Lab 5 – Interrupt Capture, State Machines and Debounce

Purpose

The purpose of this lab is to extend your knowledge of interrupt handling, debouncing inputs and state machines on the ARM architecture and the OLIMEXINO-STM32.

Equipment Required

- OLIMEXINO-STM32 and IDE.
- Three LED's and resistors
- Momentary Switch

Procedure

Connect three LED's to the OLIMEXINO-STM32. The LED's represent:

- Pump Indicator
- Vent Indicator
- Inhibit Indicator

At the top of every minute, synced to the time provided by a RTC (ie previous lab), a Pump must be turned on for 10 seconds. After the pump has been on for 5 seconds, a Vent must be turned on for 15 seconds.

A long press on the Momentary Switch enters the system into diagnostic mode.

When in diagnostic mode:

- Inhibit Line should be enabled within 1ms
- Pump and Vent should be disabled within 1ms
- The system no longer responds to the top of the minute events
- A short press transitions between states where:
    - Pump On, Vent Off
    - Pump On, Vent On
    - Pump Off, Vent On
    - Pump Off, Vent Off
- Allow for technician to update the RTC (ie from previous lab)
- A long press on the Momentary Switch exits the system into diagnostic mode.

Design Hints/Notes

Unless there is external circuitry to clean up the signal, when you press a Momentary Switch the signal is sequence of many on/off transitions. You will need to monitor the signal and determine if the signal has settled before reacting to it.

Controlling the Pump, Vent and Inhibit lines can easily be done with a state machine and control variables set from other areas of the program (such as the main loop or interrupt handlers).