

# Advanced Topics in 16-bit Programming

## Lab Information

Microchip Technology, Inc.  
MASTERS 2006 1021 APT

### Lab 2 Interrupt and Data Access Speed

Lab 2.c contains **main()**

Interrupt.s contains **\_\_IC1Interrupt**: interrupt service routine

#### Improve decoding speed by using:

- A register for the pointer to write to data buffer  
See section 4.12 on page 72 of the MPLAB C30 C Compiler User's Guide  
`unsigned int *InBufferPointer;`
- A register for the pointer to read from the buffer  
`unsigned int *OutBufferPointer;`
- Modulo addressing to write to the buffer  
See section 3.3 on page 3-7 of the dsPIC30F Family Reference Manual  
Set up modulo addressing with MODCON register  
Start and end address of `DataBuffer[]` goes in XMODSRT and XMODEND
- A register pointer to the input capture register  
Create a register variable `IC1BUFpointer` to contain the address of `IC1BUF`  
Hint: Using a pointer allows indirect RAM to RAM moves in a single instruction
- Using the built in function for a bit toggle  
Create a bit variable and replace the line `BitValue ^= 1;`  
Hint: A bit variable is created as a structure. The builtin function needs the address of the data word as well as the bit number.  
`__builtin_btg(&Address, Number or Structure Element);`
- Add any other improvements and optimizations that you can think of !!!!!

#### Instructions

- Open workspace **C:\Masters\1021\Lab2\Lab2.mcw**
- Open file **C:\Masters\1021\Lab2\Lab2.c** and **C:\Masters\1021\Lab2\Interrupt.s**
- Modify the code to optimize performance using the techniques listed above
- Run the code and look at the SIM Uart1 tab of the Output window to see how much data was decoded before it got too fast for the software.