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Environmental Robotics

Conductivity I^2C Sample Code

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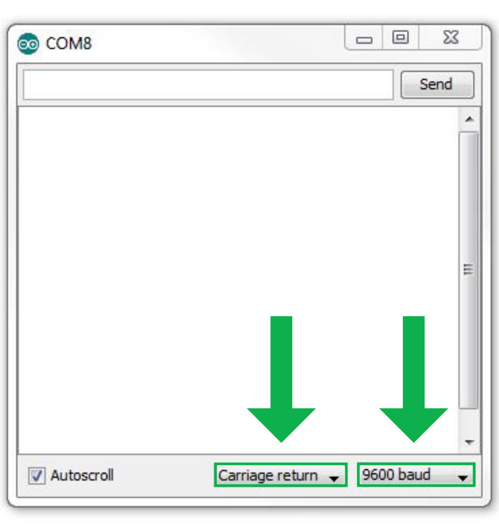

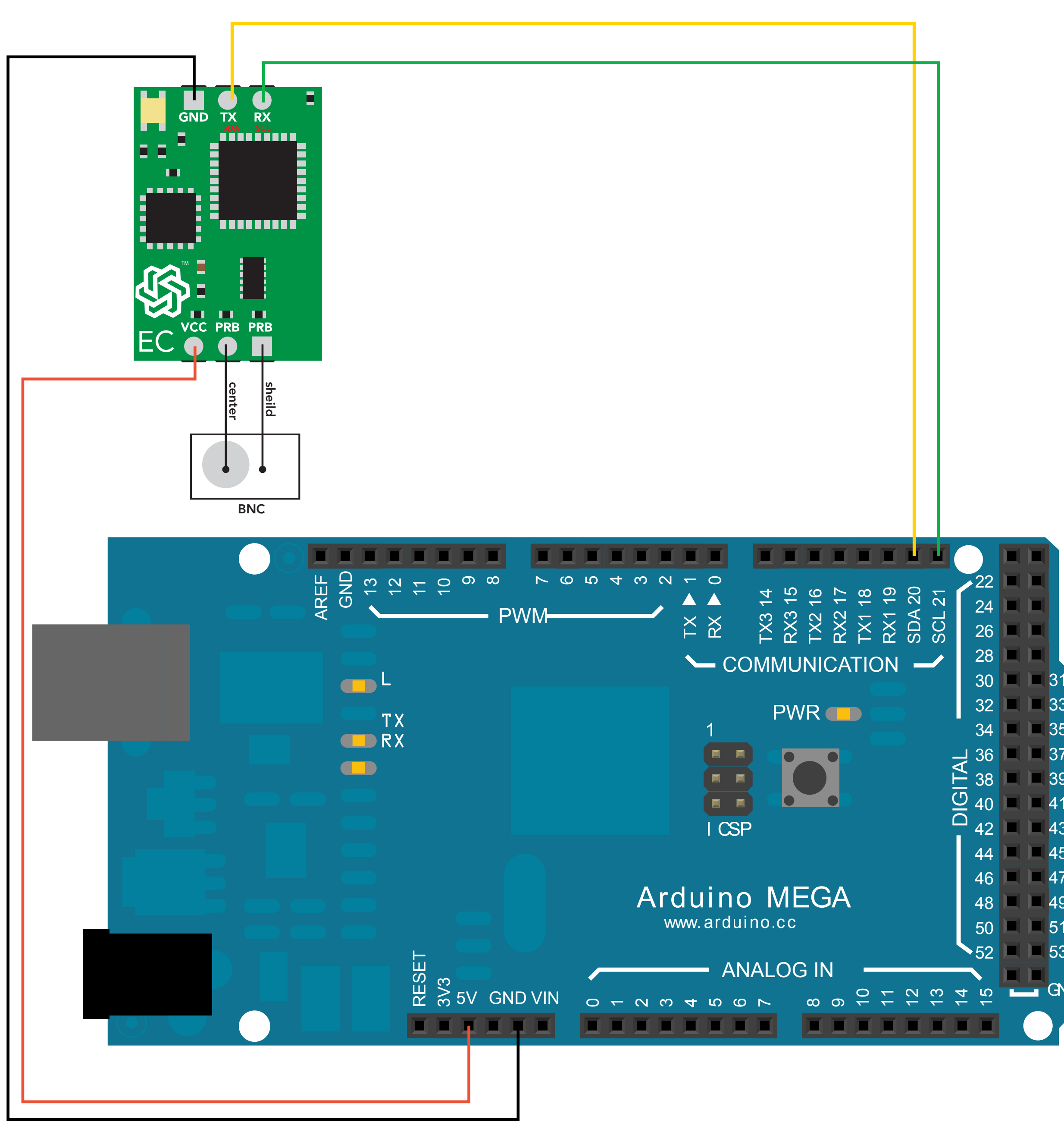

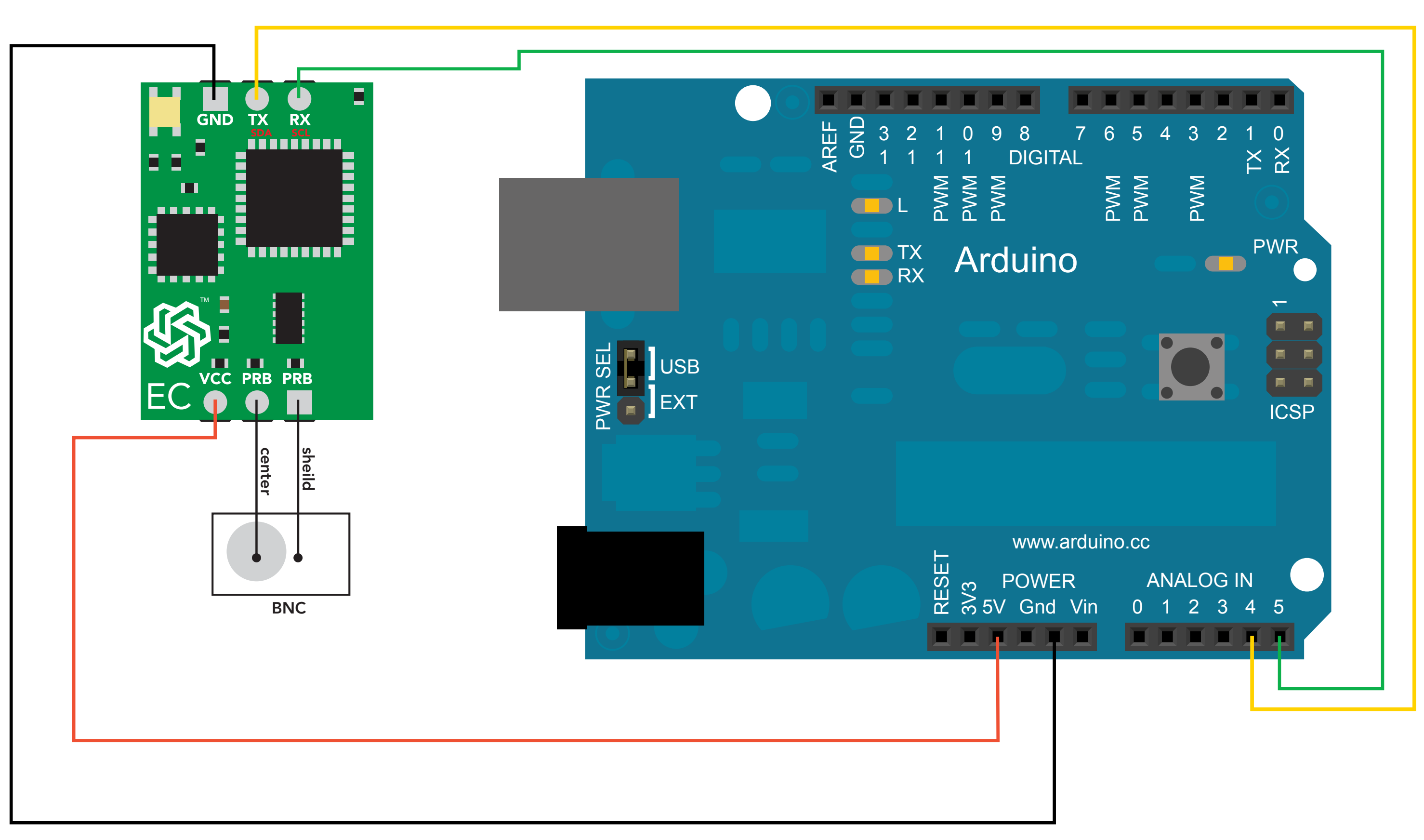

```
//**THIS CODE WILL WORK ON ANY ARDUINO**
//This code has intentionally has been written to be overly lengthy and includes unnecessary steps.
//Many parts of this code can be truncated. This code was written to be easy to understand.
//Code efficiency was not considered. Modify this code as you see fit.
//This code will output data to the Arduino serial monitor. Type commands into the Arduino serial monitor to control the EZO EC Circuit in I2C mode.


#include <Wire.h>                     //enable I2C.
#define address 100                   //default I2C ID number for EZO EC Circuit.


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 serial_event=0;                  //a flag to signal when data has been recived from the pc/mac/other.
byte code=0;                          //used to hold the I2C response code.
char ec_data[48];                     //we make a 48 byte character array to hold incoming data from the EC circuit.
byte in_char=0;                       //used as a 1 byte buffer to store in bound bytes from the EC Circuit.
byte i=0;                             //counter used for ec_data array.
int time=1400;                        //used to change the delay needed depending on the command sent to the EZO Class EC Circuit.

char *ec;                             //char pointer used in string parsing.
char *tds;                            //char pointer used in string parsing.
char *sal;                            //char pointer used in string parsing.
char *sg;                             //char pointer used in string parsing.

float ec_float;                       //float var used to hold the float value of the conductivity.
float tds_float;                      //float var used to hold the float value of the TDS.
float sal_float;                      //float var used to hold the float value of the salinity.
float sg_float;                       //float var used to hold the float value of the specific gravity.


void setup()                          //hardware initialization.
{
 Serial.begin(9600);                  //enable serial port.
 Wire.begin();                        //enable I2C port.
}


void serialEvent(){                                                  //this interrupt will trigger when the data coming from
      received_from_computer=Serial.readBytesUntil(13,computerdata,20); //the serial monitor(pc/mac/other) is received.
      computerdata[received_from_computer]=0;                        //we read the data sent from the serial monitor
      serial_event=1;                                                //(pc/mac/other) until we see a <CR>. We also count
     }                                                               //how many characters have been received.
                                                                     //stop the buffer from transmitting leftovers or garbage.


void loop(){                                                   //the main loop.

 if(serial_event){                                             //if the serial_event=1.
    if(computerdata[0]=='c'||computerdata[0]=='r')time=1400;   //if a command has been sent to calibrate or take a reading we
   else time=300;                                              //wait 1400ms so that the circuit has time to take the reading.
                                                               //if any other command has been sent we wait only 300ms.


  Wire.beginTransmission(address);          //call the circuit by its ID number.
  Wire.write(computerdata);                 //transmit the command that was sent through the serial port.
  Wire.endTransmission();                   //end the I2C data transmission.


  delay(time);                              //wait the correct amount of time for the circuit to complete its instruction.

  Wire.requestFrom(address,48,1);           //call the circuit and request 48 bytes (this is more then we need).
  code=Wire.read();                         //the first byte is the response code, we read this separately.


  switch (code){                            //switch case based on what the response code is.
    case 1:                                 //decimal 1.
      Serial.println("Success");            //means the command was successful.
    break;                                  //exits the switch case.

   case 2:                                  //decimal 2.
     Serial.println("Failed");              //means the command has failed.
   break;                                   //exits the switch case.

   case 254:                                //decimal 254
     Serial.println("Pending");             //means the command has not yet been finished calculating.
   break;                                   //exits the switch case.

   case 255:                                //decimal 255.
     Serial.println("No Data");             //means there is no further data to send.
   break;                                   //exits the switch case.
  }


 while(Wire.available()){                   //are there bytes to receive.
  in_char = Wire.read();                    //receive a byte.
  ec_data[i]= in_char;                      //load this byte into our array.
  i+=1;                                     //incur the counter for the array element.
   if(in_char==0){                          //if we see that we have been sent a null command.
       Wire.endTransmission();              //reset the counter i to 0.
       break;                               //end the I2C data transmission.
       }                                    //exit the while loop.
  }


 Serial.println(ec_data);                   //print the data.
 serial_event=0;                            //reset the serial event flag.
 //if(computerdata[0]=='r') string_pars();  //Uncomment this function if you would like to break up the comma separated string
   }                                        //into its individual parts.
}


 void string_pars(){                        // this function will break up the CSV string into its 4 individual parts. EC|TDS|SAL|SG.
                                            //this is done using the C command "strtok".

  ec=strtok(ec_data, ",");                  //let's pars the string at each comma.
  tds=strtok(NULL, ",");                    //let's pars the string at each comma.
  sal=strtok(NULL, ",");                    //let's pars the string at each comma.
  sg=strtok(NULL, ",");                     //let's pars the string at each comma.

  Serial.print("EC:");                      //We now print each value we parsed separately.
  Serial.println(ec);                       //this is the EC value.

  Serial.print("TDS:");                     //We now print each value we parsed separately.
  Serial.println(tds);                      //this is the TDS value.

  Serial.print("SAL:");                     //We now print each value we parsed separately.
  Serial.println(sal);                      //this is the salinity value.

  Serial.print("SG:");                      //We now print each value we parsed separately.
  Serial.println(sg);                       //this is the specific gravity value.


 //Uncomment this section if you want to take the values and convert them into floating point number.
   /*
   ec_float=atof(ec);
   tds_float=atof(tds);
   sal_float=atof(sal);
   sg_float=atof(sg);
   */
 }
```

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