RB-Pra-06

BNC pH Sensor Shield for Arduino

Description

Give your Arduino the ability to measure pH and ORP with the BNC sensor shield. The simple configuration means you can be up and running in no time!

Over a year in the making (with quite a few revisions) the final BNC sensor shield offers rock solid stable readings and easy configuration.

There has been a lot of thought put into this shield to make it as robust as it can be. You can select which analog pin to read from, two 90 degree trimpots mean you can re-configure on the fly and there is support for 12 bit readings via soldering in an MCP3202. Two power LED's show you the status of the entire circuit (positive and negative rails).

Uses:

- Aquariums
- Gardening projects
- Hydroponics
- Aquaponics
- Weather (measure the pH of your rainfall)
- Anything you want to get a pH or ORP reading from!

Features:

- Analog inputs are pinned out. You can select which analog pin to read from
- 2 variable resistors for rough and fine tuning of the signal
- Stackable
- MCP3202 available for 12bit spi hookup (not standard)
- Easily read any probe that produces minute voltages (pH, ORP etc.)

Compatibility:

- Arduino Uno
- Arduino Duemilanove
- Arduino Mega (reports say it works great)
- Any Arduino clone that is pin compatible with the Arduino Uno/Duemilanove (it will say so in the description)

Comes With:

- 1 BNC sensor shield (Assembled)

Parts Needed:

- 0.1uf cap x 8
- 1M ohm pot x 1
- 1000uf x 6.3v x 2
- TL072 x 1
- TC1121 x 1
- BNC Connector x 1
- 10K Pot x 1
- 41.2K resistor x 1
- 1K Resistor x 3
- 10K Resistor x 6
- 100K Resistor x 1
- Board x 1
- 8 Pin Header x 2
- 6 Pin Header x 2
- Reset Button x 1
- Jumper x 1
- Headers x 1
- 5.1V Zener Diode x 1

Sample Code

This sample code takes 50 samples from the analog pin and averages them out. It then converts that analog value into a millivolt reading. Lastly, we figure out the pH by dividing by the gain, dividing by 59.2 (millivolts per pH step) and adding 7 to that total. For acids you may need to subtract 7 (need to check on that). Watch the configuration video for how to configure the shield as it's been updated to provide more detail.

```
// change this to whatever pin you've moved the jumper to

 int ph_pin = 5;

 //int for the averaged reading

 int reading;

 //int for conversion to millivolts

 int millivolts;

 //float for the ph value

 float ph_value;

 int i;

 // highly recommended that you hook everything up and check the arduino's voltage with a multimeter.

// It doesn't make that much of a difference, but

// if you want it to be highly accurate than do this step

#define ARDUINO_VOLTAGE 5.0

// PH_GAIN is (4000mv / (59.2 * 7)) // 4000mv is max output and 59.2 * 7 is the maximum range (in millivolts) for the ph probe.

#define PH_GAIN 9.6525


void setup() {

  Serial.begin(9600);

}
```

```
void loop() {

  //take a sample of 50 readings

  reading = 0;

  for(i = 1; i < 50; i++) {

    reading += analogRead(ph_pin);

    delay(10);

  }

  //average it out

  reading /= i;

  //convert to millivolts. remember for higher accuracy measure your arduino's

  //voltage with a multimeter and change ARDUINO_VOLTAGE

  millivolts = ((reading * ARDUINO_VOLTAGE) / 1024) * 1000;

  ph_value = ((millivolts / PH_GAIN) / 59.2) + 7;

  Serial.print("pH= ");

  Serial.println(ph_value);

  delay(500);

}
```