

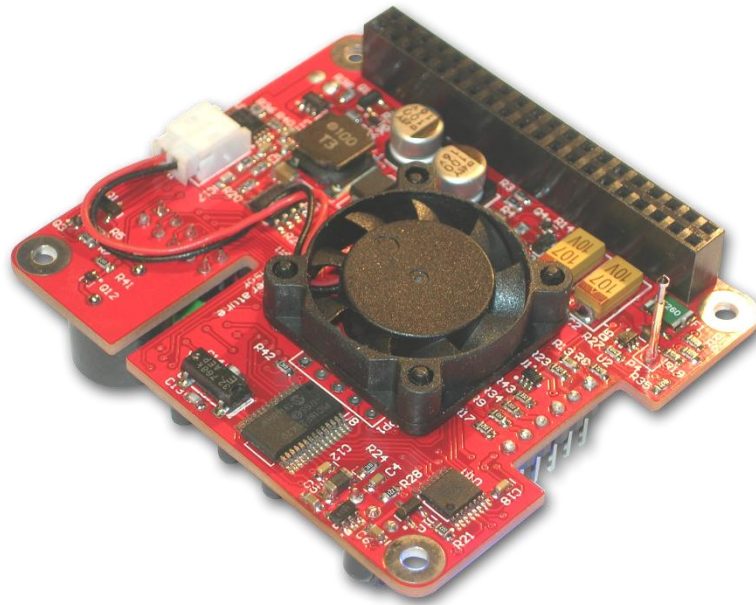
Pico fan Kit

Pulse width modulated fan Kit with **I²C**
control Interface

for use with

Raspberry Pi[®] B+, A+, B, and A

works with UPS Pico installed



HAT Compliant

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Pico fan Kit Assembly Manual V1.0

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System Overview

Introduction

The **Pico fan Kit** is an Advanced Active Cooling System for the Raspberry Pi[®] that can be easily installed on the **UPS Pico**. It is suitable for all Raspberry Pi[®] users whose boards reach a high temperature, for whatever reason. There is no need for any additional cabling or power supply, as the **Pico fan** is directly powered and controlled via **UPS Pico** supervising circuits. A small hand work is needed in order to install the **Pico fan**, solder an additional temperature sensor, as also the connector for the **Pico fan** to the **UPS Pico** board. All the required parts are included in the kit.

The **Pico fan Kit** is equipped with an embedded temperature measurement system that continuously checks the Raspberry Pi[®] PCB temperature with a dedicated sensor; according to the measured temperature, the micro controller starts, stops, or regulates the rotational speed of the embedded micro-fan.

Thanks to the **Special Air Distribution Slots** on the **UPS Pico** PCB , the **Pico fan** cools not only the microprocessor on the Raspberry Pi[®] board but all the heat-generating devices, as well as the whole Raspberry Pi[®] PCB and **UPS Pico**.

The embedded microcontroller is easily accessible by the user through the I²C interface and allows reading of the measured temperature, setting of temperature threshold, as well as starting/stopping/changing the speed of the embedded micro fan. The **Pico fan** is ultra low noise and its speed is PWM-regulated with the following levels: 0 %, 25%, 50%, 75% and 100%.

Applications

The **UPS Pico** fan kit takes advantage of the Automatic Temperature Control **PWM fan controller** implemented by the **UPS Pico** and enables the use of the Raspberry Pi[®] in extreme conditions including very high temperature environments.

Features

- Powered from the J8 (P1) connector of the Raspberry Pi[®] via **UPS Pico**
- **PWM fan** speed regulation
- Status displayed via the red LED on the **UPS Pico** board (lit = hot, not lit = cold enough)
- Full control over the system via I2C interface (the PiCO Interface):
 - Unconditional Fan **ON/OFF**
 - **PWM fan** speed regulation
 - Temperature threshold set/get
 - Current System Temperature read
- Supports Celsius and Fahrenheit scale
- Can be used inside of most already existing cases

Kit Contents:

1. Micro Fan with cable
2. Set of 4 pcs of tree clips required for **Pico fan** mounting on the **UPS Pico** PCB
3. Set of 4 pcs of rubber washers required for the **Pico fan** mounting on the **UPS Pico** PCB
4. TO-92 Temperature sensor
5. 2mm PCB connector for the fan

Case Fitment

The **Pico fan** is very low profile, placed on the **UPS Pico** bottom side, so it will fit to most cases.

Assembly Instructions

In order to assemble the **Pico Fan Kit**, a very simple hand work is required. All the required parts are contained in the **Pico Fan Kit** box. Only some basic tools are needed:

1. Soldering Station (or simple soldering tool)
2. Cutting Pliers
3. Cutting Blade
4. Tweezers



Figure 1 Tools required for the Pico fan Kit assembly

The following steps need to be done in order to complete the setup of the **Pico Fan** Kit.

Remove all **Pico fan** Kit parts from the packing box

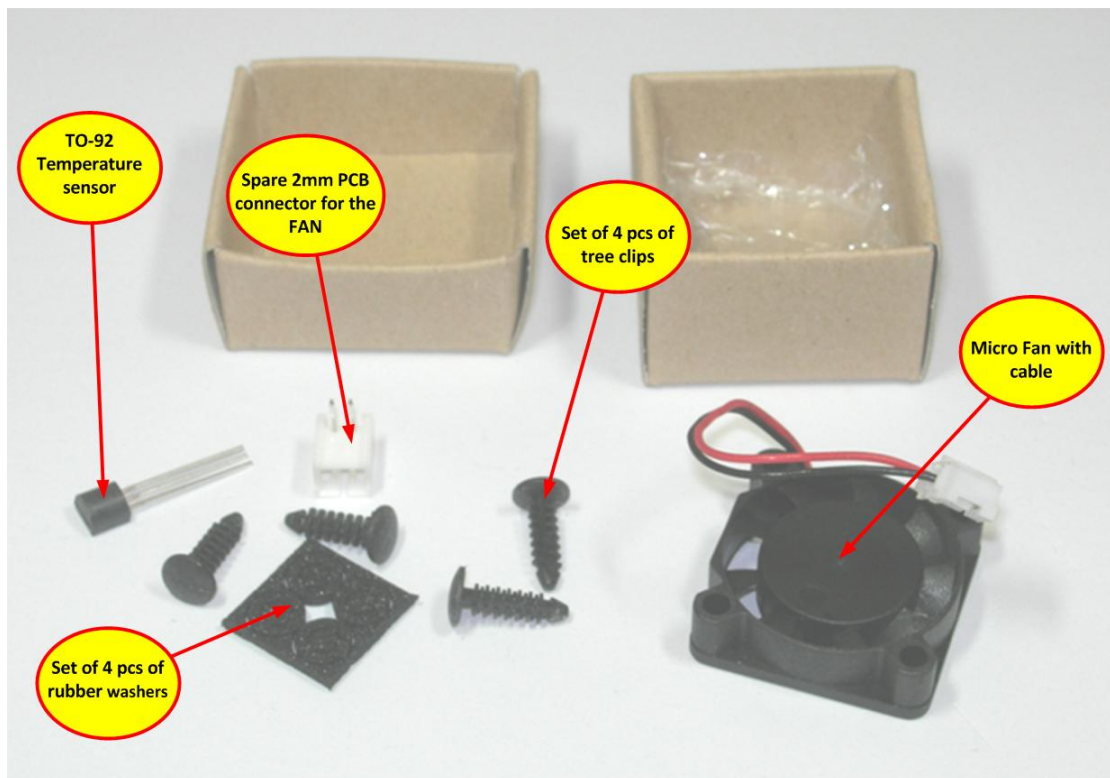


Figure 2 Pico fan Kit parts

The above shown in the picture parts should be found in the box. There are:

1. Micro fan with cable
2. Set of 4 pcs of tree clips required for **Pico fan** mounting on the **UPS Pico** PCB
3. Set of 4 pcs of rubber washers required for the **Pico fan** mounting on the **UPS Pico** PCB
4. TO-92 Temperature sensor
5. Spare 2mm PCB connector for the fan.

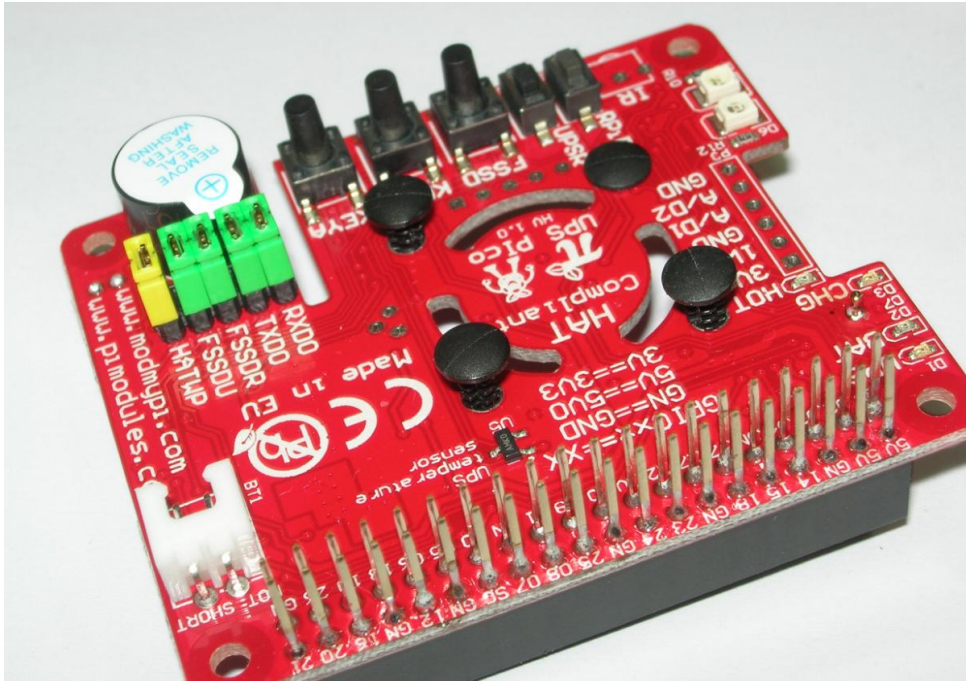


Figure 3 Placing of the tree clips on the UPS Pico PCB

Start by putting through the holes the 4 pcs of tree clips – one by one – on the **UPS Pico** PCB as shown on the picture above.

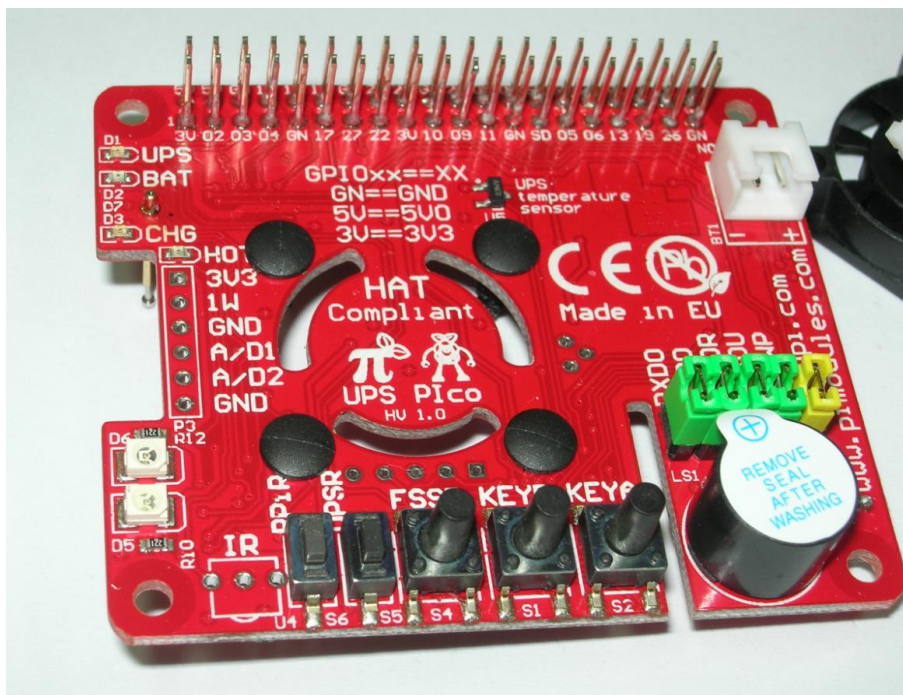


Figure 4 Tree clips placed on the UPS Pico PCB top side

The placed tree clips will look like on below picture on the bottom side of the **UPS Pico** PCB.

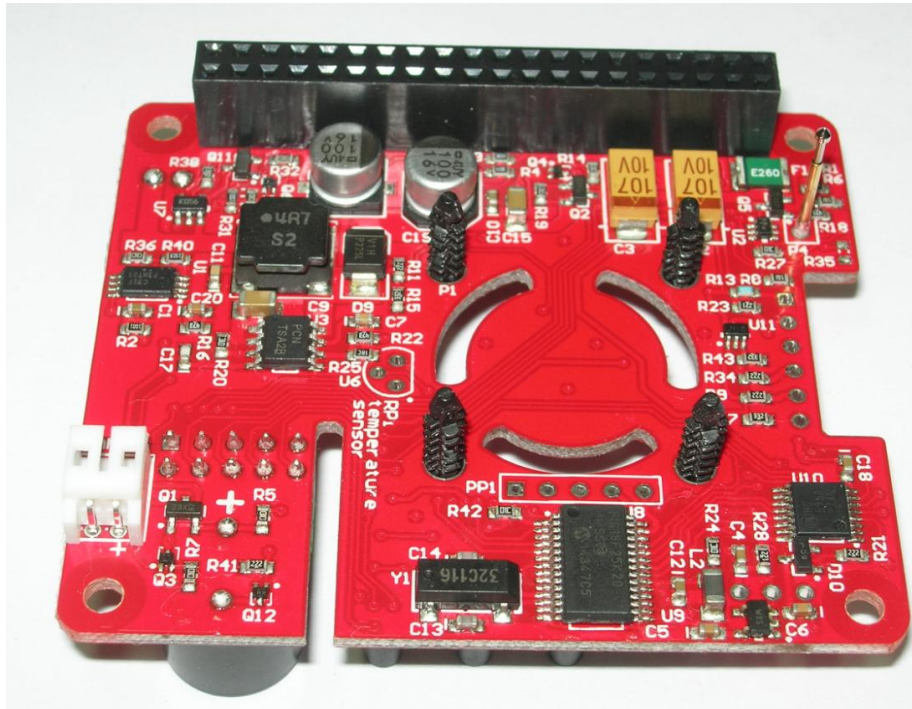


Figure 5 Tree clips placed on the UPS Pico PCB bottom side

Then start to prepare the 4 pcs of rubber washers. Place on the table the rubber with pre-cut washers, and using Cutting Blade, separate 4 pcs of them like on below pictures

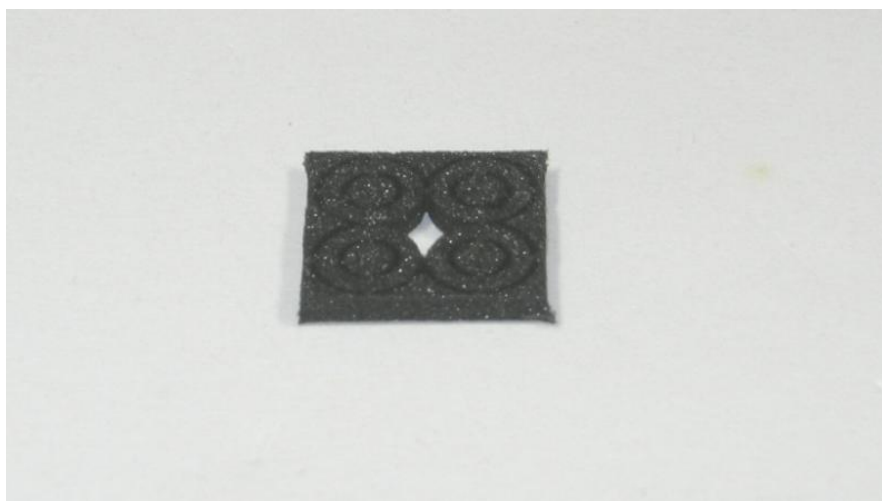


Figure 6 Pre-cut set of 4 pcs of rubber washers

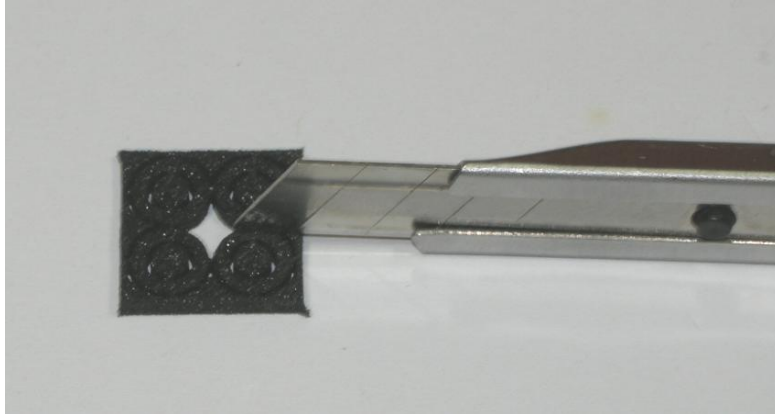


Figure 7 Cutting out the 4 pcs of rubber washers

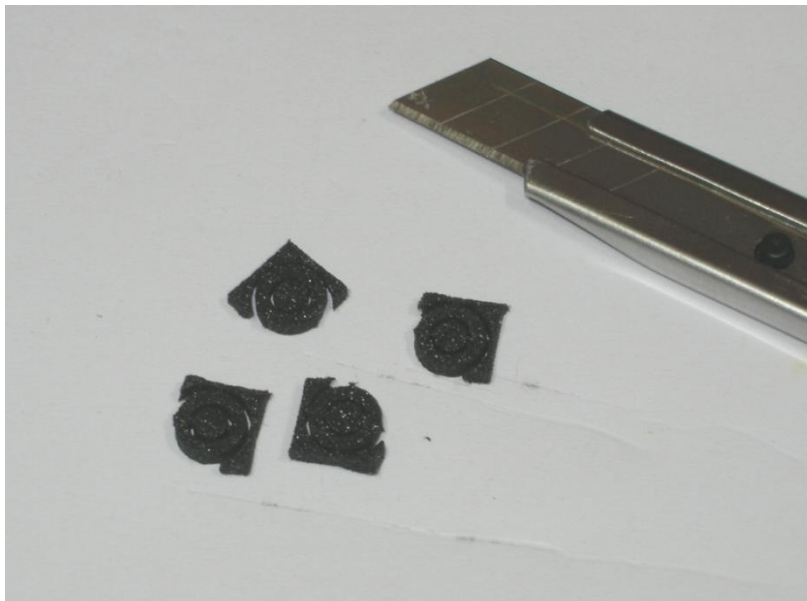


Figure 8 Rubber washers after partial cut-out

Then, after cut-out of them, using your fingers separate each one from the around rubber.
The result will be like on the picture below.



Figure 9 rubber washers

Then, using tweezers tool, remove from each one the pre-cut rubber from the circles. The result will be like on the picture below.

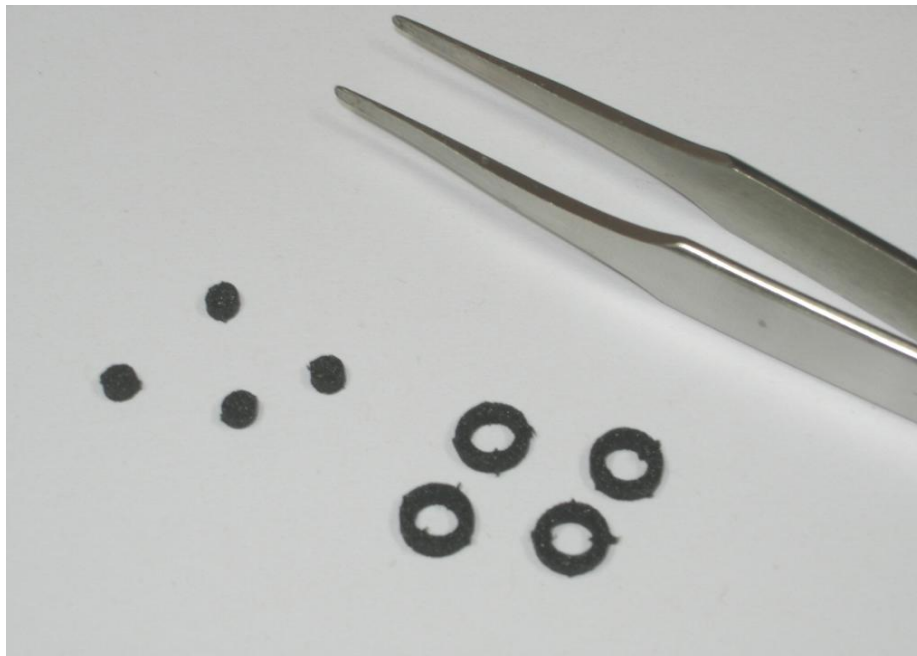


Figure 10 Final rubber washers

Put each rubber washer on their plastic clip tree on the bottom side of the **UPS PiCo** PCB like on the picture below.

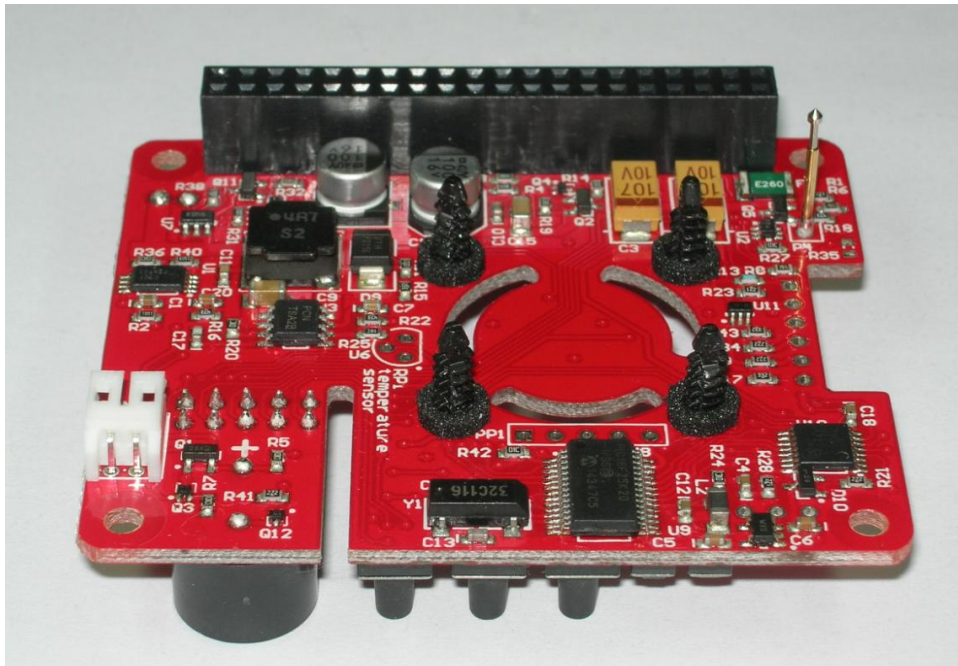


Figure 11 Plastic tree clips with rubber washers on the bottom side of the UPS PiCo PCB

Then, plug in the micro fan on the top of plastic tree clips, and press each corner of the micro fan separately in about 1-2mm. Take care to have micro fan cable on the left side.

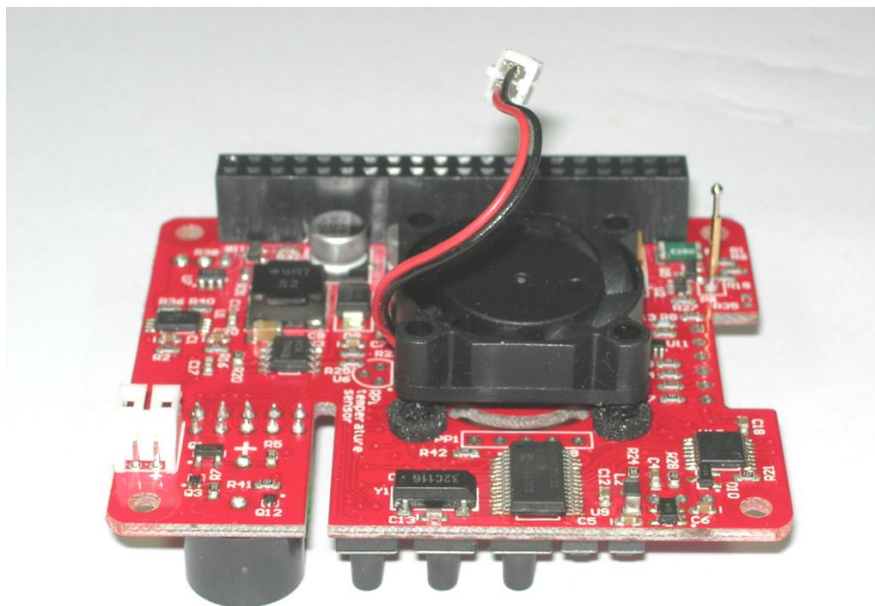


Figure 12 Micro fan placed on the plastic tree clips

Repeat this task until the distance between the micro fan and the bottom side of the **UPS Pico** PCB is approximately 1-1.5 mm. At that point, the rubber washers will be slightly pressed.

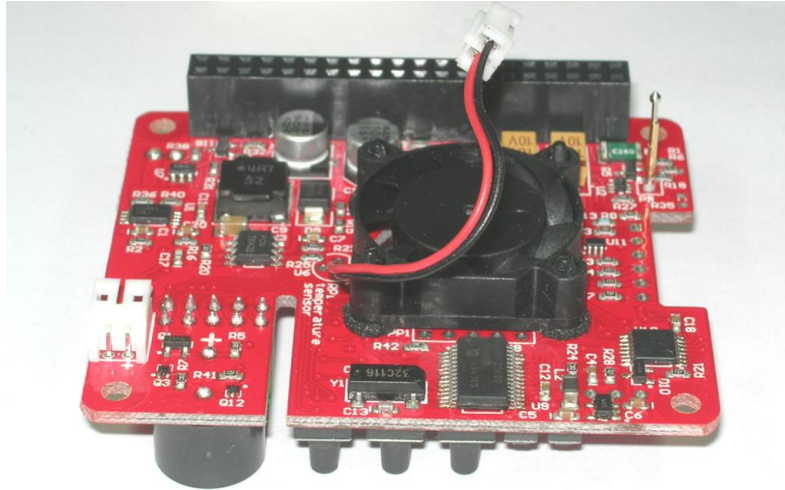


Figure 13 Micro fan placed on the plastic tree clips with final distance of 1.5mm

Connect the micro fan 2mm connector to the plug placed on the bottom side of the **UPS Pico** PCB

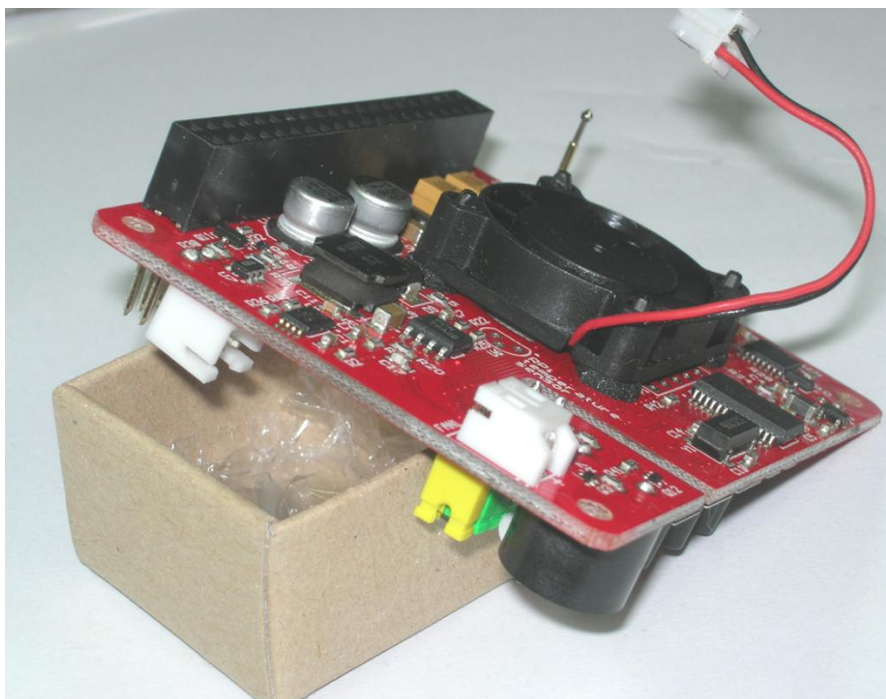


Figure 14 Micro fan placed on the UPS Pico PCB ready to connect

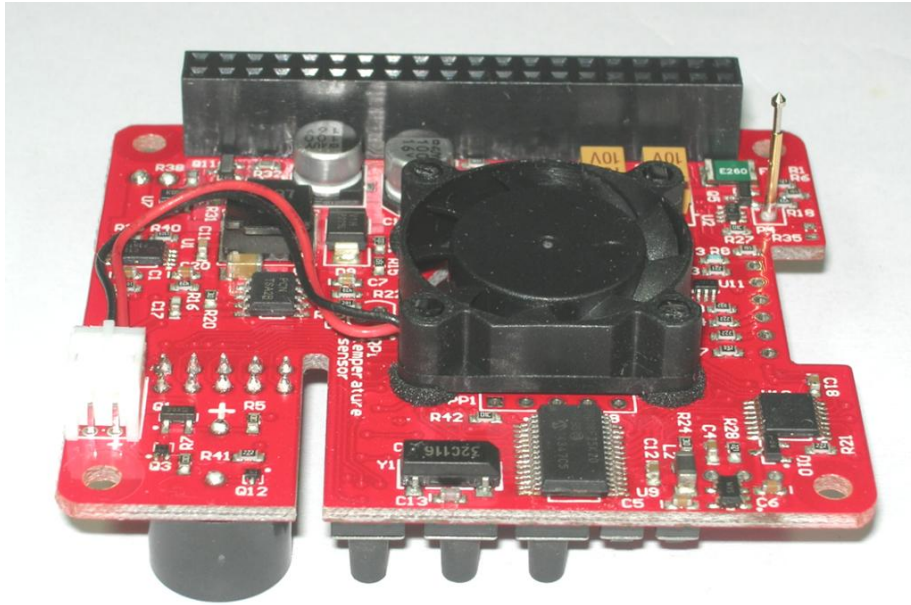


Figure 15 Micro fan connected to the PCB connector

Place the TO-92 temperature sensor on the bottom side of **UPS Pico** PCB to place marked as **RPi Temperature Sensor**

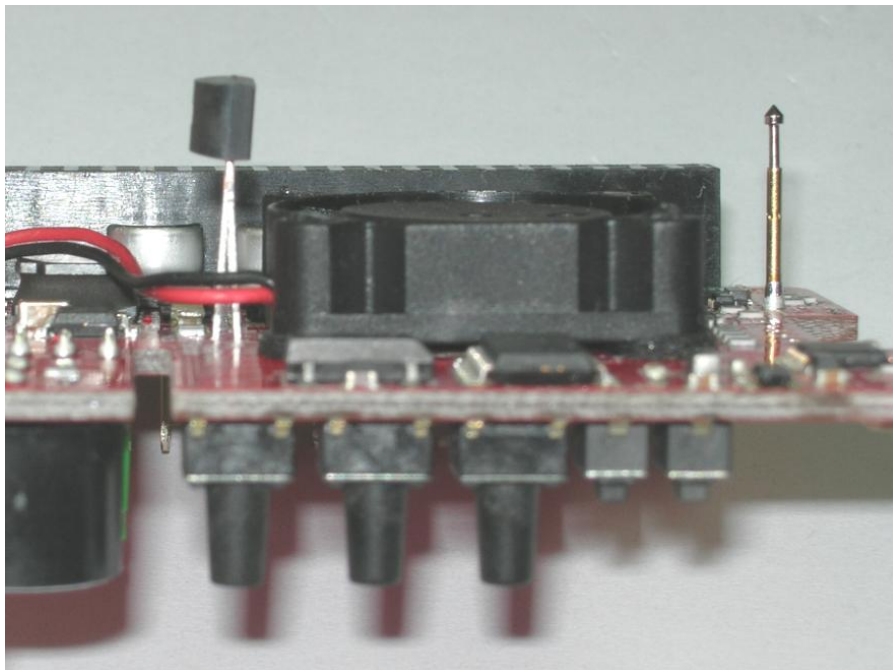


Figure 16 TO-92 Temperature Sensor installed on place

Put the completed **UPS Pico** PCB with fan and TO-92 Temperature Sensor on the top of Raspberry Pi®. With one finger press the pins of the **TO-92 Temperature Sensor** in order to make it touch the Raspberry Pi®.

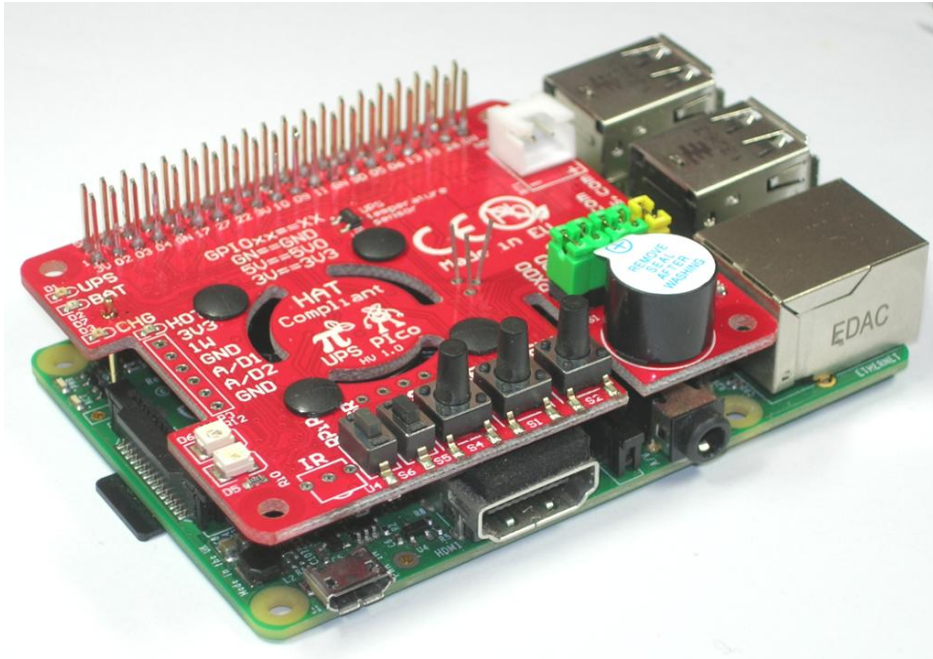


Figure 17 UPS Pico with fan and TO-92 Temperature Sensor Placed on the Raspberry Pi®

With a soldering tool, solder the three pins to the UPS Pico PCB and cut the excess length of the leads.

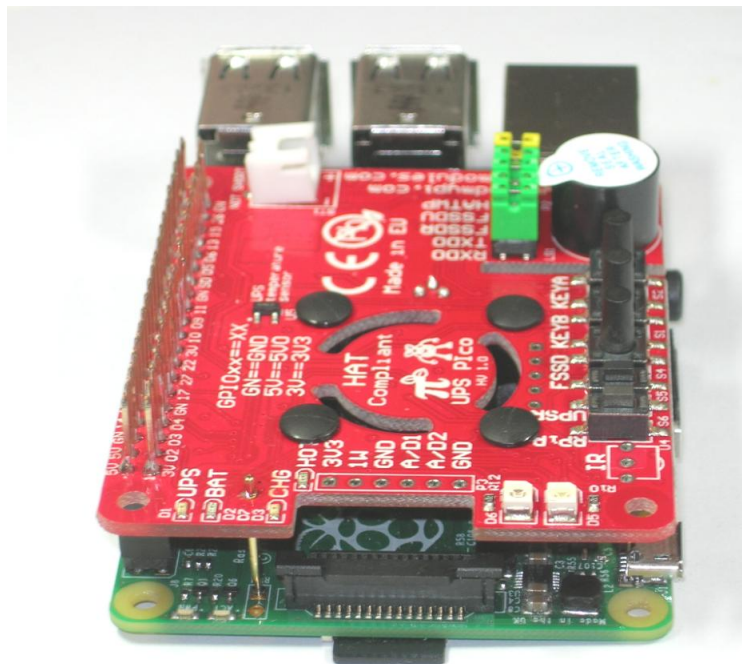


Figure 18 UPS Pico with fan and TO-92 Temperature Sensor assembled ready to be used

Your **Pico fan Kit** is now assembled and ready to be used. It will cool the Raspberry Pi® PCB, the Raspberry Pi® processor as also the **UPS Pico**.