

MicroC RTOS for PIC18 Processor

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This version of the MicroC Real Time Operating system is a port for the PIC18 processor using MPLAB IDE and the MCC18 compiler. The base context switch routine and the initial port for the PIC18 was written by Nathan Brown and can be found at: http://www.sputnickonline.com/projects/programs/micro/uCOS_for_PIC18.

This version of MicroC extends upon the context switch routine by adding support for saving and restoring the tmpdata and MATH_DATA sections in memory. According to the MicroChip MCC18 documentation, the tmpdata section contains compiler temporary variables for the non-interrupt service routine source. The MATH_DATA section contains arguments, return values, and temporary locations used by math library functions.

The extension of the context switch routine consists of extending the stack initialization to allocate space for the tmpdata and MATH_DATA sections. Two macros are defined with the purpose of saving these sections and restoring these sections. These definitions and uses are found in the OS_CPU_C.c file which contains specific RTOS implementations for the PIC18 processor. These two macros are inlined into the code during compilation and are named OS_REG_SAVE() and OS_REG_RESTORE(). The TEMP_SIZE constant is defined as the size of tmpdata + MATH_DATA sections which can be found in the map file after compilation of the application. The OS_REG_SAVE() macro works by saving the data found in the FSR0 registers into the task stack. The OS_REG_RESTORE() macro works by restoring the data back into the tmpdata and MATH_DATA sections. Each time the registers are saved, the OS_REG_SAVE() macro is called and each time the registers are restored from a new task, OS_REG_RESTORE() is called.

This project also contains a simple test to test the restore/save of the tmpdata and the MATH_DATA sections. The tests are found in the main.c file and mainly make use of the functions found in the math.h standard C libraries. This test program can be used with the PICDEM2 board. The output of the program is placed on the UART and can be displayed using the Microsoft Windows HyperTerminal.

References

- [1] Brown, Nathan *uCOS-II for PIC18*.
http://www.sputnickonline.com/projects/programs/micro/uCOS_for_PIC18.
- [2] Labrosse, Jean *uc OS-II ports*. <http://www.micrium.com/microchip/index.html>.