Raspberry Pi Spy

Raspberry Pi tutorials, scripts, help and downloads

Raspberry Pi 1- Wire Digital Thermometer Sensor

Posted on March 15, 2013 by Matt

While searching for a simple way to measure temperature using my Raspberry Pi I came across the DS18B20 1-wire digital temperature sensor. This promised an accurate way of measuring temperature with a few wires and almost no external components. The device only cost a few pounds and it seemed too good to be true.
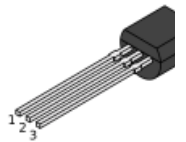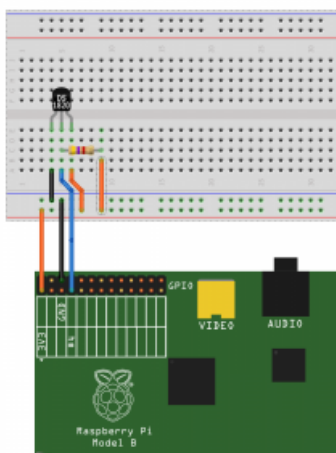
So I bought one. Within a few minutes I was measuring the temperature with it. It is so simple to use and the perfect starting point for creating a Raspberry Pi based temperature data logger.

The diagram on the right shows the DS18B20 device. It has three pins and comes in a TO-92 package which means it looks similar to other devices you may have used such as transistors.

Pin 1 is Ground. Pin 2 is the data pin and Pin 3 is the power pin. The only external component required is a single 4.7Kohm resistor.

In my testing I didn't have one of these so I used 2 x 2.2Kohm resistors in series. This worked fine.

I used a small piece of breadboard and some jumper cables to connect it to the GPIO header on my Raspberry Pi.

Pin 1 was connected to P1-06 (Ground)

Pin 2 was connected to P1-07 (GPIO4)

Pin 3 was connected to P1-01 (3.3V)

A 4.7Kohm resistor was placed between Pin 2 and Pin 3.

It is important to double check that you don't confuse Pin 1 and Pin 3 on the device otherwise the power will be applied the wrong way round!

DS18B20 Temperature Sensor

Once you have connected everything together you can power up your Raspberry

It's always best to tackle new projects with an updated SD card. I tend to use the latest Raspbian image from the RaspberryPi.org download page and then update it from time to time using the following two commands :

```
1   sudo apt-get update
2   sudo apt-get upgrade
```

In order to configure the sensor you just need to run the following commands at the command prompt :

```
1   sudo modprobe w1-gpio
2   sudo modprobe w1-therm
```

Hopefully this will have set up the device to report its temperature via GPIO4. Use the commands below to go to directory that contains the detected 1-wire devices :

```
1   cd /sys/bus/w1/devices
2   ls
```

This will list the directories associated with your 1-wire devices. Each one has a unique ID and in my case it is 28-00000482b243. Your ID will be different so be sure to use that in the example code below. Using "cd" we can change to the temperature sensor directory, list the contents and then view the "w1_slave" file :

```
1   cd 28-00000482b243
2   ls
3   cat w1_slave
```

The complete command line setup process looks like this :

DS18B20 Command Line Setup

The "w1_slave" file contains a bunch of data but the "t=23062″ at the end is the temperature reading. In this example the temperature is 23.062 degrees Celsius (centigrade).

Try touching the sensor with your finger and then using "cat w1_slave" to take another reading …

This technique is also described on Adafruits DS18B20 page and a great DS18B20 tutorial from the University of Cambridge Computer Lab.

My next project will be using this setup to create a simple temperature data logger.

g+1 77   10   Gefällt mir 126   5

This entry was posted in Hardware, Tutorials & Help and tagged DS18B20, sensor, temperature. Bookmark the permalink.