

```
/*
measuring resistance on digital Pin. tie the analog pin to the digital pin to ensure that the digital pin
is working correctly.
once everything is working you can free up and get rid of the analog pin.
*/
```

```
double arduinoVoltage = 4.94;
```

```
int Vpin = A0;
```

```
int digitalPin = 12;
```

```
int analogValuePrior = 0;
```

```
int analogValueAfter = 0;
```

```
void setup() {
```

```
  Serial.begin(9600);
```

```
  delay(100);
```

```
  Serial.print("on");
```

```
}
```

```
void loop() {
```

```
  Serial.print("resistance: ");
```

```
  Serial.println(measureOhms(digitalPin));
```

```
  Serial.print("ohms");
```

```
  // Serial.print("time MicroSec: ");
```

```
  //Serial.println(timeMicroSec); //the 5.37 is a correction due to the fact that the counter has loop
time, so the counter is off.
```

```
  //should be linear though, which only needs a linear correction (checked with +-5% accuracy from 33k -
500k)
```

```
  Serial.print("voltage prior: ");
```

```
  Serial.println(analogValuePrior/1023.*arduinoVoltage);
```

```
  Serial.print("voltage after: ");
```

```
  Serial.println(analogValueAfter/1023.*arduinoVoltage);
```

```
  Serial.print("\n\n");
```

```
  delay(500);
```

```
}
```

```
double measureOhms(int pinNum){ //pinNum is the digital i/o pin
```

```
  double timeStart = 0;
```

```
  double timeEnd = 0;
```

```
  double timeMicroSec = 0;
```

```
  timeMicroSec = 0;
```

```
  pinMode(pinNum, OUTPUT);
```

```
  digitalWrite(pinNum, LOW);
```

```
  delay(2); //discharge the cap
```

```
  pinMode(pinNum, INPUT);
```

```
  //timeMicroSec = pulseIn(pinNum, LOW);
```

```
  analogValuePrior = analogRead(Vpin);
```

```
  timeStart = micros();
```

```
  while(digitalRead(pinNum) == LOW){} //wait for the pin to go HIGH
```

```
  timeEnd = micros();
```

```
  analogValueAfter = analogRead(Vpin);
```

```
  timeMicroSec = timeEnd - timeStart;
```

```
  return convertToResist(timeMicroSec);
```

```
}
```

```
double convertToResist(double timeMicroSec){  
  
    double voltageTrigger = 2.55; //value that the arduino will consider digital in as HIGH  
    //double Vin = 4.94;  
    double capacitorUF = .1; // value of capacitor in micro farads (larger cap means you can measure lower  
    resistance resistors)  
  
    return ( pow( -log(-voltageTrigger/arduinoVoltage + 1)*capacitorUF/(timeMicroSec), -1) );  
}
```