APES Project 2

Smoke and Fire Detection System

Team members:

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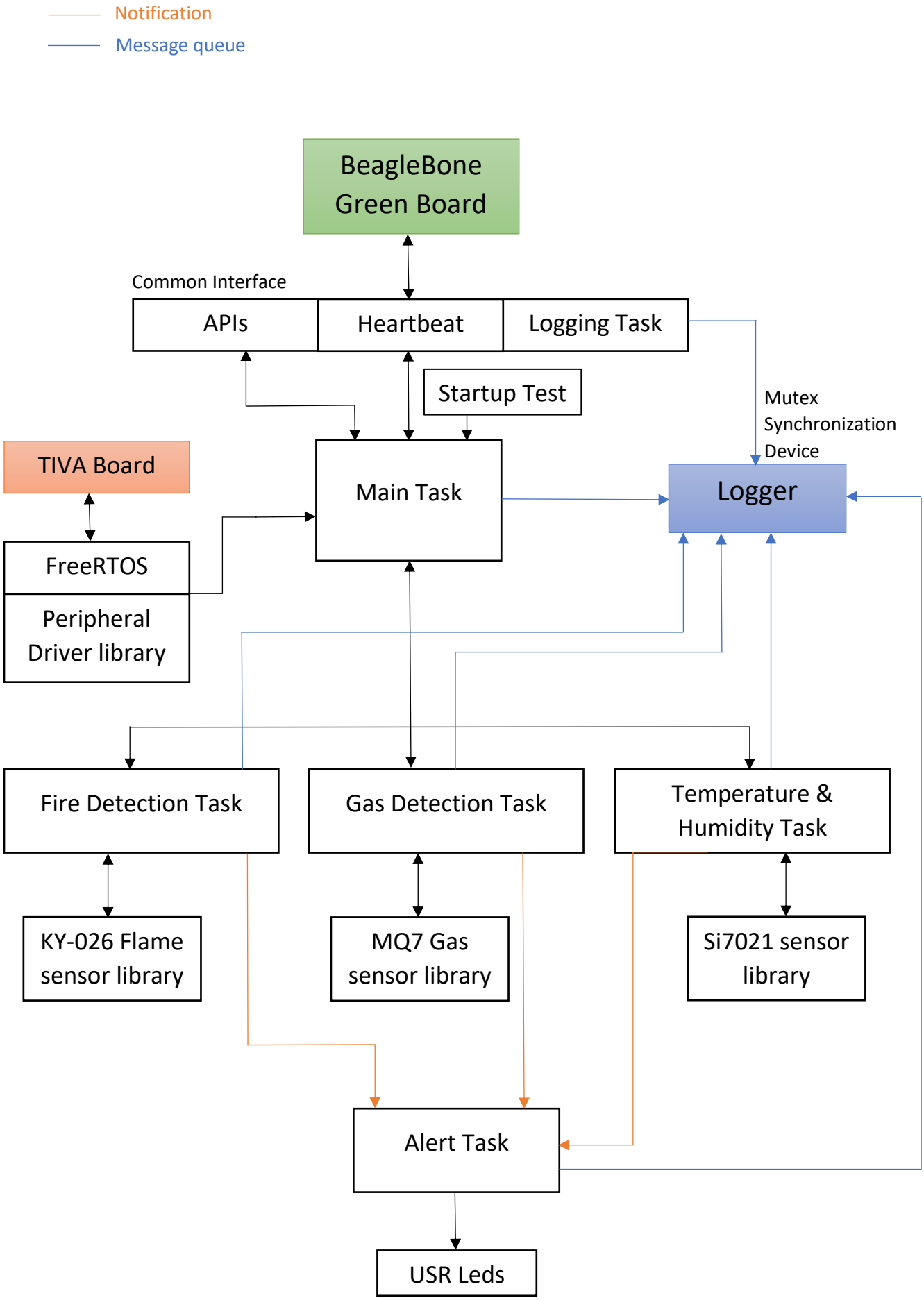
Notification
Message queue
BeagleBone Green Board
Common Interface
APIs
Heartbeat
Logging Task
Startup Test
Mutex Synchronization Device
TIVA Board
Main Task
Logger
FreeRTOS
Peripheral Driver library
Fire Detection Task
Gas Detection Task
Temperature & Humidity Task
KY-026 Flame sensor library
MQ7 Gas sensor library
Si7021 sensor library
Alert Task
USR Leds

TASK NAMES AND FUNCTIONALITIES:

Main Task:

This task is the initial main task which is responsible for the generation of five tasks

1) Fire Detection Task
2) Gas Detection Task
3) Temperature and Humidity Task
4) Alert Task
5) Logger Task

Fire Detection Task:

This task aligns with the KY026 Flame Sensor Module. It will detect the flame level and will give the alert in case of fire occurrence.

Gas Detection Task:

This task aligns with the MQ7 Gas Sensor. It will detect the presence of carbon monoxide in the concerned area. It will also give out the alert in case carbon monoxide level increases above some threshold value.

Temperature and Humidity Task:

We are planning to use humidity parameter of the Si7021 Temperature and Humidity Sensor and this task corresponds to the same. This task is responsible for continuous monitoring of the humidity and raise an alert if humidity increases above some level.

Alert Task:

This task is responsible to get notified from any of above three mentioned tasks in case the value increases above some threshold. In that case. This task will send out an alert by turning on LED. This can be achieved by xTaskNotify and xTaskNotifyWait FreeRTOS APIs.

Logger Task:

The logger task logs the data from gas detection, flame detection and humidity task after certain interval of time. This can be achieved by xTimerCreate and Software timer functionality of FreeRTOS.