

【RT-Thread 作品秀】冷链运输监管系统

作者：冯亮

概述

背景：大量生鲜冷链运输途中如果遇到温度上升，或温度未达到指定温度。极易造成物品变质，且变质后不易排查以及如何规避，因此开发此冷链运输温度监管系统。

硬件方案：采用 AT32F403A 作为主控，MCU 具体内部资源如下

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外设硬件包含：

4G 透传模块 * 1

SD_CARD 模块 * 1

SHT30 模块 * 1

OLED12864 * 1

四向摇杆 * 1

实现功能: 通过对 SHT30 进行实时读取获取温度湿度。并实时存储。并将数据上传至云监管平台。

RT-Thread 使用情况概述

线程间通信：消息队列

内存管理：使用小内存管理算法

组件部分：使用农历组件。按键组件

FINSH 控制台

硬件框架

采用 AT32F403A 开发板作为主控，利用杜邦线分别连接 SPI_OLED 模块。SPI_SDCARD 模块，串口 4G 透传模块，四向摇杆。

软件框架说明

系统核心采用 RT_THREAD，通过编写每个硬件的驱动。建立多线程运行，串口通讯通过消息队列递交数据。

软件模块说明

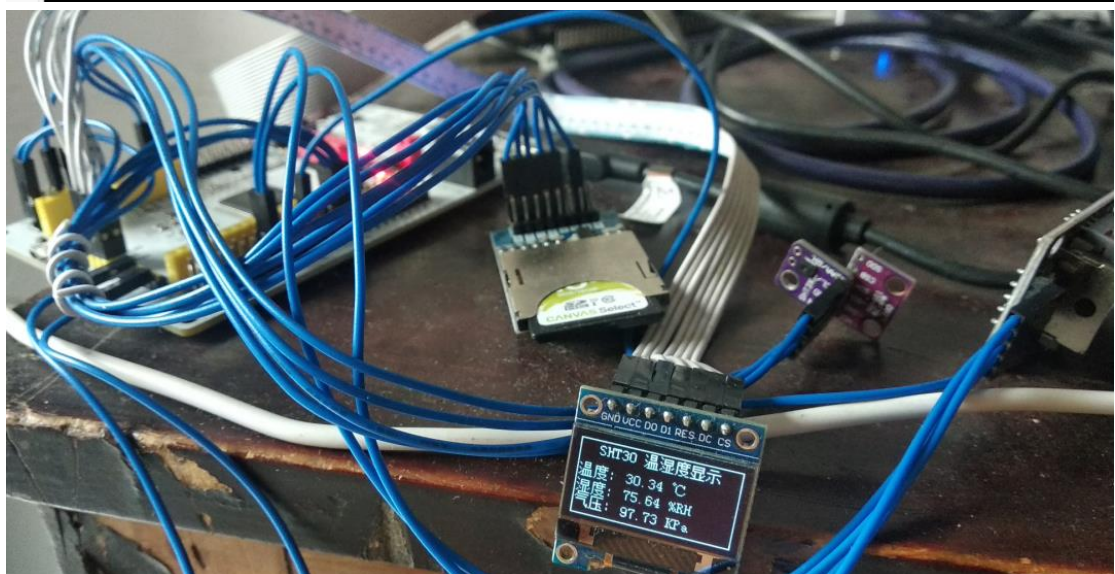
创建四个线程，线程 1 负责 SD 卡数据记录 线程 2 负责温湿度及气压的记录，线程 3 负责 OLEDGUI 绘图 线程 4 完成物理按键的处理及回调函数

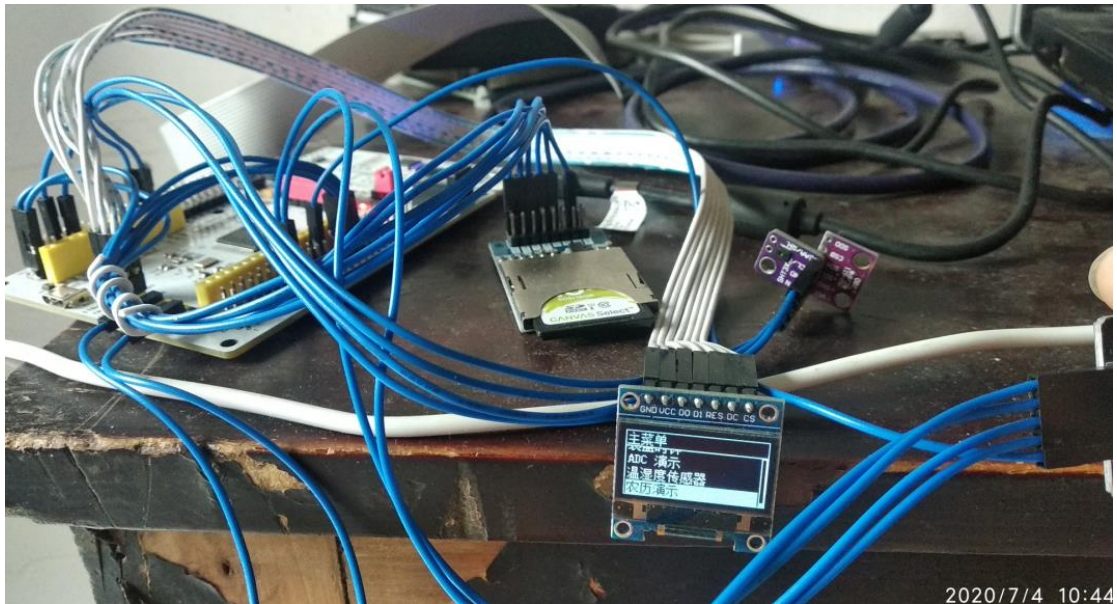
演示效果

```
1 新建会话
setdate      - setdate sample: setdate <YYYY/MM/DD>>
settime      - settime sample: setdate <HH/MM/SS>>
rtc_show     - at32 rtc show
sht3x_show   - show sht3x temperatrue & humidity
bmp280_show  - show bmp280 temperatrue & pressure
debugstorage - debug the sdcard storage status
showlunar    - showlunar generator: showlunar [year] [month] [day]
key          - Send a key to simplegui
version      - show RT-Thread version information
list_thread  - list thread
list_sem     - list semaphore in system
list_event   - list event in system
list_mutex   - list mutex in system
list_mailbox - list mail box in system
list_msgqueue - list message queue in system
list_timer   - list timer in system
help         - RT-Thread shell help.
ps           - List threads in the system.
free         - Show the memory usage in the system.
reboot       - Reboot System
clear        - clear the terminal screen
runningtime  - get mcu runningtime

msh >sht
sht3x_show
msh >sht3x_show
sht30_temperature : 3102
sht30_humidity : 7308
msh >bmp
bmp280_show
msh >bmp280_show
bmp_temperature : 3202
bmp_pressure : 9773
msh >
```

```
bmp_pressure : 9773
msh >debugs
debugstorage
msh >debugstorage 1
msh >Write sdcard : 445,2020,7,4,10,41,27,3110,7264,3211,9773,0,0,0,0,0,0,0,0
Write sdcard : 446,2020,7,4,10,41,28,3112,7266,3211,9773,0,0,0,0,0,0,0,0
Write sdcard : 447,2020,7,4,10,41,29,3110,7281,3211,9773,0,0,0,0,0,0,0,0
Write sdcard : 448,2020,7,4,10,41,30,3112,7292,3211,9773,0,0,0,0,0,0,0,0
Write sdcard : 449,2020,7,4,10,41,31,3109,7290,3211,9773,0,0,0,0,0,0,0,0
Write sdcard : 450,2020,7,4,10,41,32,3109,7290,3211,9773,0,0,0,0,0,0,0,0
Write sdcard : 451,2020,7,4,10,41,33,3112,7288,3211,9773,0,0,0,0,0,0,0,0
```





代码地址

链接: <https://pan.baidu.com/s/1exMy6jL2upqZZcDXI4Qaug> 提取码: xp46

视频地址

<https://www.bilibili.com/video/BV1sT4y177Ef/>