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DHT22 Temperature / Humidity Sensor

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by **Davespice** » Mon Mar 24, 2014 10:47 am

Hi everyone;

Does anyone know of a reliable DHT22 driver for the Pi? I'm currently using one from here;

https://github.com/adafruit/Adafruit-Ra ... ver_Python

and here (which I think is the same as the Adafruit one)

https://github.com/tomhartley/AirPi/tree/master/sensors

There are issues with reading data back from the sensor, occasionally the read fails or the crc fails. You can see in the air Pi code they've got extra Python to mitigate the effect of this. I may have a go at rewriting it myself but I am wondering if anyone knows of anything more solid that exists already.

Thanks in advance!

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Posts: 1463

Joined: Fri Oct 14, 2011
8:06 pm

Location: London, United
Kingdom

-

by **joan** » Mon Mar 24, 2014 10:49 am

viewtopic.php?p=515575#p515575

Posts: 7007

Joined: Thu Jul 05, 2012
5:09 pm

Location: UK

by **Davespice** » Mon Mar 24, 2014 11:31 am

It seems you have the same issue as me Joan, I've had it lock up quite a few times. From that thread I'm not quite sure what you did to make it work?
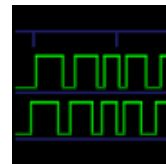
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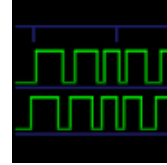**Quick Star　Downloads　Buy Codecs　Forum　FAQs　About**

8:06 pm

Location: London, United

Kingdom

- ☐

by **joan** » Mon Mar 24, 2014 12:32 pm

> Davespice wrote:It seems you have the same
> issue as me Joan, I've had it lock up quite a few
> times. From that thread I'm not quite sure what
> you did to make it work?

Posts: 7007

Joined: Thu Jul 05, 2012

5:09 pm

Location: UK

Currently I use an external pull-up to 3V3 through a 4K7 (from memory) resistor on the data line.
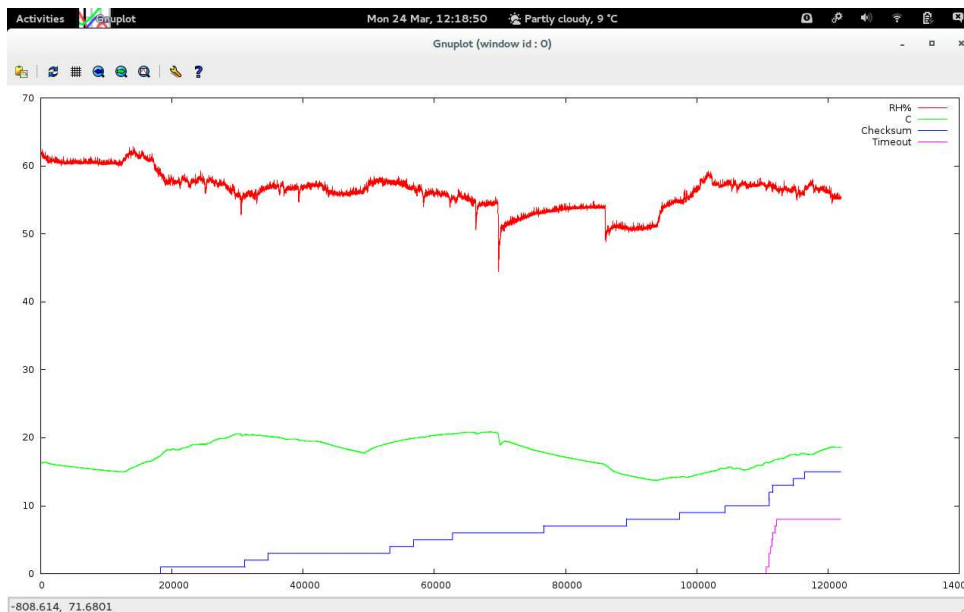
I think I've seen it lock up one time since. But that was after 100,000 readings.

My usage is not typical. I'm not really interested in the readings themselves - I'm mainly interested in how to interface to the chip.

Mine is on a breadboard with other stuff I need to use. Leaving it alone seems to work best.

DHT22-b.png (59.49 KiB) Viewed 4816 times

Checksum (15 total) and timeout (8 total) are cumulative error counts.

Note: The Adafruit code seems susceptible to software lock-ups. When I say lock-up I mean you can still be sending the trigger pulses but the sensor will not respond. When this happens I've tried other DHT22 software to see if they can re-start the sensor. I've had no success. I have to pull the plug.

by **Davespice** » Mon Mar 24, 2014 1:35 pm

> trigger pulses but the sensor will not respond.
> When this happens I've tried other DHT22
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8:06 pm

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Kingdom

This is what I currently have as my solution... I kick off a thread which takes the reading, monitor it for 10 seconds and if it hasn't returned then I os.popen("kill <pid>") to suicide the process. After that it's okay again. It means I'd have to crontab the readings though.

by **danjperron** » Tue Mar 25, 2014 11:44 pm
Well I was happy when Joan put his code but got problems with it.

Still didn't figure out was is wrong with it.

I used Joan's code in the crontab but I wasn't able to run more than 6 hours without hang.

My Raspberry Pi had a lot to do ,mjpeg-streamer, 1 wire ds18b20 and pigpio on other routine to control R/C servo or relay.

I decide to run continually the python code in a loop by implementing it into /etc/rc.local. (A DHT22 reading every 30 seconds).
It is better! Still hang but less often.

The only good code I got was the one I created using the SPI. Maybe because the SPI method creates a clean signal with no transition glitch and does'nt care about cpu timing.

http://www.raspberrypi.org/forum/viewto ... 83#p506283

I don't want to use the SPI method. I want to spare the SPI for other thing.

Right now I will check if the voltage is an issue. (last hope). I will use 5V instead of 3.3V with the Adafruit voltage converter.

Otherwise I will use an extra gpio on the dht22 power. This way I will be able to power it off and on again.

Posts: 1242

Joined: Thu Dec 27, 2012
4:05 am

Location: Québec, Canada

by **joan** » Tue Mar 25, 2014 11:58 pm
@danjperron
I did find a fault in my code.

In a rare circumstance the watchdog isn't cancelled so the new reading gets timed out immediately. In that circumstance you can see on a 'scope that the DHT22 is still sending its bits, they are just being ignored. In a proper lock-up the DHT22 doesn't send its bits.

I've altered the logic to remove that bug. I've left mine running for several days now without problem.
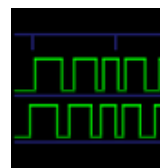
Posts: 7007

Joined: Thu Jul 05, 2012

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by **danjperron** » Wed Mar 26, 2014 1:03 am

Hi Joan,

When the DHT22 hang , Even if I reboot the RPi ,using sudo reboot, the DHT22 doesn't respond. I didn't check with a scope . Maybe I should. I also try to kill pigpiod and restart it and still no luck.

The only way to restore the DHT22 was to pull it out and re-insert it into the protoboard. This works all the time.
So I don't think it is a timeout issue. I put exclusive file lock to be certain that when I use the DHT22.py code , it is only one running. That was an issue on crontab. My python code was sometimes very slow to read the 1-wire ds18b20 sensors.

So to recap.

Adafruit's code doesn't work with mjpeg-streaming. Cpu timing is way out of wack.

The SPI code works all the time but you need the MISO and MOSI gpio with a diode. And you are can't use it for something else unless you add some 74hc4052 i.c to multiplex the SPI.

Your code works but got some DHT22 hangs for unknown reason. It is better in continuous mode (Maybe it won't hang if I read the device every 5 sec but I read it every 30 seconds).

I implement your DHT22.py and add a Read function. This way I import dht22.py and call the Read function only.

This is the Read function inside the DHT22.py

Code: <u>Select all</u>

```
    def Read(self):
      """ Read temperature and humidity """


      #force exclusive mode
      #if another script tries to read the dht22
      #it will have to wait


      #exclusive lock file in tmpfs folder
      fichierlock = "/tmp/DHT22Lock"


      #if the exclusive file doesn't exist
      #create it and make it r/w for all
      if not os.path.isfile(fichierlock):
        f = open(fichierlock,"w")
        f.close()
```

Posts: 1242

Joined: Thu Dec 27, 2012 4:05 am

Location: Québec, Canada

```python
        #Now try to get exclusivity on the file
        try:
            f = open(fichierlock,"w")
            fcntl.flock(f,fcntl.LOCK_EX)
            #write pid number into file for debug purpose
            f.write("{}".format(os.getpid()))
            f.flush()
        except IOError:
            print("ioerror")
            return [None,None]


        #First set data to None
        data=[None,None]


        #wait one second to be sure
        time.sleep(1.0)


        #start DHT22 conversion
        self.trigger()


        #wait a little
        time.sleep(0.2)


        #is the data OK?
        if not self.timed_out():
            if not self.bad_checksum():
                data[0]= self.temperature()
                data[1]= self.humidity()
        self.cancel()


        #remove exclusive file lock
        fcntl.lockf(f,fcntl.LOCK_UN)
        #remove pid number into file
        f.truncate(0)
        f.seek(0)
        #close exclusive file
        f.close()
        return data
```

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Is it possible that I got glitch because I use the pigpio on different python code. I got some
Php code, via pigpio tunnel, to move the camera R/C servo.

I will try the sensor with 5V and see if it is the real problem. Right Now at 3.3V it hangs every
~12 hours when the script start in the /etc/rc.local.

Daniel
by **joan** » Wed Mar 26, 2014 6:20 am
How odd.

Could you point me to the SPI code you are using? I'd like to know how that interacts with the
DHT22. Perhaps it is very picky about trigger timing. I'd like to find a pattern for the DHT22
going into unresponsive mode.

I have been doing readings at once a second. I have assumed the more often readings are
taken the more likely problems are.

Posts: 7007

Joined: Thu Jul 05, 2012
5:09 pm

Location: UK

by **danjperron** » Wed Mar 26, 2014 11:13 am
This is the post with the code and how to connect the 2 SPI gpios.

http://www.raspberrypi.org/forum/viewtopic.php?p=506283#p506283

The 5V didn't work ;-(I got a hang after one hour.

Posts: 1242

Joined: Thu Dec 27, 2012
4:05 am
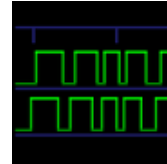
Location: Québec, Canada

I will change the period of scan to 5 seconds. B.T.W. Can't go faster , maybe 3 seconds.

My python code do stuff in this order

> 1-Read xml configuration file (which gpio go
> where).
> 2- Read Sensors (ds18b20, DHT22)
> 3- read all gpio level (pigpio.read(gpiopin))
> 4- Analyze data and set new relay information
> (temperature controller). The DHT22 is there
> only for info. Decision are made with the
> DS18B20 sensors.
> 5- Transfer relay info to corresponding gpio.
> 6- Create a running xml file. This file is used to
> create graphic,historic log and status information
> on web page.
> 7- wait loop
> 8- return to 1

Daniel
by **danjperron** » Thu Mar 27, 2014 2:04 am

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But I found that the VCC power from my power supply was out of specification with a 0.5V ripple at 4.65V.

I suspect the sensor was hanging when one on the relay activates. This was creating a voltage spike on
the 5V power and the DHT22 can't handle it.

The micro-usb cable was the problem!
I change the cable with a 30cm cable and now the 5V is inside the specification.

I will see if it will keep runnning for a long period.

Daniel
by **danjperron** » Mon Mar 31, 2014 2:47 am
Well no luck!

The DHT22 still hang time to time. Never more than a day.

I'm presently making an universal PIC module which will use RS-485 and should be ready to communicate with the DHT22 in a week.

I will see if the DHT22 hangs with a PIC cpu.

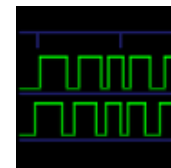Daniel
by **joan** » Mon Mar 31, 2014 7:29 am

> danjperron wrote:Well no luck!
>
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>
> Daniel

I still don't know if this is a software or hardware problem. I've had it running for over 200,000 samples and then it stops working. I'll leave it running with a 'scope going and see if anything obvious happens just before the hang.

It's the non-responsiveness of the chip which is puzzling.

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