

## REVIEW 2

The Final Exam will be given 2:45 - 4:45pm, on Monday, April 23, 2012, in class (C-122). It will be an open books, open notes test. Students can use any printed, publicly available material (that includes the Text, Motorola/Freescale Manuals and Data Sheets and Page 12 of the Manual for the D-BUG 12 Monitor) as well as their OWN homework assignments, prelabs, and copies of their lab reports. The use of cell phones, any communications devices and tablets are strictly forbidden. Students should bring their Exam Blue/Green Books for the test. The exam will be problem oriented (no essay questions). Students are responsible for topics covered in class, in the lab, in the lab project, in the homework assignments and in the lecture notes posted on the Class Web Page. The final exam is comprehensive but more emphasis will be given to topics covered after the midterm exam.

Immediately after the test students should return those Motorola Manuals they have borrowed for this term. If they fail to do so their names will be reported to the Registrar and will be placed on hold.

Topics covered in class include:

1. **9S12DP512 Architecture and Memory Map**  
Special Function Registers  
Memory Map
2. **9S12DP512 Programmer's Model**  
Data Formats  
Addressing Modes  
CCR Register  
Instructions, Instruction Fetch and Execution Times  
Assembler Directives  
Special Syntax for C Programs
3. **Interfacing to the 9S12DP512 Parallel Ports**  
Input and Output Ports  
Polling Signals, Generating Delays by Program  
Signal Buffers
4. **Programming the Flash Memory (in Tutorial, not a test problem)**

- 5. 9S12DP512 Interrupts**  
**Interrupt Vector Address Table**  
**External Interrupts (IRQ\*)**  
**Enabling the Interrupt System**  
**Skeleton Structure of a Main Program Segment along with an Interrupt Service Routine in C**
  
- 6. 9S12DP512 Timer Module**  
**Main Timer, Timer Overflow Interrupts**  
**Output Compare, Generating Output Waveforms**  
**Output Compare Interrupts**  
**Input Capture**  
**Pulse Width and Signal Frequency Measurement**  
**Input Capture Interrupts**
  
- 7. uC/OS-II RT Kernel (in Tutorial and on the Class Web Page, not a test problem)**
  
- 8. 9S12DP512 Pulse Width Modulation Module**  
**Programming the PWM Module**
  
- 9. 9S12DP512 Analog-To-Digital (ATD) Conversion Module**  
**Programming the ATD Module**  
**ATD Interrupts**
  
- 10. Interfacing a DAC Converter to the 9S12DP512**
  
- 11. Non-TTL Signal Interfacing**
  
- 12. RTI Interrupts**
  
- 13. Asynchronous Serial Communications**  
**Programming the Serial Communications Module (SCI)**  
**SCI Interrupts**
  
- 14. Synchronous Peripheral Interface (SPI)**  
**Programming the SPI Module**  
**SPI Interrupts**

- 15. Controller Area Network (CAN)  
Programming the MSCAN Module  
MSCAN Interrupts**
- 16. Glue Logic for I/O Interface Design**
- 17. Static Memory System Design  
EEPROM and SRAM Interfacing  
Address Decoder Design  
9S12DP512 Extended Bus (not a test topic)  
Read and Write Memory Cycle Critical Timing Analysis  
(not a test topic)**