SKU:TEL0005 (https://www.dfrobot.com/product-57.html)

(https://www.dfrobot.com/product-57.html)

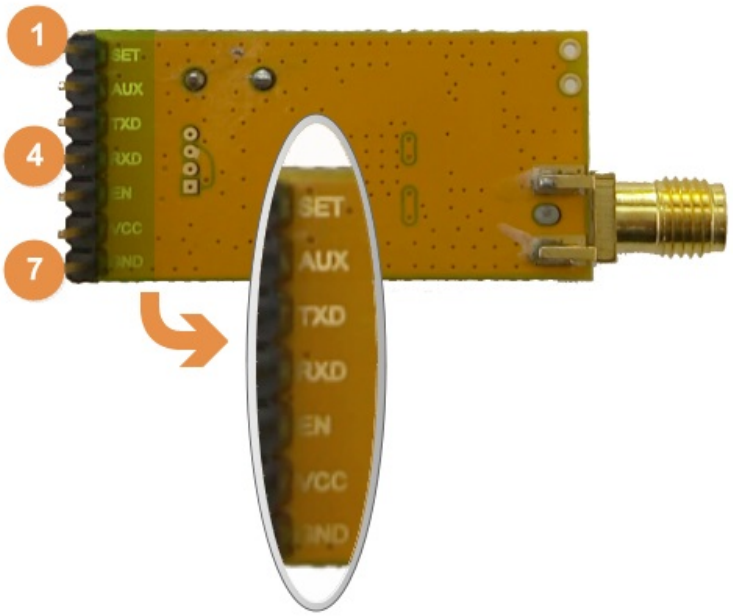
Introduction

The **APC220 arduino radio data module** (https://www.dfrobot.com/product-57.html) is a highly versatile, low power radio solution that is easy to setup and integrate into any project that requires a wireless RF link. It is perfect for robotic applications if you need wireless control. You can connect one of these modules with your MCU through TTL interface, and connect to your PC with another APC220 module through a TTL/USB converter.

Specification

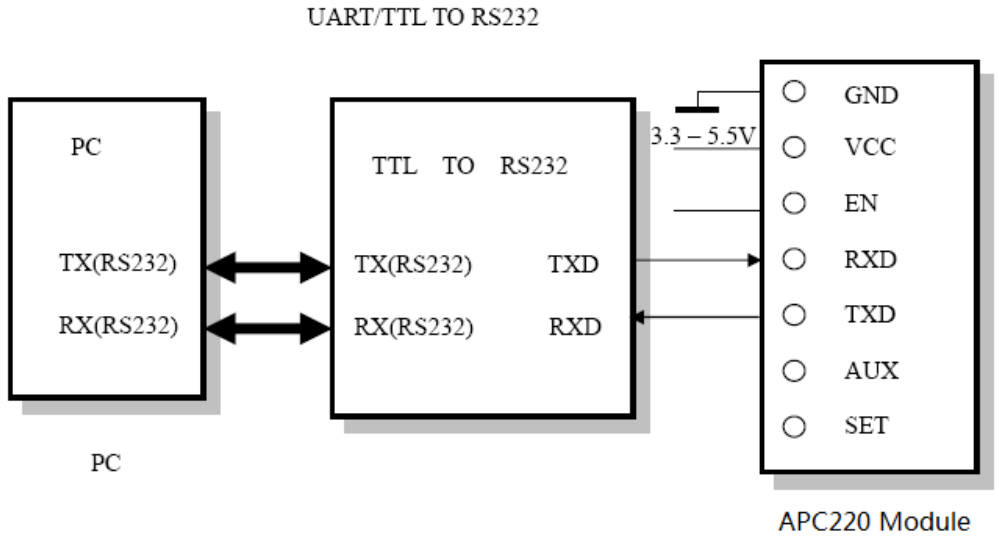
- Working frequency: 420 MHz to 450 MHz
- Power: 3.5-5.5V
- Current: <25-35mA
- Working temperature: -20℃～+70℃
- Range: 1200m line of sight (1200 bps)
- Interface: UART/TTL
- Baud rate: 1200-19200 bps
- Baud rate (air): 1200-19200 bps
- Receive Buffer: 256 bytes
- Size: 37mm × 17 mm × 6.6mm
- Weight: 30g

Pin Definitions

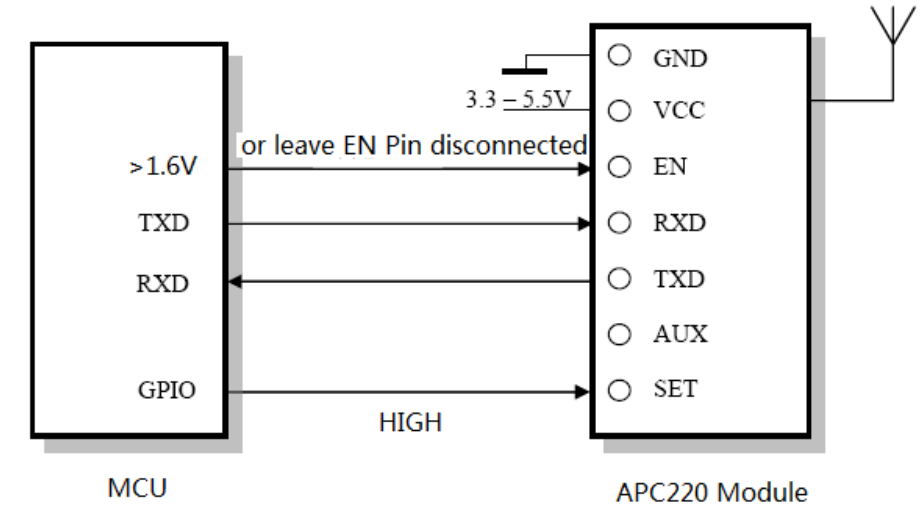


Pin	Definition	Detail
1	SET	Set parameters (low)
2	AUX	UART Signal- Receive (low) Transmit (high)
3	TXD	UART TX
4	RXD	UART RX
5	EN	Disable the device when apply <0.5V. Enable the device when leave it disconnected or apply >1.6V
6	VCC	3.3V-5.5V Power
7	GND	0V Ground

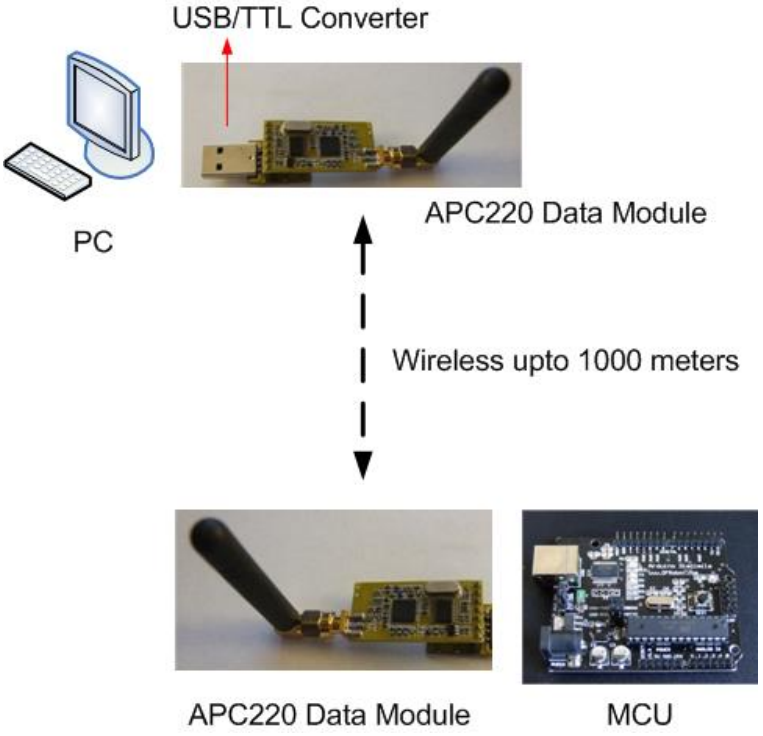
Connections



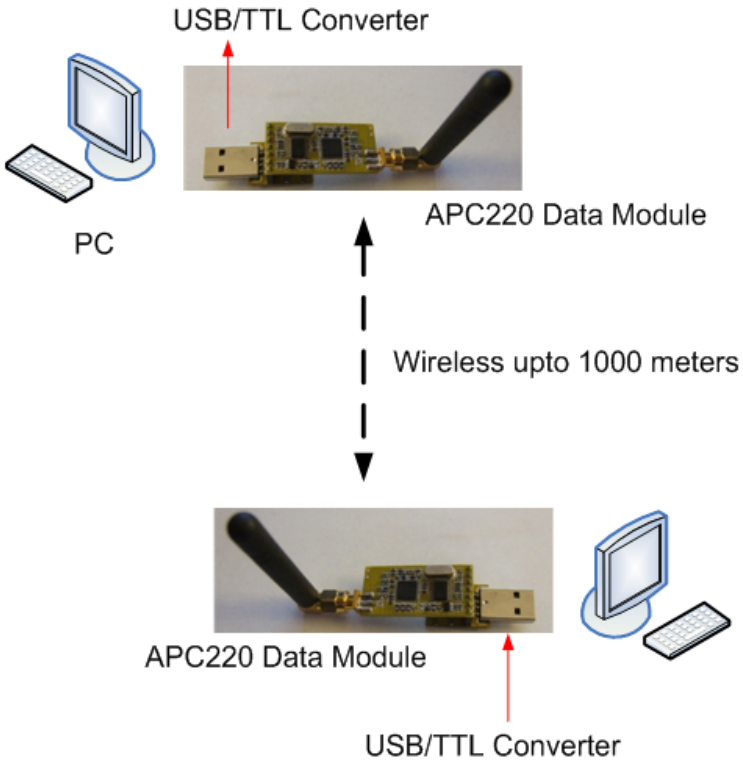
APC220 to PC via RS232-TTL converter



APC220 to MCU



PC to MCU via APC220



PC to PC via APC220

Tutorial

This tutorial will guide you **how to communicate between your PC and your Arduino Board wirelessly** by two APC220.The PC will receive the message "Hello!" from the Arduino and print it on screen by serial monitor.

Requirements

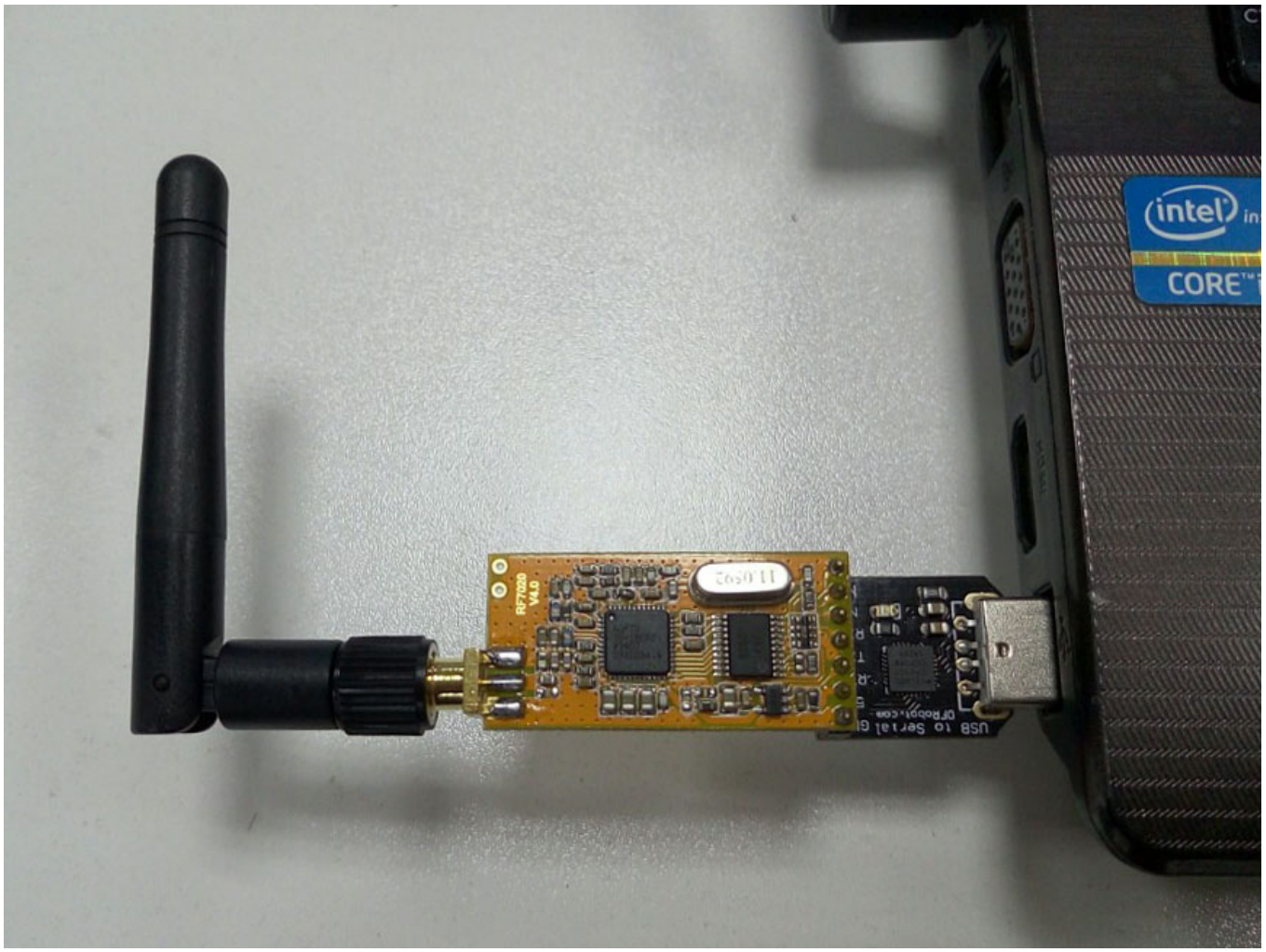
- Hardware
  - APC220 module x2
  - CP210 USB to UART Converter x1
  - Arduino board (https://www.dfrobot.com/category-104.html) x1
  - USB Cable A-B for Arduino (https://www.dfrobot.com/product-134.html) x1
- Software
  - RF-magic Download RF-Magic Configure software (https://www.dfrobot.com/image/data/TEL0005/rfmagic.rar).
  - Arduino IDE 1.0.6 Click to Download Arduino IDE (https://www.arduino.cc/en/Main/Software)
  - Serial Assistant: Click to download Serial debugging assistant (http://www.darkwood.me/serialport/)

NOTE: The Arduino board here we use is Romeo (Leonardo), which uses **Serial1** instead of **Serial** in the code, if you use another Arduino, e.g. Uno, Mega, Bluno.., please rewrite the **Serial1.println()** to **Serial.println()**.

Arduino IDE 1.6.5 cannot display the message at all, we recommend using Arduino 1.0.6 serial monitor or an alternative serial monitor.

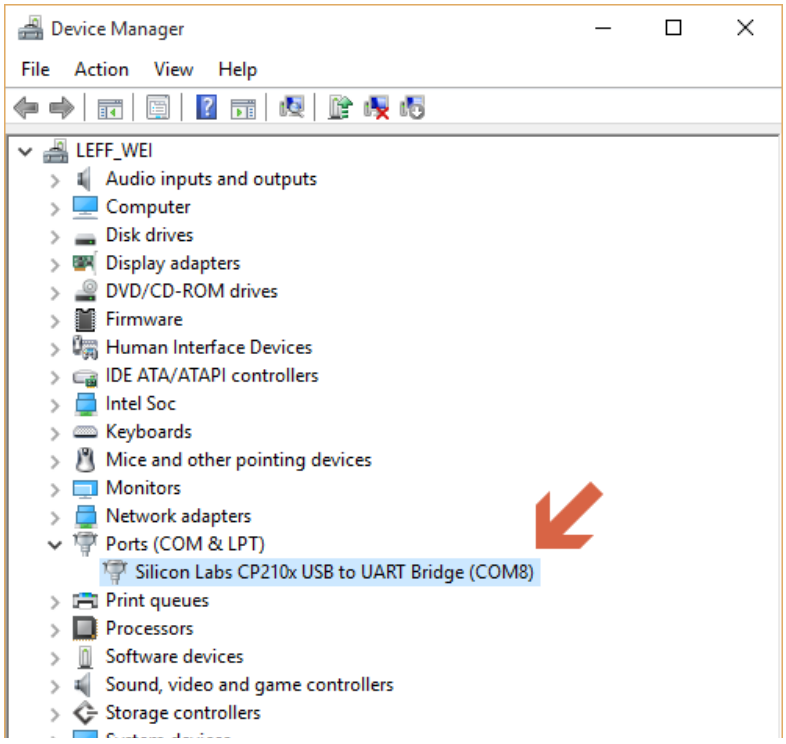
Set APC220

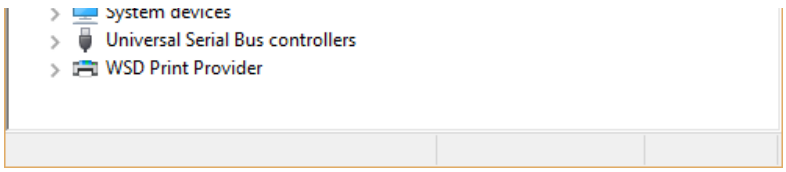
1) Screw in the antenna to the APC220 and plug it in to the USB-TTL converter, and then plug the converter in to your computer.



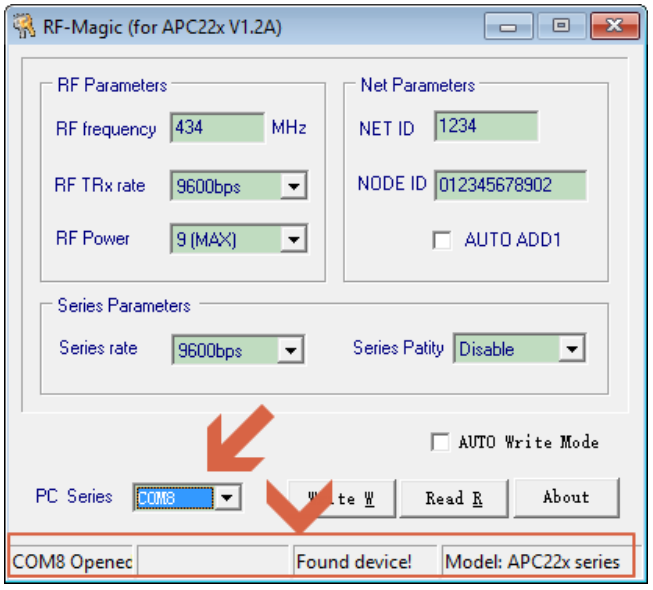
2) Download and install the driver for the USB-TTL converter. Go to Silicon Labs to download for your system (http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx)

3) Check the serial port in the Device Manager if your driver was installed. Here, it's **COM8**.



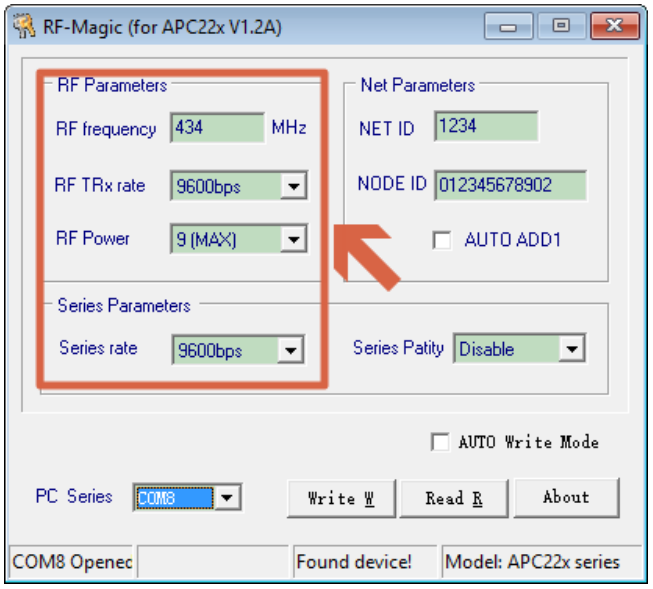


4) Run the **APC22X_V12A.exe** (i.e. RF-magic) **as Administrator** if your system is not Windows XP. How to avoid to Run as Administrator every time. (https://www.dfrobot.com/forum/viewtopic.php?f=8&t=1496#p7591)

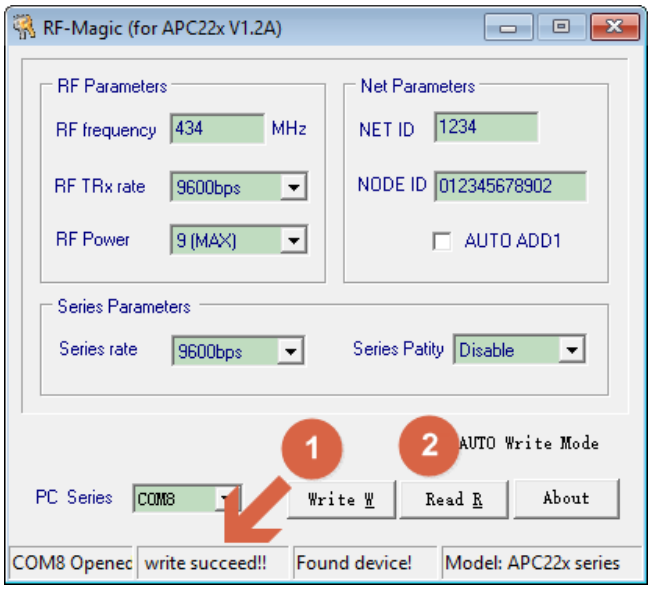


NOTE: The software will recognize the APC220 module and open the serial port COM8 automatically once opened. If it fails, please try to revise the COM port in the device manager to **COM1** and restart the software.

5) Configure RF-magic as in the red square frame below (default setting) , and click **Write W** to write your setting, then click **Read R** to read the parameters you've set.



Configuration



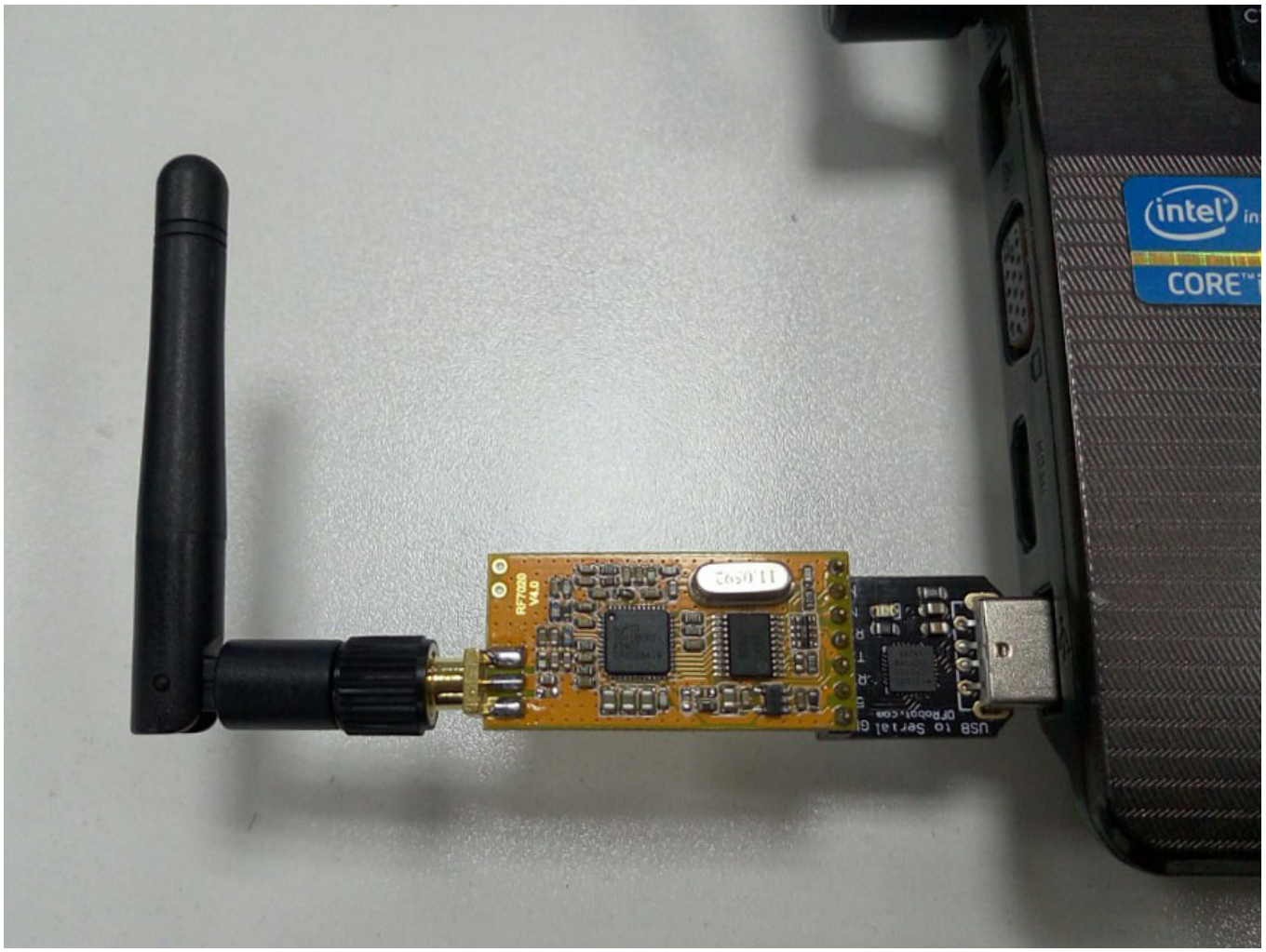
Write and Read setting

Parameter	Range	Default
RF frequency	Resolution 1KHz，Accuracy ±100Hz	434MHz
RF TRx Rate	1200，2400，4800，9600，19200bps	9600bps
RF Power	0-9	9
Series Rate	1200，2400，4800，9600，19200，38400，57600bps	9600bps
NET ID	0-65535（16 bit）	12345
NODE ID	123456789012	
Series Patity	Disable，Odd Patity，Even Patity	Disable

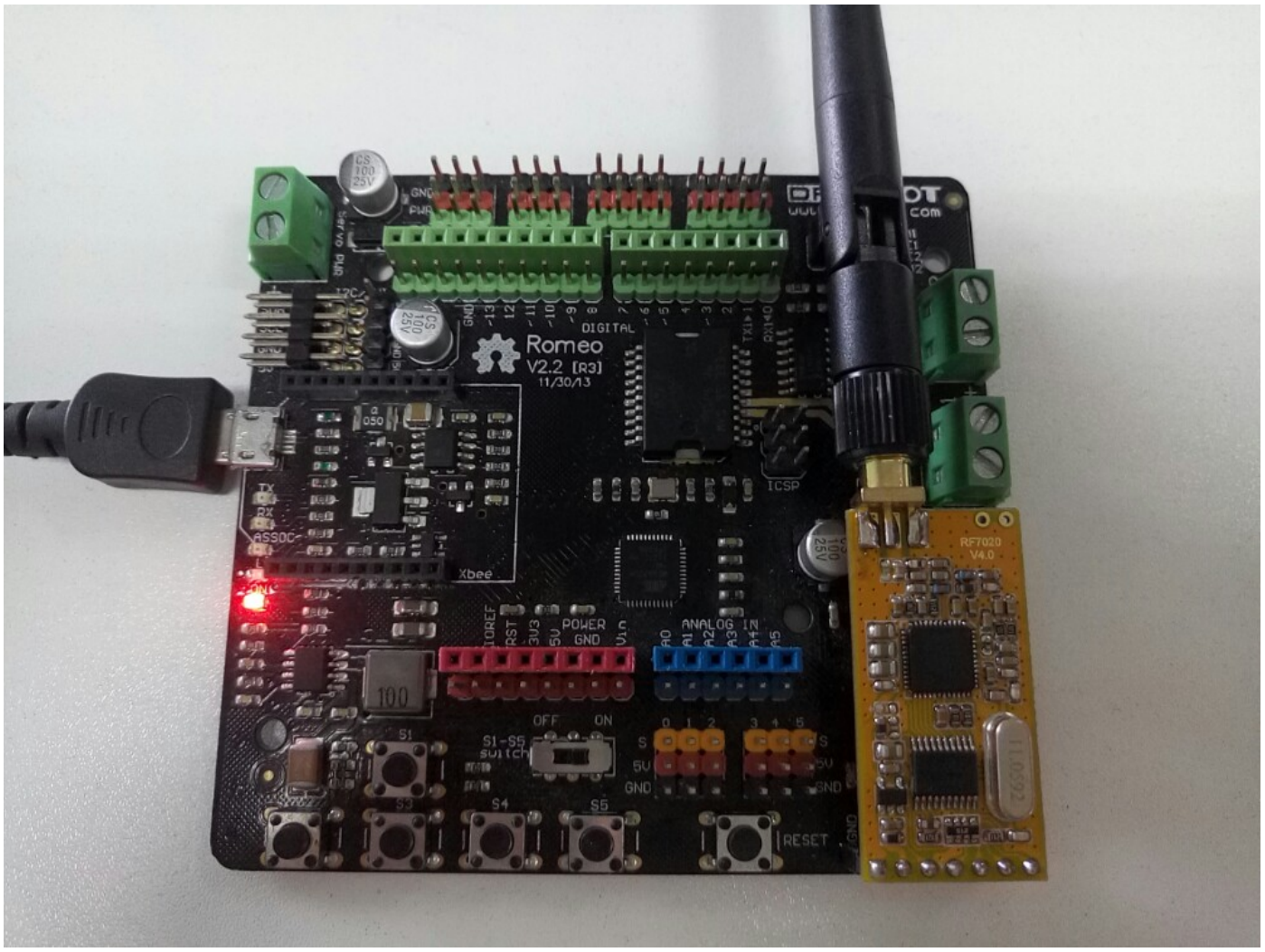
6) Set the other APC220 module again in the same way, with the same parameter setting.

Communication Test

1) Plug one module in to your PC, and plug another one in to your Arduino.



One on computer to **receive** “Hello”



Another on computer to **send** “Hello”

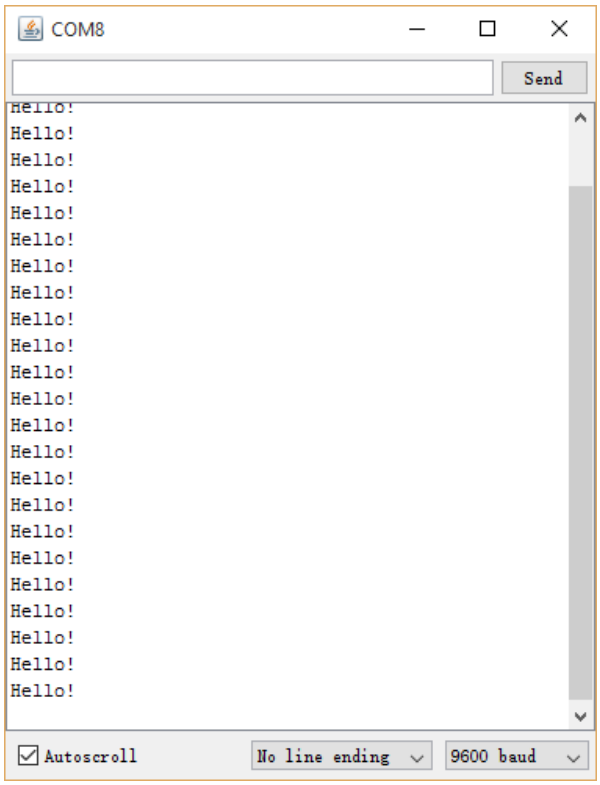
2) Upload the code below to Arduino (**Leonardo** here we use).

NOTE: Please revise the **Serial1** to **Serial** if your Arduino board is Uno, Bluno, Mega etc.

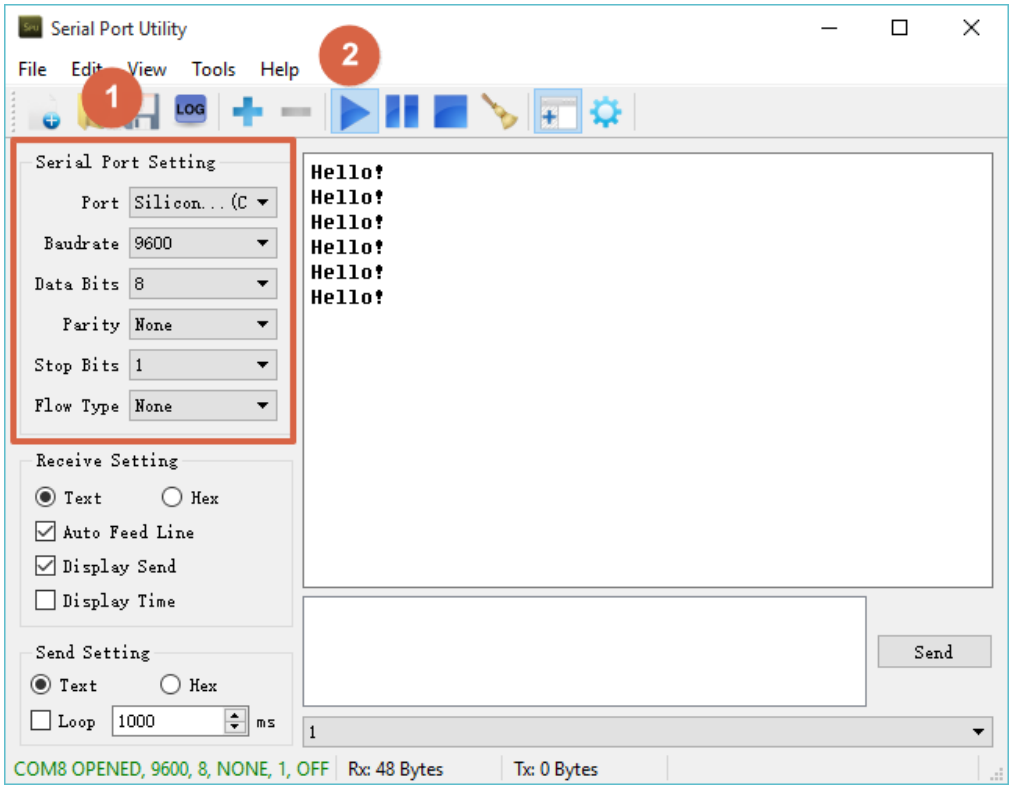
```
//The sketch is tested on: Romeo v2 (Leonardo)
void setup()
{
  Serial1.begin(9600);             //Set serial baud rate to 9600
}

void loop()
{
  Serial1.println("Hello!");           //print out hello string
  delay(1000);                  //1 second delay
}
```

3) Open **COM8** by Serial Assistant or on the Arduino IDE serial monitor (Note Arduino IDE 1.6.5 works abnormally). You will see "Hello" appear on your screen every second.



Arduino serial monitor on COM8(IDE 1.0.6)



Serial Assistant on COM8

FAQ

Q&A	Some general Arduino Problems/FAQ/Tips
Q1	Why I can not connect the APC220 module after I opened the RF-magic software on my Window/Linux?

Q&A	**Some general Arduino Problems/FAQ/Tips**

A1	If you are using Mac or Linux, please note: 1) Linux: The current on the 'En' pin of adapter is different when using the USB-Serial board on Linux. The same issue happens on **Mac**. The solution is **to not connect the En pin**, using a cable, or a handmade breakout board. 2) Windows (64-bit OS): You should set the RF-Magic program's compatibility to "windows XP (Service pack 3)" and "run this program as administrator"
Q2	I tried to test communication between two Arduino boards, but failed, any suggestions or example are appreciated?
A2	Check the that baudrate setting in your code and the APC220 modules are all the same, e.g. they are all be set to **9600**. Examples can be found here APC220 appliaction (https://www.dfrobot.com/forum/viewtopic.php?f=5&t=1497) on DFRobot Forum.
Q3	Driver issue on Windows, after I downloaded and installed the latest driver from Silicon Labs (http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx), it just can't be recognized by my computer properly, the USB-TTL adapter I use is a yellow one.
A3	The one with Yellow color but not Black is the old version, but the lastest driver should be compatible. Anyway, you could try this driver (https://github.com/leffhub/Storage4Share/raw/master/CP210x_VCP_Win2K_XP_S2K3.zip) instead.

For any question/advice/cool idea to share, please visit **DFRobot Forum** (https://www.dfrobot.com/forum/).

More Documents

- Communication between two Arduino boards. (https://www.dfrobot.com/forum/viewtopic.php?f=5&t=1497&p=7596&hilit=apc220#p7596)

Shopping from APC220 Radio Communication Module (https://www.dfrobot.com/product-57.html) or **DFRobot Distributor**. (https://www.dfrobot.com/index.php?route=information/distributorslogo)

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