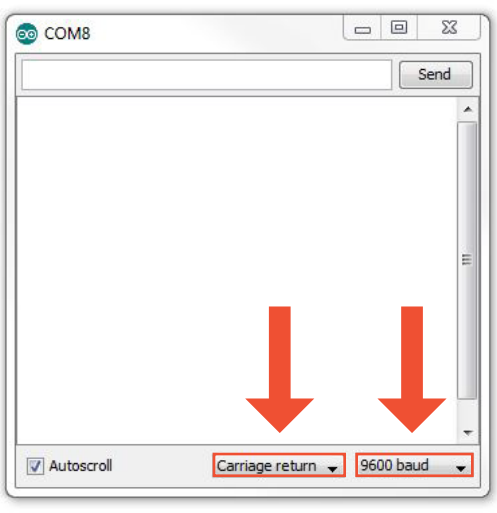
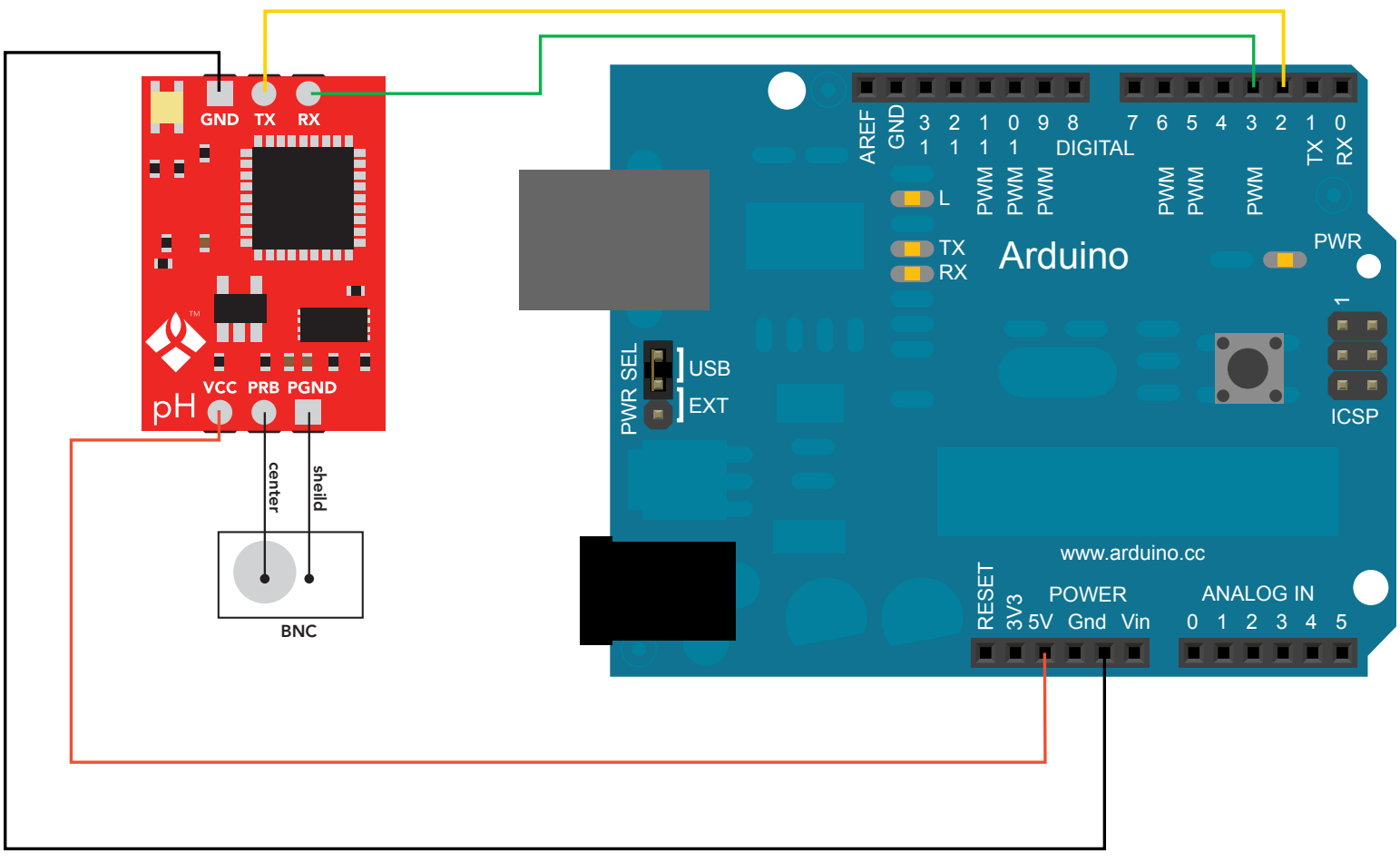
Arduino pH Sample Code




```
//This code has intentionally has been written to be overly lengthy
//and includes unnecessary steps. Many parts of this code can be truncated.
//This code was written to be easy to understand. Code efficiency was not considered.
//Modify this code as you see fit. This code will output data to the Arduino serial monitor.
//Type commands into the Arduino serial monitor to control the pH circuit.
//set the var Arduino_only to equal 1 to watch the Arduino take over control
//of the pH circuit.
```

```
//As of 11/6/14 the default baud rate has changed to 9600.
//The old default baud rate was 38400.
```




```
#include <SoftwareSerial.h>          //we have to include the SoftwareSerial library, or else we can't use it.
#define rx 2                         //define what pin rx is going to be.
#define tx 3                         //define what pin Tx is going to be.

SoftwareSerial myserial(rx, tx);     //define how the soft serial port is going to work.
```

```
char ph_data[20];                    //we make a 20 byte character array to hold incoming data from the pH.
char computerdata[20];               //we make a 20 byte character array to hold incoming data from a pc/mac/other.
byte received_from_computer=0;       //we need to know how many characters have been received.
byte received_from_sensor=0;         //we need to know how many characters have been received.
byte arduino_only=0;                 //if you would like to operate the pH Circuit with the Arduino
                                     //only and not use the serial monitor to send it commands set this to 1.
                                     //The data will still come out on the serial monitor, so you can see it working.

byte startup=0;                      //used to make sure the Arduino takes over control of the pH Circuit properly.
float ph=0;                          //used to make sure the Arduino takes over control of the pH Circuit properly.
byte string_received=0;              //used to identify when we have received a string from the pH circuit.
```

```
void setup(){
    Serial.begin(9600);              //enable the hardware serial port
    myserial.begin(9600);            //enable the software serial port
     }
```

```
 void serialEvent(){                                                    //this interrupt will trigger when the data coming from
                                                                        //the serial monitor(pc/mac/other) is received.
                                                                        //if Arduino_only does not equal 1 this function will
      if(arduino_only!=1){                                              //be bypassed.
       received_from_computer=Serial.readBytesUntil(13,computerdata,20); //we read the data sent from the serial monitor
                                                                        //(pc/mac/other) until we see a <CR>. We also count
                                                                        //how many characters have been received.
       computerdata[received_from_computer]=0;                          //we add a 0 to the spot in the array just after the last
                                                                        //character we received.. This will stop us from
                                                                        //transmitting incorrect data that may have been left
                                                                        //in the buffer.
       myserial.print(computerdata);                                    //we transmit the data received from the serial monitor
                                                                        //(pc/mac/other) through the soft serial port to the
                                                                        //pH Circuit.
       myserial.print('\r');                                            //all data sent to the pH Circuit must end with a <CR>.
      }
     }
```

```
void loop(){

 if(myserial.available() > 0){                                          //if we see that the pH Circuit has sent a character.
   received_from_sensor=myserial.readBytesUntil(13,ph_data,20);         //we read the data sent from pH Circuit until we see
                                                                        //a <CR>. We also count how many character have
                                                                        //been received.
   ph_data[received_from_sensor]=0;                                     //we add a 0 to the spot in the array just after the last
                                                                        //character we received. This will stop us from
                                                                        //transmitting incorrect data that may have been left
                                                                        //in the buffer.
   string_received=1;                                                   //a flag used when the Arduino is controlling the
                                                                        //pH Circuit to let us know that a complete string
                                                                        //has been received.
   Serial.println(ph_data)                                              //lets transmit that data received from the pH Circuit
                                                                        //to the serial monitor.
   }

 if(arduino_only==1){Arduino_Control();}                                //If the var arduino_only is set to one we will call this
                                                                        //function. Letting the Arduino take over control of
                                                                        //the pH Circuit


}
```

```
void Arduino_Control(){

    if(startup==0){                  //if the Arduino just booted up, we need to set some things up first.
      myserial.print("c,0\r");       //take the pH Circuit out of continues mode.
      delay(50);                     //on start up sometimes the first command is missed.
      myserial.print("c,0\r");       //so, let's send it twice.
      delay(50);                     //a short delay after the pH Circuit was taken out of continues mode is used to make sure we don't
                                     //over load it with commands.
      startup=1;                     //startup is completed, let's not do this again during normal operation.
    }
```

```
  delay(800);                        //we will take a reading ever 800ms. You can make this much longer or shorter if you like.
   myserial.print("R\r");            //send it the command to take a single reading.
   if(string_received==1){           //did we get data back from the ph Circuit?
     ph=atof(ph_data);               //many people ask us "how do I convert a sting into a float?" This is how...
     if(ph>=7.5){Serial.println("high\r");}  //This is the proof that it has been converted into a float.
     if(ph<7.5){Serial.println("low\r");}    //This is the proof that it has been converted into a float.
     string_received=0;}             //reset the string received flag.


}
```

```
//here are some functions you might find useful
//these functions are not enabled


void cal_s(){                        //calibrate to a pH of 7
  myserial.print("cal,mid,7\r");}     //send the "cal,mid,7" command to calibrate to a pH of 7.00

void cal_f(){                        //calibrate to a pH of 4
  myserial.print("cal,low,4\r");}     //send the "cal,low,4" command to calibrate to a pH of 4.00

void cal_t(){                        //calibrate to a pH of 10
  myserial.print("cal,high,10\r");}   //send the "cal,high,10" command to calibrate to a pH of 10.00

void phFactoryDefault(){             //factory defaults the pH circuit
  myserial.print("X\r");}            //send the "X" command to factory reset the device

void read_info(){                    //get device info
    myserial.print("I\r");}          //send the "I" command to query the information

void phSetLEDs(byte enabled)         //turn the LEDs on or off
{
  if(enabled)                        //if enabled is > 0
    myserial.print("L,1\r");         //the LED's will turn ON
  else                               //if enabled is 0
    myserial.print("L,0\r");         //the LED's will turn OFF
}
```

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