COMPSYS 723 Assignment 1 – Frequency Relay

1. Top

S

1. ISRs
2. Frequency Relay

Triggered when a new peak data has been received, calculate instantaneous frequency and push to *frequency data* queue.

1. Button ISR

Reads the edge capture register, toggle maintenance mode or *precise increment* flag then clear edge capture register.

1. Keyboard ISR

Decode the keyboard message, if it is type ASCII MAKE, push key value to *keyboard data* queue.

1. Timer ISR

Set *timer expired* flag.

1. Tasks
2. Frequency Update Task

Priority: 5 Run condition: when frequency data queue is not empty.

1. Keyboard Update Task

Priority: 4 Run condition: when keyboard data queue is not empty.

Get key press and increment/decrement instantaneous frequency and rate of change (RoC) thresholds.

Pops the *keyboard data* queue, checks if it is one of the arrow keys and it is press down instead of release by toggling a *key pressed* flag every time an arrow key has been popped. If it is a press down it will take the *threshold semaphore* protecting the thresholds, increment or decrement by a certain amount then give the semaphore back. The amount that is incremented or decremented depends on *precise increment* flag, toggled by button ISR.

A minor problem with this approach is that if two or more arrows keys are pressed, the thresholds change may update twice or not at all. This can be simply fixed by having individual key pressed flag for each arrow key.

This task has higher priority than Load Manager Task as the manager requires the threshold values to determine whether the system is stable.

1. Load Manager Task

Priority: 3 Run condition:

1. Load Control Task

Priority: 2 Run condition: periodic, 100 ms.

Read toggle switches, if *maintenance mode* is on, set load LEDs to be the same as toggle switches

1. VGA Task

Priority: 1 Run condition: periodic