

P∞  
RTC/Long-term Scheduler

Interrupt

-Enables/disables other 1-shot tasks or routines  
-Alternatively, takes and releases blocking semaphores used by tasks/routines

P∞  
UART RX Buffer Full Interrupt

Interrupt to prevent dropping Keystrokes

-Empty buffer into CLI queue/buffer, exit asap.  
-If architecture makes this impossible, on overflow, send byte 0x07 (Bell) to alert user.

P∞  
UART RX Buffer Full Interrupt

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P15  
Firmware Update

Low priority, but blocking. Prepares firmware update and goes to bootloader

-Check if any alarms are soon, if so wait/set RTC alarm for >1 hour from now, exit  
-Download firmware, phase 1 checks, report to IOT that firmware will start updating  
- Reset system to bootloader with update flag

P90  
WiFi Manager

WINC1500 Controller

-Manages WiFi Connection  
-Might actually send/recieve messages?  
-Exact responsibilities defined by 516 team

P∞  
ExternalInterrupt (Button/I2C)

If individual ISRs per pin are supported, each of these becomes seperate. For now, I'm assuming I have to figure out what caused the interrupt

-Poll configured EXTINTs (2,3,5,7)  
-IF Expander (2), enable GPIO Expander Interrupts task.

P∞/P85  
AV Board UART Recieve

Sets/updates state of semaphores or variable flags. Must be very lightweight.

-If a task exists for some of this with interrupt, it will be P85. This would be to keep system lean.

-Sets flags if operation success or fail  
-If AV board asked if it can turn off light, manage semaphores for food level check, feed start, etc, and tell it if yes or no

P10  
CLI

Command Line

-Run when UART data available  
-Can dispatch other tasks/functions  
-Might also log to console if other tasks add to a printing queue? Or maybe this happens in that task.

P95  
GPIO Expander Interrupts

Lower priority signals are connected through the GPIO expander. If an EXTINT fires, this task will be enabled and then we can check all pins to see what is going on.

-Read pin change interrupt list  
-If available, read interrupt list from expander and reset interrupt flag  
-If necessary, read all input states to make sure we don't miss an interrupt.  
-Enable the appropriate task or pass a message directly (IMU tamper, etc).

P20  
Check temperature/humidity

-Periodic or one-shot enabled by RTC

- Checks SHT external Sensor  
- Checks HDC3022 Sensor  
- Sends data to IOT task

P5  
LED Fade

Fading on dog request and ext status leds

-May have a queue for input  
-Uses I2C  
-Failsafe is to just set LED driver to blink if it cannot auto fade things  
-If LED driver can be very self sufficient, may make priority higher

P∞+1  
Feed STOP NMI

Enabled by Feed task, will disable itself  
Edge trigger

-Immediately stop motor  
-Release feed semaphore  
-Disable nmi

P∞+1  
Water STOP NMI

Enabled by Water task, will disable itself  
Level trigger

-Immediately stop motor  
-Release water semaphore  
-Disable nmi

P45  
Food tamper

Enabled when food tamper switch opens then closes, indicating more food added

-Check IMU to see if unit is upright  
-Send message to IOT task if not upright with urgency  
-Run food level check  
-IOT task send notification that feeder has been refilled

P60  
Water check and start

Actions related to water bowl filling and water level, triggered by time

-Ensure feed semaphore isnt active  
-Check and report water tank level to IOT task  
-Check bowl level sensor. If level is low, proceed. Else end.  
-Enable NMI for Water STOP

-Start Pump  
-Give semaphore to NMI to return when done  
-End blocking section, suspend  
-After NMI returns, send success to IOT task

P80  
Feed Start

Actions related to feeding

-Enable Food Level Check Task, wait with semaphore  
-Set flag for GPIO expander interrupt for distance sensor interrupt to trigger take image process  
- Setup distance sensor with interrupt enable  
-Enable NMI for FEED STOP

-Start Motor  
-Give semaphore to NMI to return when done

-End Blocking section, suspend  
- After NMI returns, send sound trigger to AV board if necessary

P35  
Process Dog Request Button

-Enabled by interrupt, disables itself

-Contains anti-spam feature, may log all presses but doesn't send notifications if spammy  
-If configured by owner, can initiate feeding task, or request from AV board sound or photo

P50  
Food Level Check

Stuff for food level check

-Communicate with AV board, get reference light level  
-Enable LED lamp if needed  
-Read each I2C light sensor  
-Find food level  
-Send food level to IOT task  
-Release semaphore and end

P85  
IOT Task

Periodically check if data is available once per 5ish minutes, or some sort of push type notification. Periodically (on new data available), send data to cloud

-If no critical data forces this to run and no push from cloud, runs every 5-10 minutes, but may decrease to 30-90 minutes  
-May adjust RTC or enable/disable other tasks  
-May send audio trigger if necessary  
- May prepare firmware update

Note: P∞ means interrupt based, as this pre-empt's everything. Interrupts are this color

Items in this color are blocking, as they are critical. Task cannot be suspended.

Items in this color are periodic tasks.

Items in this color are one-shot tasks. These run once and then disable themselves.

