MEAS HTU21D
FOR LINUX® DRIVER

Digital Humidity and Temperature
Digital Component Sensor (DCS) Development Tools

The HTU21D Linux driver provides the necessary software to interface the HTU21D digital relative humidity and temperature sensor to any Linux driver system that supports the Industrial I/O ecosystem (IIO). The HTU21D sensor is a self-contained humidity and temperature sensor that is fully calibrated during manufacturing. The sensor can operate from 1.5V to 3.6V, has selectable resolution, low battery detect, and checksum capability. The HTU21D has a low power stand-by mode for power-sensitive applications.

Refer to the HTU21D data sheet for detailed information regarding operation of the IC:
http://www.meas-spec.com/downloads/HTU21D.pdf

Specifications

- Measures relative humidity from 0% to 100%
- Measures temperature from -40°C to 125°C
- I²C communication
- Fully calibrated
- Fast response time
- Selectable resolution
- Very low power consumption

Linux® is a registered trademark.

Project setup

Configuration

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 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 the device tree. The example below applies to Raspberry Pi but can be done on any other hardware supporting 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 {
        [...]
        htu21: htu21@40 {
                compatible ="measspec,htu21";
                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 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 the same class of sensors (in our case, humidity & 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 HTU21D is a single chip humidity and temperature sensor.
The driver returns a relative humidity percentage and 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)
heater_enable	Enable/Disable the on chip heater (0 to disable, 1 to enable)
in_humidity_relative_input	Current relative humidity from HTU21D sensor (hundredth %RH)
in temp_input	Current temperature from HTU21D sensor (milli-°C value)
sampling_frequency	Set the desired sampling frequency
sampling_frequency_available	Returns all available sampling frequencies

Linux® is a registered trademark.

te.com/sensorsolutions

Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

MEAS, TE Connectivity and TE connectivity (logo) are trademarks. All other logos, products and/or company names referred to herein might be trademarks of their respective owners.

The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, TE Connectivity makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. TE Connectivity's obligations shall only be as set forth in TE Connectivity's Standard Terms and Conditions of Sale for this product and in no case will TE Connectivity be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of TE Connectivity products should make their own evaluation to determine the suitability of each such product for the specific application.

PRODUCT SHEET

MEAS France SAS,
a TE Connectivity company.
Impasse Jeanne Benozzi CS 83 163
31027 Toulouse Cedex 3, FRANCE
Tel:+33 (0) 5 820 822 02
Fax: +33 (0) 5 820 821 51
customercare.tlse@te.com