FW19 - Structure

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Interrupt -> Queue -> Infinity Loop Task -> Output buffer / Action

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- Input
  - CAN
    - Interrupt CAN(0 and 1) push data
  - ADC (100Hz)
    - Timer to start acquisition
    - ADC for Aux Data and another for Debug Data
  - IMU (100Hz)
    - Timer to unlock the Task that requires the data and then convert it
  - GPS
    - USART Interrupt pushes data
  - I / O
    - Interrupt pushes data
  - USART RX
    - Interrupt pushes data
    - Thread resolves all the problems ad-hoc (Command parsing and Ack pushing to FIFO)

- Output
  - Saving (100Hz)
    - TMR IRQ
      - Saving pointer is incremented before saving
      - Writing pointer is incremented here
      - Timestamp is incremented here
    - After the save request, wait a semaphore from the dma interrupt, with a defined timeout. If unlocked because of timeout, close and open a new file (Recovery strategy)
    - File Name: YYYY-MM-DD_HH-MM-SS.dprc
    - File refresh: evrey minute, based on saving cycles counters for each task
      - SD
      - USB
  - SEMAPHORE TO CONTROL THE XBEE RESOURCE!!
    - Telemetry Data & Debug (10Hz)
      - Tmr irq unlocks the task
      - Task
        - Controls if saving is on. If not, increments the writing and saving pointer.
    - Telemetry Status (1Hz)
      - Tmr Irq unlocks Task
    - Async Messages (Error / Ack)
      - Waits for a FIFO

- Misc
  - Fantastic data write/save buffer
  - Status data write / save buffer
  - RTC
    - Get / Set
  - Init / Startup
  - Linear Offset set-up (Mem Address for saving)
    - Backup RAM
  - ETHERNET
  - VBatt (RTC / Retaining RAM)
    - Send an alarm if low (It's important for the sosp. Zero values storage)

- Check later
  - SYSTEM CLOCK SOURCE
    - Tmr 9 INSTEAD OF SYSTICK
  - DMA Priority
    - DMA 2
      - ADC
      - SD

        - USART1 (XBEE)
    - CAN Timing
        - Enable error irq to send the error in telemetry
        - Check the clock source (MxCube signs as 54MHz)
        - Sample point ate 77.5% (Pre 3, phase1 13, phase2 4)
    - Error IRQs for the peripherals
        - CAN
        - I2C
    - FreeRTOS
        - Enabled Run time and task stats

- TImer List
    - TMR 7 (100Hz)
        - ADC
        - IMU
        - Saving
    - TMR 6 (10Hz)
        - Telemetry Data & Debug
        - I'm alive (LED)
    - TMR 5 (1Hz)
        - Telemetry Status

- LED Colors
    - Green
        - I'm alive
    - Red (Everybody is allowed to use)
        - Error Detected
        - (Maybe later, define frequency code for different errors)
    - Yellow
        - Saving enabled (After all the files are opened)