

ECE 441 MONITOR PROJECT Spring 2012

Demo and Report Due Dates: Apr. 24th and April 26th, 2012

Design Objective:

Since we have learned the different aspects of hardware design such as memory, I/O design and glue logic with a 68000 processor, the goal of the final project is to build up a monitor program with 68000 assembly language programming. The monitor should be able to perform basic debugger functions, such as memory display, memory sort, memory change, block fill, block search, block move. Also, it can deal with exceptions. You are required to design and come up with the list of necessary monitor commands. It is required that you divide your project into four components:

- 1. Command interpreter**
- 2. Debugger commands**
- 3. Exception handlers**
- 4. User instruction manual**

In the **command interpreter** part, the monitor recognizes which command is entered and then branches to subroutine for executing this command. And when there is no match, it displays an error message. You must include adequate error handling and error checks in the command interpreter.

In the **debugger commands** part, you must define appropriate commands (at least 12 commands for the full monitor program implementation) and provide adequate descriptions for including these commands. You must also describe the basis for your selection of the commands and provide minimum three references for the monitor program.

The monitor must be able to execute your selection of commands after prompt "MONITOR441>" and terminated with carriage return, <CR>. The group of commands must deal with a basic breakpoint mechanism support and memory operations including memory display, modify, move, search and memory testing.

In the **exception handler** part, the monitor must be able to handle the different system exceptions of MC68000. They are:

- Bus Error Exception
- Address Error Exception
- Illegal Instruction Exception
- Privilege Violation Exception
- Divide by Zero Exception
- Line A and Line F Emulators

In the **instruction manual** part, the monitor program should include a help screen for every command and their syntax such as the required parameters and operands.

Design Constraints:

The program and look up tables have the following **practical design constraints**:

- Entire code must be smaller than 3K size starting from \$1000 (including look-up tables for help and error messages).
- 1 K stack size residing in memory locations \$3000 and up
- Include any relevant I/O trap #14 routines in code
- Erroneous inputs should not kill program but the number of errors statements should be minimum.

Requirements and Report Contents:

- The Project should be finished individually and independently.
- The firmware has to be command driven and properly organized.
- The software of project has to be demonstrated on the SANPER-1 ELU in the final lab week.
- Instructions for each command must be fully described in the project report. ERROR messages must guide the user for correct usage of the commands.
- A Project Report has to be submitted that would include:
 - A table of contents
 - Abstract section
 - Clear and concise description of the implementation of commands
 - A separate section for the flowcharts/algorithms used in
 - a. Command interpreter
 - b. Individual commands
 - Code listings with global and local comments
 - A quick manual for command usage and monitor
 - A separate section where you highlight the engineering and design challenges and methods to overcome these challenges
 - A separate section discussing the expansion of the existing monitor for more advanced implementations. How would this project help if you are developing a OS for an embedded system using 68000? Provide an example and discuss the features for this.
 - Conclusion
 - References

Grading Policy:

- ❑ Demonstration of the project
 - ❑ Testing and evaluation of the command interpreter
 - ❑ Functional evaluation of each command
 - ❑ Evaluation of exception handling
 - ❑ Clarity of presentation, syntax error handling and help messages
- ❑ Final Report
 - ❑ Must include all the required sections listed above