DHT11驱动实现_中断方式和IIO系统

- 内核线程
  - 参考函数：kernel_thread、kthread_create、 kthread_run
  - 参考文章：https://blog.csdn.net/qq_37858386/article/details/115573565

1. 中断方式

触发DHT11转换数据后，就把引脚配置为输入引脚，并注册中断：在中断函数中记录上升沿、下降沿的实际，解析出温湿度。

获取时间函数如下：

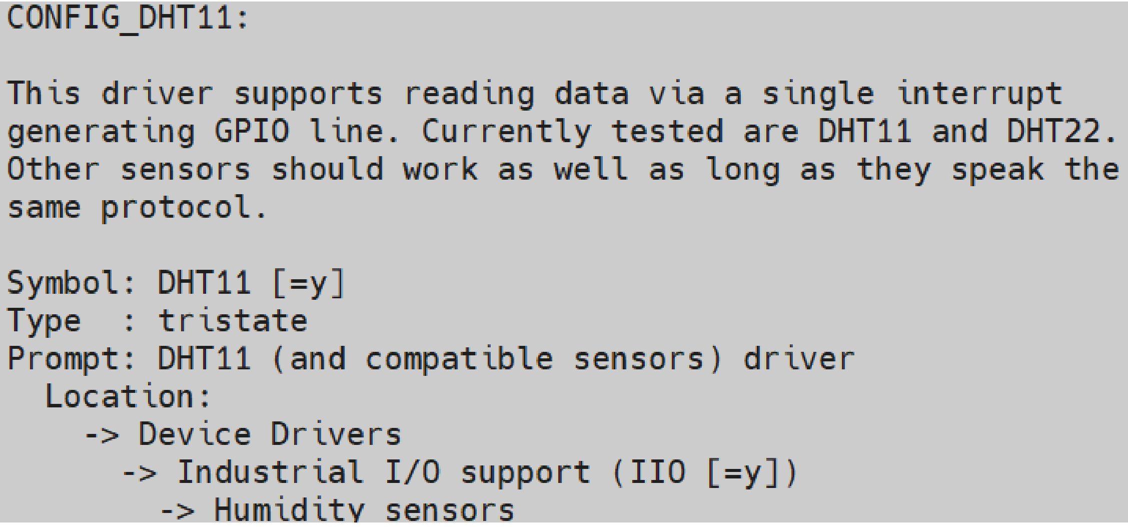
```
ktime_get_ns();           // 获取内核启动到现在的时间，在挂起时会暂停
ktime_get_boottime_ns();  // 获取内核启动到现在的时间，不受挂起影响，是绝对时间
ktime_get_real_ns();      // 获取Unix时间(1970年)到现在的时间，可能涉及闰秒更新，用得比较少
ktime_get_raw_ns();       // 类似ktime_get_ns(),不涉及闰秒更新，用得比较少
```

参考文档：https://www.kernel.org/doc/html/latest/core-api/timekeeping.html#c.ktime_get_ns

2. 使用IIO子系统

内核已经自带DHT11的驱动程序：`drivers/iio/humidity/dht11.c`：

- 配置内核



```
CONFIG_DHT11:

This driver supports reading data via a single interrupt
generating GPIO line. Currently tested are DHT11 and DHT22.
Other sensors should work as well as long as they speak the
same protocol.

Symbol: DHT11 [=y]
Type  : tristate
Prompt: DHT11 (and compatible sensors) driver
  Location:
    -> Device Drivers
      -> Industrial I/O support (IIO [=y])
        -> Humidity sensors
```

- 编写设备树，参考`Documentation\devicetree\bindings\iio\humidity\dht11.txt`

```
// imx6ull
humidity_sensor { compatible = "dht11";
    gpios = <&gpio4 19 0>;
};

// stm32mp157
humidity_sensor { compatible = "dht11";
    gpios = <&gpioa 5 0>;
};
```

怎么使用?

```
cat /sys/bus/iio/devices/iio:device1/in_temp_input
cat /sys/bus/iio/devices/iio:device1/in_humidityrelative_input
```