



USB Thermometer

Description

Digital thermometer with USB connection based on DS18B20 1-wire probe and PL2303GL serial interface. Optional version with waterproof stainless steel or copper shell in two lengths (3 cm and 6 cm) is available.

Sensor measuring range:	−55 °C — +125 °C
Accuracy:	0.5 °C (from −10 °C to +85 °C), 2 °C
Resolution:	0.0625 °C
Data record frequency:	above 750 milliseconds
Cable length:	approximate 82 cm

System requirements:

- a free USB port
- Linux (with Kernel 5.5 and newer), or Windows 7, 8, 10 and 11 (with PL2303 driver)
- Digitemp software, or LogTemp (for taking periodic measurements)

Drivers

On Linux based operating system, a serial driver is usually provided by the kernel (pl2303.c) and, after connecting the USB thermometer, the serial device usually appears under `/dev/ttyUSB0` device file. Since this device file is sometimes owned by group `dialout`, there might be permission mismatch, i.e. access denial. To solve this issue add user to this group, e.g. `adduser user dialout`

On Windows system, a PL2303 serial driver¹ is needed, but our tests have shown that enabled Windows Update driver discovery service (on Windows 10 & 11) is also able to find appropriate driver. After installation a new (virtual) serial (COM) port is detected. Usually that would be COM3 or COM4.

USB device vendor ID: 0x067b, product ID: 0x23a3

Usage

Digitemp (Linux)

On Debian based distributions, e.g. Ubuntu, Digitemp software is available as a software package `digitemp`, that could be installed by the following command.

```
sudo apt-get install digitemp
```

Before temperature acquirement Digitemp software needs an initialization, this is done by executing:

¹https://www.prolific.com.tw/US/ShowProduct.aspx?p_id=225&pcid=41



`digitemp_DS9097 -i -s /dev/ttyUSB0` , where `/dev/ttyUSB0` is character special file representing digital thermometer. After initialization a Digitemp configuration file is created.

Then and each next time, using the same USB thermometer, the temperature could be acquired by executing: `digitemp_DS9097 -q -t 0`

Digitemp (Windows)

Digitemp software for Windows is available at Digitemp webpage². From the archive, only `digitemp.exe` file is needed.

Before temperature acquirement Digitemp software needs an initialization. Obtain serial (COM) port number (from Windows device manager) and open command prompt, eg. press Win-R and type „cmd“ in. Navigate to the directory where `digitemp.exe` was extracted to and execute: `digitemp.exe -i -s4` , if virtual serial (COM) port has number 4; otherwise change the this number to the number of the COM port. After initialization a Digitemp configuration file is created.

Then and each next time using the same USB thermometer, the temperature could be acquired by running: `digitemp.exe -q -t 0`

OWFS 1-wire File System (Linux)

When using the USB thermometer with `owserver`³, `owhttpd` ... make sure you're using `passive` option (and not `serial` or `device`). The configuration file `/etc/owfs.conf` should have the following line.

```
server: passive = /dev/ttyUSB0
```

Python package

For scripting purposes a `pydigitemp` python package⁴ could be used.

Next code snippet acquires temperature from the probe connected at COM4.

```
from digitemp.master import UART_Adapter
from digitemp.device import DS18B20
bus = UART_Adapter('COM4')
sensor = DS18B20(bus)
print(sensor.get_temperature())
```

²<https://www.digitemp.com/software/windows/dtreg17.zip>

³<https://owfs.org/>

⁴<https://github.com/neenar/pydigitemp>



LogTemp (Windows)

For periodic measurements and saving values to CSV file on Windows use LogTemp software⁵. Additionally, this program needs 1-wire driver from Analog⁶, installed.

Cautions

Do not expose the temperature probe to temperatures higher than 110 °C and longterm higher than 90 °C. Do not expose the probe to any corrosive substance or use it in environments with threats to human health.

This device shall not be used in or be a part of equipment that requires an extremely high level of reliability and safety, such as nuclear reactor control, aerospace or life support equipment.

USB connector is not waterproof.

Document history

This document describes 2nd generation of USB Thermometer (as a device). The only difference between generations is different serial interface, previously PL2303TA. Change was made because PL2303TA reached its End-of-Life, defined by its manufacturer.

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⁵<https://www.mrsoft.fi/ohj01en.htm>

⁶<https://www.analog.com/en/design-center/evaluation-hardware-and-software/1-wire-sdks/download-1wire-ibutton-drivers.html>