

[Reply](#)

(/member/Arnod/)

Don't know if it helps. But i replaced <WProgram.h> with <Arduino.h> in VirtualWire.cpp



(/member/spudziuvelis)

4 months ago

Reply

Arduino: 1.5.7 (Windows 8), Board: "Arduino Mega or Mega 2560,  
ATmega2560 (Mega 2560)"

In file included from transmitter.pde:6:0:  
C:\Program Files (x86)\Arduino\libraries\VirtualWire\VirtualWire.h:14:20: fatal  
error: wiring.h: No such file or directory  
#include  
^  
compilation terminated.

This report would have more information with  
"Show verbose output during compilation"  
enabled in File > Preferences.

i was trying to compile trasmitter example aaaaand this error appeared



(/member/kalium.pt)

**kalium.pt (/member/kalium.pt/)** spudziuvelis

4 months ago

Reply

You must install the VirtualWire library before compile the code, you  
can download it from the article where it says: "**First Download the  
library from Here .**  
(<http://www.seeedstudio.com/depot/images/product/VirtualWire.rar>)".  
Afterwards, uncompress it to your arduino library folder which is in this  
case: "C:\Program Files (x86)\Arduino\libraries\  
After doing this, close all arduino compiler interfaces and you should  
see a new set of examples. The code is now able to run. Good luck ;)

.



(/member/uolengineer)

**uolengineer (/member/uolengineer/)** kalium.pt

1 month ago

Reply

i install the VirtualWire library but i face a lot of errors.i have paste all  
the errors below.please give me the solution asap.

In file included from transmitter.cpp:11:  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:5  
error: variable or field 'vw\_set\_tx\_pin' declared void  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:5  
error: 'uint8\_t' was not declared in this scope  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:5  
error: variable or field 'vw\_set\_rx\_pin' declared void  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:5  
error: 'uint8\_t' was not declared in this scope  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:6  
error: variable or field 'vw\_set\_ptt\_pin' declared void  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:6  
error: 'uint8\_t' was not declared in this scope  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:6  
error: variable or field 'vw\_set\_ptt\_inverted' declared void  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:6  
error: 'uint8\_t' was not declared in this scope  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:7  
error: variable or field 'vw\_setup' declared void  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:7  
error: 'uint16\_t' was not declared in this scope  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:9  
error: 'uint8\_t' does not name a type  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:9  
error: 'uint8\_t' does not name a type  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:9  
error: 'uint8\_t' does not name a type  
C:\Users\decent\Documents\Arduino\libraries\VirtualWire\VirtualWire.h:1  
error: 'uint8\_t' does not name a type  
transmitter.cpp: In function 'void setup()':  
transmitter.pde:-1: error: 'vw\_set\_ptt\_inverted' was not declared in this  
scope  
transmitter.pde:-1: error: 'vw\_setup' was not declared in this scope  
transmitter.cpp: In function 'void loop()':  
transmitter.pde:-1: error: 'vw\_send' was not declared in this scope



**spudziuvelis (/member/spudziuvelis/)** kalium.pt 4 months ago [Reply](#)

I installed the library but it doesn't matter now cause i fixed it myself by downgrading from 1.5.6. Ide to 1.0.6.ide and it worked



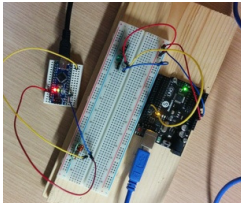
**ghoshmanideep (/member/ghoshmanideep/)** spudziuvelis 2 months ago [Reply](#)

same issue i have faced.Do you have any solution for it



**Digital Explorer (/member/Digital+Explorer/)** made it! 2 months ago [Reply](#)

(/member/Digital+Explorer/)



(<http://cdn.instructables.com/FXT0Y8S/I63EYHJG/FXT0Y8S/I63EYHJG.LARGE.jpg>)



**uolengineer (/member/uolengineer/)** Digital Explorer 1 month ago [Reply](#)

share the code please

(/member/uolengineer/)



**ka182 (/member/ka182/)** 2 months ago [Reply](#)

(/member/ka182/)

Hi there,

I need help.. I'm using 433Mhz transmitter/receivers Module. data is sent from my transmitter to my receiver module without any issue but when using adafruit bmp183 temp sensor, sensor data value is wrong. i did some debugging and notice that issue is with vw\_setup() function, when value is greater than 0 values temp value goes wrong. does anyone have the same issue or does anyone know how to fix it? i think that it is something related with clock speed issue. adafruit bmp183 calcs are based on 16Mhz and i think that that function may change clock speed on my arduino. :(



**uolengineer (/member/uolengineer/)** ka182 1 month ago [Reply](#)

please send me the sample code that is working for you.

(/member/uolengineer/)

uolengineer@gmx.com



**AdithyaA2 (/member/AdithyaA2/)** 1 month ago [Reply](#)

(/member/AdithyaA2/)

can you make a one were if you press an led, it sends the signal to the other

one



**MadelInDreams.ca (/member/MadelInDreams.ca/)** 2 months ago [Reply](#)

(/member/MadelInDreams.ca/)

Awesome tutorial! I was wondering. Does controller have to be integer? or can

it be a string??



**Arvix (/member/Arvix/)** 2 months ago [Reply](#)

(/member/Arvix/)

Work great! Thanks!



**Andr sM4 (/member/Andr%C3%A9sM4/)** 2 months ago [Reply](#)

(/member/Andr%C3%A9sM4/)

does it work in NLOS conditions??

**KilianO (/member/KilianO/)**





3 months ago

[Reply](#)

(/member/KilianO/)

Has anyone found a nice Half-Duplex solution for 433MHz modules and VirtualWire on Arduino?

Would appreciate any suggestions. Thanks,

Kilian



**Martin.V.Stuttgart** (/member/Martin.V.Stuttgart/)

KilianO

2 months ago

[Reply](#)

(/member/Martin.V.Stuttgart/)

take a HC-12 instead...



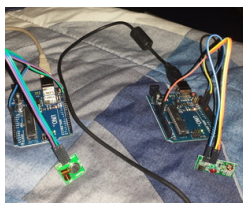
**StatikZ** (/member/StatikZ/) made it!

3 months ago

[Reply](#)

(/member/StatikZ/)

Got it to work, following instructions, of course! Now I'm off to trying to get some wireless communication in order to display information to a LCD display. Shouldn't be too hard if I figure out the LCD commands.



(<http://cdn.instructables.com/F7V/9K4A/I58IC95E/F7V9K4A/I58IC95E.LARGE.jpg>)



**azimazwan** (/member/azimazwan/)

3 months ago

[Reply](#)

(/member/azimazwan/)

hi everyone. why i cannot compile this coding? it said that my header is not define. somebody help me please? contact me at [azimazwan@gmail.com](mailto:azimazwan@gmail.com)

tqvm



**azimazwan** (/member/azimazwan/)

3 months ago

[Reply](#)

(/member/azimazwan/)

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tqvm



**azimazwan** (/member/azimazwan/)

3 months ago

[Reply](#)

(/member/azimazwan/)

hi everyone. why i cannot compile this coding? it said that my header is not define. somebody help me please? contact me at [azimazwan@gmail.com](mailto:azimazwan@gmail.com)

tqvm



**TomášV** (/member/Tom%C3%A1%C5%A1V/)

3 months ago

[Reply](#)

(/member/Tom%C3%A1%C5%A1V/)

Hi,  
can you help me please.. Can I use this for wireless conecting guitar to amp?

Actually can you help me with code or something like this?

Thanks



**RobinB1** (/member/RobinB1/)

3 months ago

[Reply](#)

(/member/RobinB1/)

NOTHING BUT A BUNCH OF ERRORS !!!!



**kalium.pt** (/member/kalium.pt/)

4 months ago

[Reply](#)

(/member/kalium.pt/)

Hi! Can I use the transmitter module with a VCC of 12 V and connect the data directly to the arduino D12?



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Please be positive and constructive.

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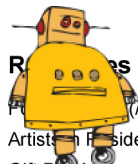
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