Current-Sensing with Allegro ACS714 Hall-Effect-Sensor

Schematic:

```
        ----- [CurrentSensor] -----
        |            |            |
  [Analog Pin 0]    [Ground]    [+5v]
```

```
int AnalogInputPin = 0; // Define analog input pin

//
-----------------------------------------------------------------------------------------------

void setup(){

  Serial.begin(9600);
}

void loop(){

  double Current = currentSensor(analogRead(AnalogInputPin));  // Read  analog value
  Serial.print(", VariationFromNull: ");
  printDouble(Current, 2);                                     // display Current
  Serial.print(" A");
  Serial.println("");
  delay(1000);
}

//
-----------------------------------------------------------------------------------------------

// Print decimal numbers

void printDouble(double val, byte precision) {

  Serial.print (int(val));                                     // Print int part
  if( precision > 0) {                                         // Print decimal part
    Serial.print(".");
    unsigned long frac, mult = 1;
    byte padding = precision -1;
    while(precision--) mult *=10;
    if(val >= 0) frac = (val - int(val)) * mult; else frac = (int(val) - val) * mult;
    unsigned long frac1 = frac;
    while(frac1 /= 10) padding--;
    while(padding--) Serial.print("0");
    Serial.print(frac,DEC) ;
  }
}
```

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```
// Read 1.1V reference against AVcc

long readInternalVcc() {

  long result;
  ADMUX = _BV(REFS0) | _BV(MUX3) | _BV(MUX2) | _BV(MUX1);
  delay(2);                                        // Wait for Vref to settle
  ADCSRA |= _BV(ADSC);                             // Convert
  while (bit_is_set(ADCSRA,ADSC));
  result = ADCL;
  result |= ADCH<<8;
  result = 1126400L / result;                      // Back-calculate AVcc in mV
  return result;
}

// Calculate current with Allegro ACS714

double currentSensor(int RawADC) {

  int    Sensitivity    = 66; // mV/A
  long   InternalVcc    = readInternalVcc();
  double ZeroCurrentVcc = InternalVcc / 2;
  double SensedVoltage  = (RawADC * InternalVcc) / 1024;
  double Difference     = SensedVoltage - ZeroCurrentVcc;
  double SensedCurrent  = Difference / Sensitivity;
  Serial.print("ADC: ");
  Serial.print(RawADC);
  Serial.print("/1024");
  Serial.print(", Sensed Voltage: ");
  printDouble(SensedVoltage, 1);
  Serial.print("mV");
  Serial.print(", 0A at: ");
  printDouble(ZeroCurrentVcc, 1);
  Serial.print("mV");
  return SensedCurrent;                            // Return the Current
}
```

by wildblue (http://playground.arduino.cc/Profiles/Wildblue)

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