electric wool

Just another DIY electronics blog

S0 measurement value acquisition of electricity meters

Some newer electricity meters are equipped with an optocoupler that delivers a pulse for each watt-hour consumed (1000 pulses = 1 kWh). Connecting it to an Arduino is therefore simple: set the meter's D+ output to 5V and connect the D- output to a digital input on the Arduino. This input must be grounded with a 4kΩ resistor to obtain a clear signal.

To display the current wattage, the Arduino counts the milliseconds between two edges on the input. With 1000 pulses per kWh, 3600 milliseconds between edges corresponds to a connected load with 1000 watts.

```
/** Utility for evaluating the counters
* A maximum of 8 S0 meters can be connected, which are equipped with the following protocc
* output to the serial interface:
*
* byte0 byte1 byte2 byte3 ...
* A-H    0-9       0-9       0-9        n
* Channel Millis Newline
*
* The millis are the milliseconds between the last two low-high edges
* on the specified channel.
*/
const byte counterPins[8] = { 2,3,4,5,6,7,8,9 };
unsigned long millisBetween[8];
unsigned long lastMillis[8];
byte lastState[8];
```

```
void setup() {
  for (byte i = 0; i < sizeof(counterPins); i++) {
     pinMode(counterPins[i], INPUT);
     digitalWrite(counterPins[i], LOW);
     millisBetween[i] = 0;
     lastMillis[i] = 0;
     lastState[i] = 0;
  }
  Serial.begin(9600);
}

void loop() {
  unsigned char bitMaskToSend = 0;
  unsigned long time = millis();
  for (byte i = 0; i < 8; i++) {
     byte val = digitalRead(counterPins[i]);
     if (val == HIGH && lastState[i] == LOW) {
       millisBetween[i] = time-lastMillis[i];
       lastMillis[i] = time;
       bitSet(bitMaskToSend, i);
     }
     lastState[i] = val;
  }
  for (byte i = 0; i < 8; i++) {
     unsigned long dataToWrite = millisBetween[i];
     if (bitRead(bitMaskToSend,i)) {
       Serial.print((char)('A'+i));
       Serial.println(dataToWrite);
     }
  }
}
```

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2 thoughts on “ S0 measurement value recording of electricity meters ”

induce

27.07.2011 at 00:07

Hi Wolle, arazer and I are currently working on a similar electricity meter project.
I hope you can still identify our nicknames from the hackerspace 😉 ..

We have an easymeter electricity meter with an infrared interface that outputs serial data, which is fed into a Schmitt trigger via a photodiode for signal amplification.
With such an electricity meter, you can make everything digital right away and don't have to set new values even in the event of a power outage or controller failure, because you can directly evaluate the internal meter reading.
The code is finished and running for the D0 interface. If you're interested, we can gladly provide you with the EAGLE files and code.

hack on.arazer
+ induce

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electric wool
27.07.2011 at 00:42

Sounds good, but my solution is about recording actual data and with 8 meters, the simple meters from B+G are simply unbeatable value for money.
