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Serial Port Temperature Sensors - Software

This page describes the linux software required to interface to the temperature sensors via a PC's serial port.

Overview

On linux, the **digitemp** application is required to query the temperature sensor.

As the the serial port interface circuit described previously is equivalent to the DS9097U 1-wire serial port adapter, we'll use the binary designed for the 9097 adapter, namely `digitemp_9097`.

Note that a Windows version of **digitemp** is also available.

Installing digitemp

Installing on Debian

On debian, digitemp can be installed using apt-get:

```
apt-get install digitemp
```

This will install three binaries into `/usr/bin`, one for each type of 1-wire interface adapter.

Installing on RedHat / Fedora

Download the latest tarball from the digitemp website (at the time of writing, this was digitemp-3.4.0.tar.gz), and copy or SCP this tarball into `/usr/src` on your linux box.

Note that the digitemp tarball contains three `spec` files (`digitemp_2490.spec`, `digitemp_9097.spec` and `digitemp_9097u.spec`), and rpmbuild will default to the first one, but we want digitemp_9097, which is for the serial port adapter.

Because of this, we can't just build the rpm directly from the tarball, but need to extract the required `spec` file from the tarball.

Copy the digitemp tarball into `/usr/src/redhat/SOURCES/` (this is the default directory rpmbuild will use when building from a `spec` file).

Extract the required `spec` file into `/tmp`:

```
tar zxvf /usr/src/digitemp-3.4.0.tar.gz -C /tmp digitemp-3.4.0/digitemp_9097.spec
```

Then build the digitemp_9097 RPM, specifying the appropriate `spec` file:

```
rpmbuild -bb /tmp/digitemp-3.4.0/digitemp_9097.spec
```

and install the resulting RPM:

```
rpm -Uvh /usr/src/redhat/RPMS/i386/digitemp-3.4.0-1_ds9097.i386.rpm
```

This will install the binary as `/usr/local/bin/digitemp_DS9097`.

Installing on other Linux distributions

If using another linux distribution, you'll need to manually compile from the source.
Download the latest tarball from the digitemp website, and SCP into `/usr/src/` on your linux box.
Extract the contents of the tarball:

```
cd /usr/src
tar zxvf digitemp-3.4.0.tar.gz
```

and compile it:

```
cd digitemp-3.4.0
make ds9097
make install
```

Note that the `make install` is likely to fail for digitemp 3.4.0, so manually copy the binary:

```
cp digitemp_DS9097 /usr/local/bin
```

Create Symbolic Link

Create a `digitemp` symbolic link to the `digitemp_DS9097` binary:

```
ln -s /usr/local/bin/digitemp_DS9097 /usr/local/bin/digitemp
```

Configuring digitemp

Initialise digitemp

First we need to configure the interface by telling digitemp the serial port that the interface is connected to.
By default, digitemp will look for a configuration file (`.digitemprc`) in the current working directory, so we'll explicitly specify the location of the configuration file.

Assuming the interface is connected to COM1 (ie, ttyS0):

```
digitemp -i -s /dev/ttyS0 -q -c /etc/digitemp.conf
```

You should see output similar to this:

```
Turning off all DS2409 Couplers
.
Searching the 1-Wire LAN
100486B60008009E : DS1820/DS18S20/DS1920 Temperature Sensor
ROM #0 : 100486B60008009E
```

This will create a file `/etc/digitemp.conf` containing the configuration information for digitemp.

Permissions
If you attempt to run digitemp from a user account which doesn't have access to the serial port, you'll see something similar to this when you run digitemp:

```
Error, you don't have +rw permission to access /dev/ttyS0
```

The solution is to either run digitemp as `root`, or relax the permissions on the serial port.
To allow everyone read/write access to COM1 (ie, `/dev/ttyS0`), run the following as `root`:

```
chmod a+rw /dev/ttyS0
```

Adjust Read Delay
Note that the DS18S20 temperature sensor has a slightly slower response time (to convert its reading to a temperature) than the original DS1820 sensor The DS18S20 sensor takes approx 750ms to do the temperature conversion, and digitemp defaults to a 1000ms read delay.

If you are occasionally getting temperature readings of 85 degrees Celsius (which is the sensor's error code), you'll need to slow down the read delay performed by digitemp from the default 1000ms.

To set the read delay to 2000ms and store this configuration in `/etc/digitemp.conf`, run the following:

```
digitemp -i -q -r2000 -c /etc/digitemp.conf
```

With relatively short wire runs between the sensor and the serial interface circuit, I've found that the default read delay of 1000ms provides reliable temperature readings.

Reading Temperatures

Query Temperature
The sensor can now be queried for the current temperature (the "`-a`" tells digitemp to read all connected sensors):

```
digitemp -a -q -c /etc/digitemp.conf
```

and output similar to this should be displayed:

```
Apr 17 23:09:56 Sensor 0 C: 26.69 F: 80.04
```

Handling Errors
Note that occasionally the DS18S20 temperature sensor will return an error code, returning a value of 85 degrees Celsius, instead of a valid temperature reading. If this occurs, re-reading the temperature will normally return the correct value.

next page: windows software

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