

CS/ECE 5780/6780: Embedded System Design

John Regehr

Lecture 0: Course Overview

Course Information

Course web site: <http://www.eng.utah.edu/~cs5780/>

Send questions to: teach-cs5780@list.eng.utah.edu

Course mailing list: cs5780@list.eng.utah.edu

Lectures: T, H 12:25-1:45pm in WEB 1250.

John's office: MEB 3470

TA: Rohit Pagariya

Lab: MEB 2265 (ECE Digital Lab)

Course Description

Introduction to issues in embedded system design using microcontrollers.

Topics include:

- Microcontroller architecture,
- Embedded software design,
- Interrupt synchronization,
- Timing generation and measurement,
- Serial and parallel I/O interfacing, and
- Analog interfacing.

Prerequisites

You are expected to have knowledge of the following subjects:

Programming in C (i.e., CS 1000, CS 2000, or CS 4400)

Data structures in C (queues, stacks, and linked lists)

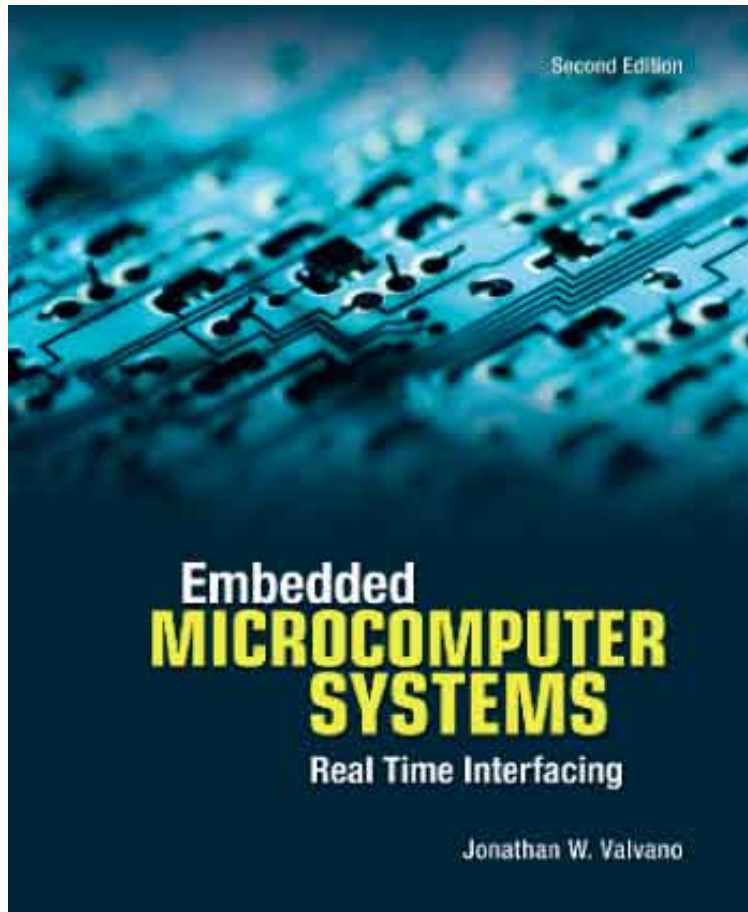
Microcomputer programming (i.e., assembly language programming)

Digital logic (binary arithmetic, multiplexers, tri-state logic, finite state machines, etc.)

Test equipment like multi-meters and oscilloscopes

Discrete analog electrical circuits (resistors, capacitors, inductors, and transistors)

Textbook & documentation



Title: *Embedded Microcomputer Systems: Real Time Interfacing*, 2nd Edition

Author: Jonathan W. Valvano

ISBN-10: 0-534-55162-9

Should be available in the bookstore.

Microcontroller, project board, and code development environment documentation are available via the course website.

Grading Policy

CS/ECE 5780:

Lab reports - 40 percent

Midterms - 30 percent

Final - 30 percent

CS/ECE 6780:

Lab reports - 20 percent

Midterms - 30 percent

Final - 30 percent

Project - 20 percent

More information regarding the 6780 student projects will be given later.

Labs

The lab is staffed from 7:30 a.m. to 6:00 p.m

24/7 card key access is also available

Go to MEB 2355 to get access

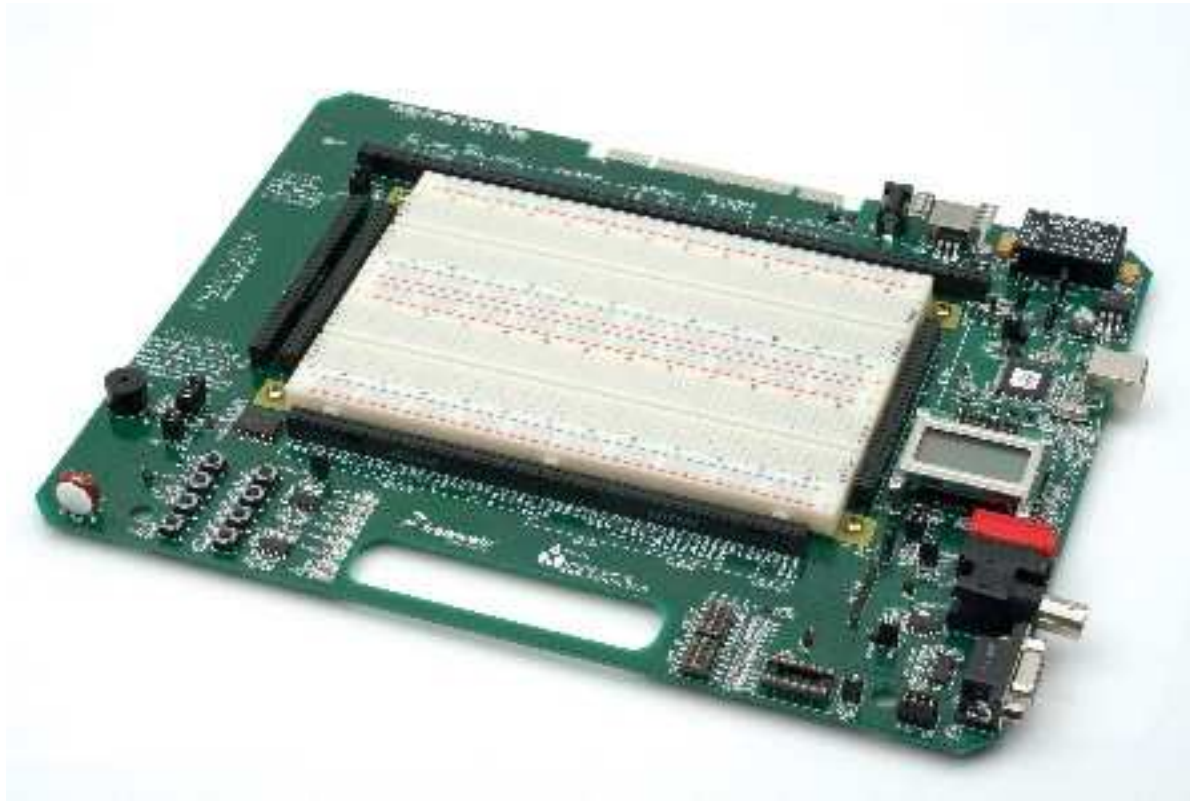
We'll work on lab times on Thursday

Lab Partners

Labs can be completed in teams of two.

6780 students must work with other 6780 students.

PBMCUSLK: Microcontroller Project Board



Breadboard

60-pin MCU
connector

USB BDM pod

LCD Module

COM Port

8 DIP Switches

5k Ω

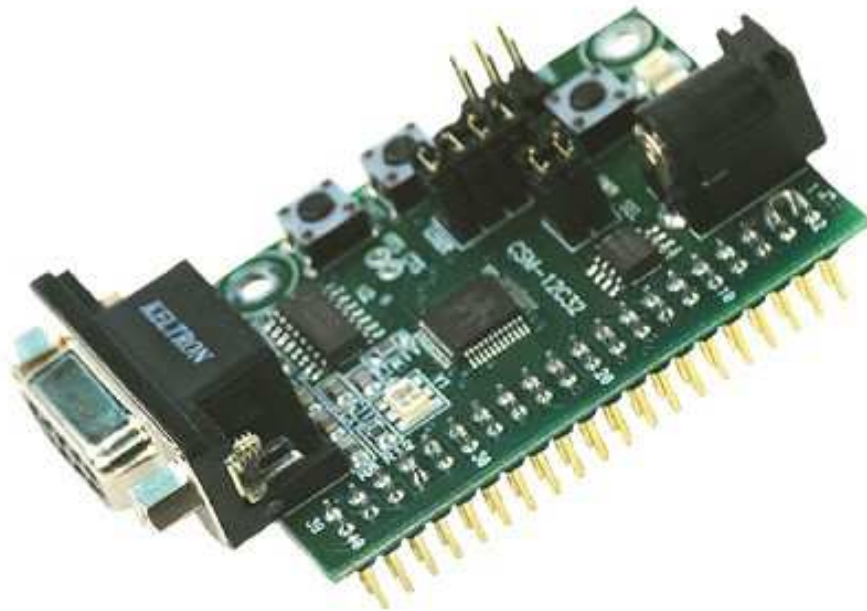
potentiometer

8 green LEDs

8 push buttons

Buzzer

16-Bit HCS12C32 Student Learning Kit



MC9S12C32 MCU

32K Byte Flash

EEPROM

2K Bytes RAM

31 I/O lines

8-Ch 16-bit Timers

SCI/SPI Ports

CAN 2.0 Module

8-Ch 10-bit ADCs

8MHz Internal Bus

25MHz Operation

40 pin connector

RS-232 Serial Port

3 push buttons (2
user/reset)

3 LEDs (2 user/VDD)

Microcontroller Kit Checkout Policy

Each partnership receives one Microcontroller Project Board and HCS12C32 module.

Both parties must be present to checkout the kit and sign the loan agreement form.

These kits also include software, cables, wires, docs, etc.

The entire contents of the kit must be returned **CLEAN, COMPLETE, AND IN WORKING CONDITION** before the last day of class.

You are responsible for up to \$250 for loss or damage.

Labs and Lab Reports

Labs begin next week or the week after

Prelab checked at the beginning of your lab section.

Working lab should be checked off during your lab section.

Lab reports due to TA at beginning of your next lab section.

Only one prelab and report per team is required.

Put your lab section number on all lab reports.

There is **NO** provision for turning in late lab reports.

Lab reports will be returned in your next lab section.

If you have a question regarding your grade, please contact the grader for that assignment to address the issue.

All lab reports and exams are assumed to be correctly graded one week after they are returned.

After the one week has lapsed, no changes will be considered.

Use of Email

I expect all students to be on the class mailing list

Don't mail the class mailing list unless you want everyone to get it

Mail about the class should go to the teach-cs5780 address

Include your full name in any email

We prefer to get mail from University accounts

Don't send big attachments