Wireless Temperature Sensor 2.0

In this project you will build a powerful wireless temperature sensor that is capable of transmitting temperature readings over long distances to your Raspberry Pi. This product is basd on Texas Instruments CC1110 wireless transceiver which sports a micro-controller unit (MCU), memory, a sub-1GHz transceiver, an encryption engine and a USB controller (for the CC1111 based module). The product is very easy to use and transmits clear text temperature readings that can be received by your Raspberry Pi serial port via a Base Station Receiver unit.

This is our second generation wireless temperature sensor which has a number of advantages over generation 1:

- Quicker and easier build
- 35% smaller (36mm x 36mm x 15mm or 1.42" x 1.42" x 0.59")
- Better looking cream colored casing will look great in your environment
- Case is tightly sealed with chrome screws
- We have have a concerted effort to source high quality parts in large quantities allowing this device to be 20% cheaper than generation 1
- Simplified PCB that makes it easier to build, but also easy access to the device's serial port for our more advanced users who may want to upgrade or change firmware
- Weighing 18 grams it is 35% lighter

It has all the same features as generation 1:

- Log data to PrivateEyePi dashboard or any other cloud logging service
- Easy clear text communications. It can transmit to your Raspberry Pi fitted with a base station receiver and slice of Pi. Options also available for communicating with your PC.
- Is shipped in deep sleep mode which transmits temperature readings every 5 minutes (configurable) allowing for approx 1 year battery lifespan.

What you need

All of the following parts are available in our store in a single kit.

- Wireless temperature sensor (RF22):
  - 1 X Wireless transmitter & PCB
  - 1 x 10K Precision Thermistor (NTCLE100E3103JB0)
  - 2 x 10k resistors
  - 1 x Capacitor
  - 1 x CR2032 Battery holder
  - 1 x Elegant case with screws
  - 1 x Whip antennae
  - 1 x 3V CR2032 battery
- Base Station Receiver (RF01) - One per Raspberry PI or other micro controller. You can link unlimited sensors to one base station receiver.

How it works

The wireless temperature sensor will transmit the temperature at 5 minute intervals to the base station. The transmitter is optimized for extremely low current consumption so that it is able to last over a year on a single battery. The RF units are very powerful and should easily handle communications distances around a residential home. The transmitters come pre-configured with a unique number identifier that will be used to uniquely identify each sensor. You can find this number inside

the sensor case. This enables you to have as many wireless temperature sensors as you want (e.g. inside, outside, fridge etc…). The Python code required to read the temperatures from the serial communications stream is provided. We also provide the code to send the temperature value to the PrivateEyePi server to be displayed on your WWW dashboard; however this is not a mandatory part of this project. If you want a wireless temperature sensor for other projects then these steps will help you achieve that goal too.

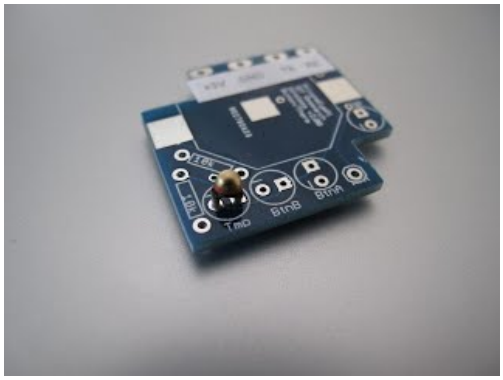
Construction

The following explains how to construct the wireless switch.

Construction should take about 20 mins and does not involve complex soldering procedures. Before soldering parts to the sensor make sure you have the correct part placed in the correct position as shown in each of the following images.Solder each part as close to the sensor as possible so you don't have any parts that are protruding and could prevent the sensor front fitting snugly into the case.

Solder each part as shown and clip off the remaining wire on the underside of the board with some wire clippers.

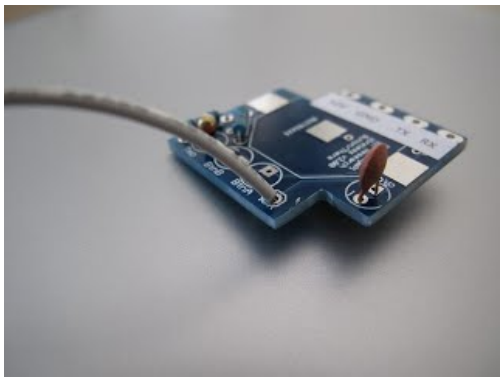
Step 1: Solder the 10k thermistor to the sensor



Step 2: Solder the 10k resisttors to the sensor

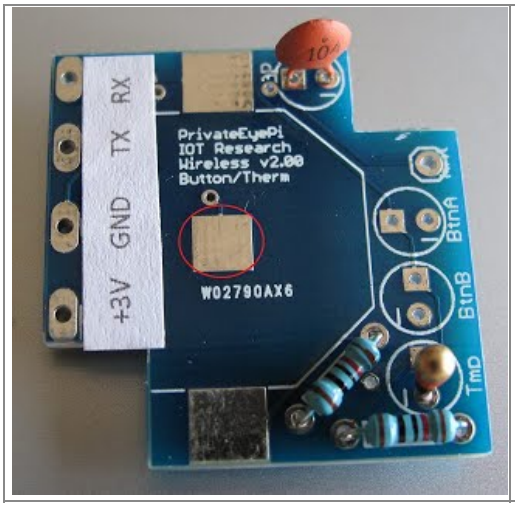
Step 3: Solder the capacitor to the sensor

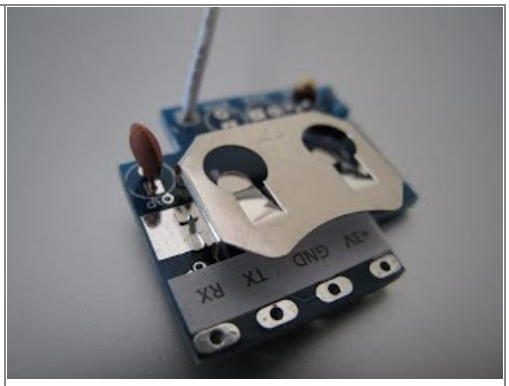
Step 4: Solder the antennae to the sensor



Step 5: Solder the battery holder to the sensor

Cover the pad shown below on the left hand side in the red circle with solder. This will ensure good contact is made between the negative surface of the battery and the holder. Then solder the holder to the sensor as shown on the right hand side below. Make sure you heat up the pad with the soldering iron for a few seconds before applying solder. This will help make a solid bond between the sensor pad and the holder. Use a considerable amount of solder that covers the whole pad and each leg of the holder. Pull the holder gently with your fingers to make sure it has good contact. If it pops off then re-solder it and repeat the exercise again until it is strongly attached.

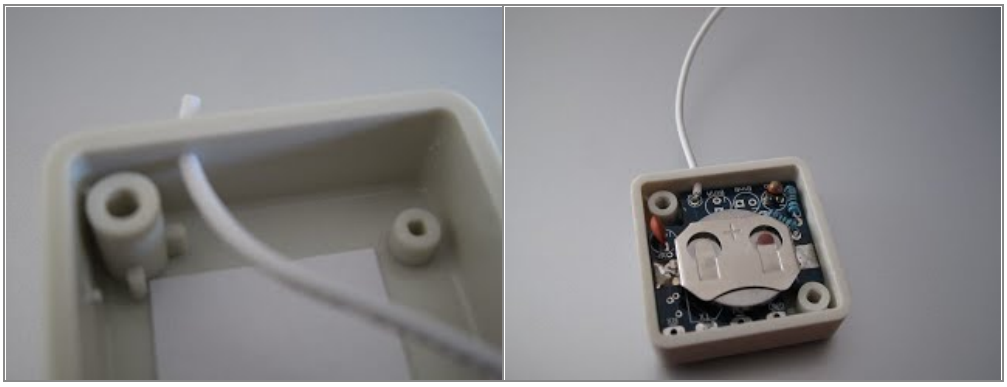




Step 6: Insert battery and place the sensor in the case.

Insert the CR2032 battery taking care to insert it the right way round. +VE terminal (the larger flat surface) facing up.

As shown on the left hand side below carefully thread the antennae through the hole in the case. Then place the sensor into the case taking care not to pinch the antennae wire between the case and the sensor as this could cut the antennae. You may need to gently press the sensor into the case as the width dimensions of the sensor are exactly the same as the inside of the case.The sensor sits snugly into the case and will not rattle around.



Step 7 : Close the case

Fasten the base of the case using the two screws that came with your kit as shown below.

That's it! Now you are ready to configure your Raspberry Pi to receive the temperature readings. Follow the steps outlined on our wireless sensor page.

Comments

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