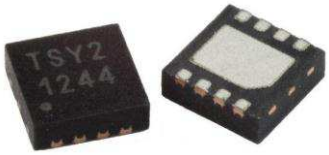


RoHS

MEAS TEMPERATURE SYSTEM SENSOR (TSYS02D) FOR LINUX® DRIVER

Digital Temperature
Digital Component Sensor (DCS) Development Tools

The Temperature System Sensor (TSYS02D) Linux driver provides the necessary software to interface the TSYS02D digital temperature sensor to any Linux driver system that supports the Industrial I/O ecosystem (IIO). The TSYS02D sensor is a self-contained temperature sensor that is fully calibrated during manufacturing. The sensor can operate from 2.2V to 3.6V. The TSYS02D has a low power stand-by mode for power-sensitive applications.

Refer to the TSYS02D data sheet for detailed information regarding operation of the IC:

http://www.meas-spec.com/downloads/Digital_Sensor_TSYS02D.pdf

Specifications

- Measures temperature from -40°C to 125°C
- I^2C communication
- Fully calibrated
- Fast response time
- Very low power consumption

Project setup

Configuration

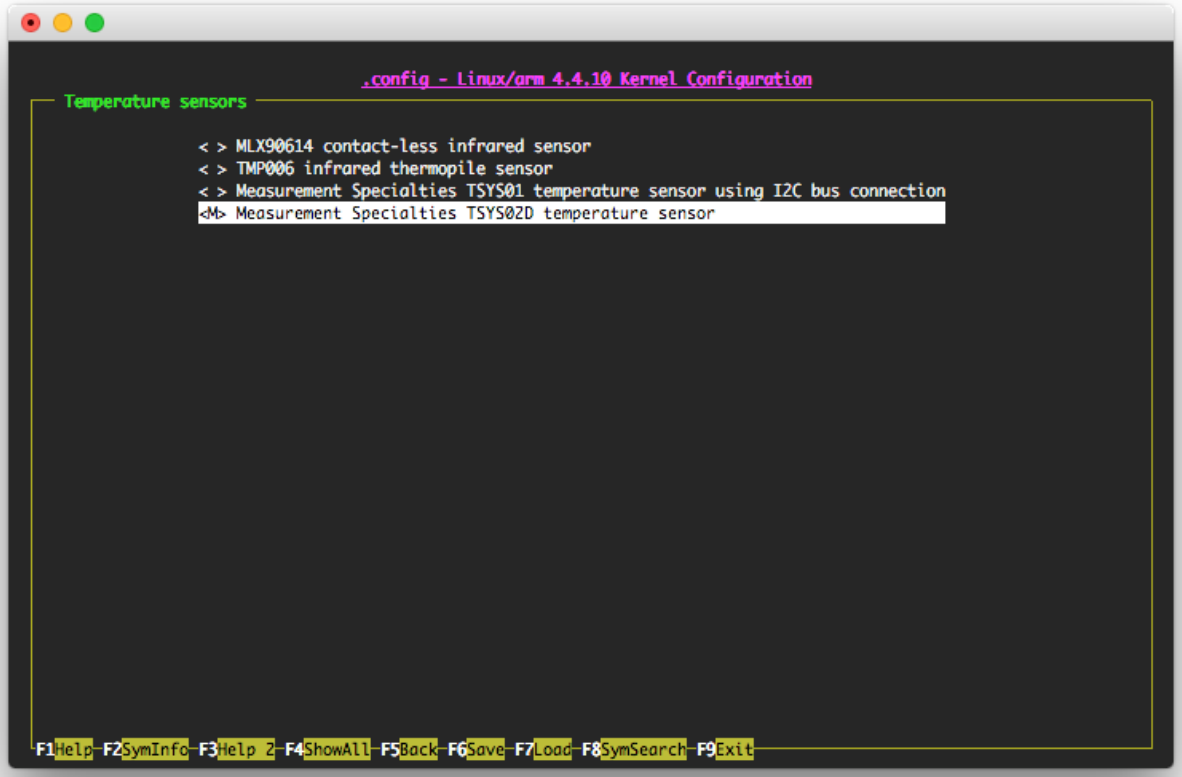
The Linux driver running on any platform is relevant to access sensor information as long as appropriate patch is included in Linux Kernel.

In order to properly use the sensor, it is necessary to describe HW configuration within device tree.
An example of device tree enabling the sensor is provided in next section.

The driver can be compiled with Linux Kernel by selecting it in Linux driver menu configuration (`make nconfig` as shown below in the Linux kernel directory). You can search by driver name, and then enable the appropriate setting the configuration menu.
The driver can also be used as a module, and loaded dynamically (this is done using `insmod` command).

```
make nconfig
```

You need to enable the Industrial I/O subsystem support in the Device Drivers and then you can enable your driver support.



Device Tree

In order to have the Linux driver properly configure hardware to access the sensor, you have to inform it where the device is connected on the platform. This is done using device tree.
The example below applies to Raspberry Pi but can be done on any other hardware supporting the Linux driver. You will have to do the same kind of change in the appropriate corresponding file.

`<linux kernel directory>/arch/arm/boot/dts/bcm2708_common.dtsi`

```
i2c1: i2c@7e804000 {
        [...]
        tsys02d: tsys02d@40 {
                compatible ="measspec,tsys02d";
                reg = <0x40>;
        };
};
```

Once this is done, the device tree shall be recompiled and installed using following commands:

```
make -j4 modules dtbs
sudo make modules_install
sudo cp arch/arm/boot/dts/*.dtb /boot/
sudo reboot
```

And appropriate dtb device tree file shall be used when booting the Linux driver.

Driver description

The driver is based on Linux IIO (Industrial I/O) framework. This framework provides services intended to provide support for devices that in some sense are analog to digital converters (ADCs).
See `<Linux Kernel directory>/drivers/staging/iio/Documentation/overview.txt`
Within that framework, some generic attributes are defined that are applicable to same class of sensors (in our case, temperature).
The driver is also based on I²C client that provides services to send / receive data on I²C interface. This part is somehow transparent from application standpoint.

The TSYS02D is a single chip temperature sensor.
The driver returns a milli-degre celius value using the IIO framework.

Via the IIO sysfs interface (`/sys/bus/iio/devices/`), there are several attributes available:

IIO Attributes	
Signal	**Description**
battery_low	Returns whether sensor VDD is above 2.25V or below ('0' : VDD > 2.25V)
in temp_input	Current temperature from TSYS02D sensor (milli-°C value)
sampling_frequency	Set the desired sampling frequency
sampling_frequency_available	Returns all available sampling frequencies

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PRODUCT SHEET

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