Instructions for group project

1. Experiment Objectives

The main objective of the group project is to apply the learned knowledge on the hardware and software of 8051 microcontroller and propose solutions for control issues of a specific mechatronic system. On complete of the group project, students are expected to:

- be able to use the experimental toolkit, and compile, debug, download the program using the software platform (Keil μvision).
- use resources available in the experimental toolkit to simulate the selected real world mechatronic systems.
- write program in assembly language for the 8051 microcontroller to solve the control issues of the mechatronic systems, and implement the program in the experiment toolkit.
- able to finish the group project on mechatronic systems by working closely with the team members and promotes your capabilities on problem-solving, communication in English, team work etc.

2. Main Experiment Apparatus

PRECHIN microcontroller development toolkit as shown below, including the main board (HC6800EM3-V3.0) and other accessories:

3. Experiment Tasks and Requirements

Students are required to form groups with no more than 3 group members. Each group should complete the following tasks:

- Choose an appropriate project from the real world by discussing with the group members or searching on-line. The chosen project should at least involve the use of the digital input (e.g. press button, switches etc.), digital output (e.g. LED, LED digital display, LCD digital display, relay etc.), microcontroller, etc. Examples for the group project are digital counter, digital voltmeter, digital thermometer, electronic organ, etc.
- Use the experimental toolkit to simulate the chosen project.
- Draw flowchart and code accordingly in assembly language for the control task of the chosen project.
- Debug the program to realize the control task of the chosen project.
- Present the project with PPT slides in-class and demonstrate the implementation of the program with the experiment toolkit.
- Each group should submit one lab report.

4. Important Dates

12 Oct: determine the group members.

2 Nov: submit the chosen project with a short description of the control problem and the design task.

30 Nov: Submit the program and lab report.

21 Dec: Finish the presentation in class.

5. Grading

Grading of the group project depends on following components, including the quality of the chosen project, completeness of the project, quality of the prepared PPT slides and presentation in class, and the quality of the lab report.

6. Requirements on the lab report

The lab report should document the following contents in details, including a description of the chosen project, a thorough analysis of the project, flowchart and source code, experimental results, suggestions and comments regarding the group project, achievements obtained, and any other related things.