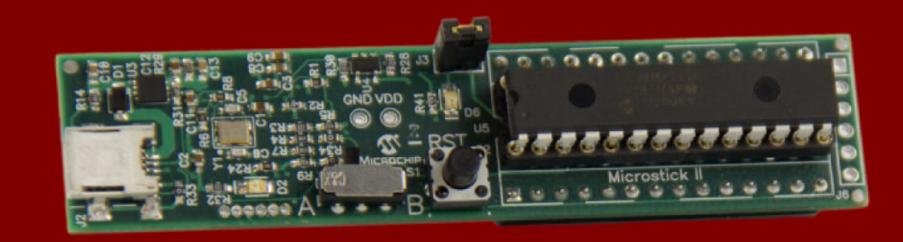# PIC32 Development for ECE4760

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Purpose

The purpose of this project is to update the current curriculum for ECE 4760 at Cornell. The current teaching tool is a well made microcontroller, but it lacks the advanced features that students need to be competitive as soon as they graduate. This project aims to implement a brand new, state-of-the-art microcontroller family ripe with features for the 21st century.

PIC32 Microstick II Development Board

Goals

-Read and understand available features of the PIC32
-Experiment with the advanced features of the PIC32
-Develop examples demonstrating advanced features
-Create API's to make complex features easy to use
-Condense documentation to make it readable
-Create PCB's to make hardware design easy

Strategy

Gather a list of featues:
-SPI (25 Mbps)
-I2C (1 Mbaud)
-10-bit ADC (1.1Msps)
-Capacitive Touch Sensing
-UART (12.5 Mbps)
-Hardware DMA (Direct Memory Access)
-Full Speed USB 2.0 OTG (12 Mbps)
-Real-Time Clock and Calendar
-Peripheral Pin Select
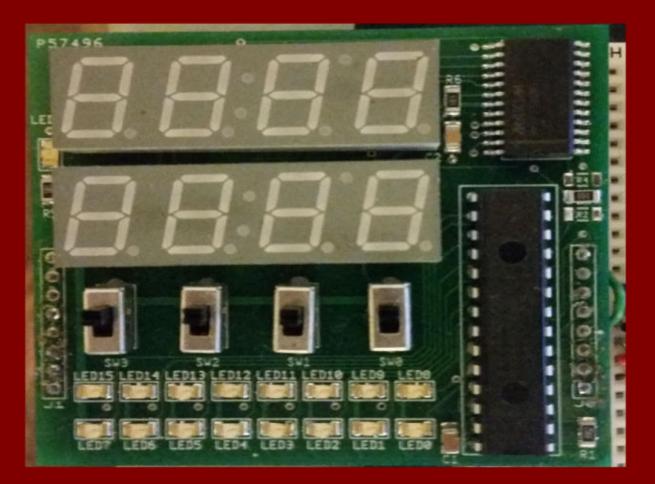-Parallel Master Port
-10/100 Base-T Ethernet

Explore, research, and implement examples using some (or all) of these features

Create circuit boards to make these features easy to use in a condensed time frame

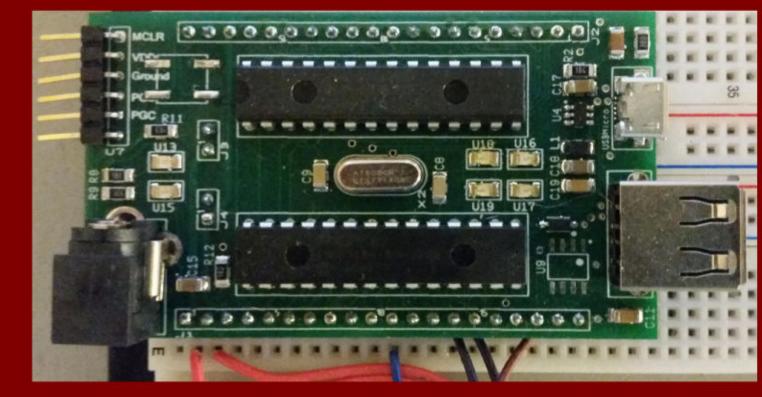Tetris implemented on PIC32 using a 16-bit SPI LCD screen and USB keyboard

Results

Basic I/O Board with LEDs, Switches, and Seven Segment Displays

Developed three circuit boards that make advanced features easy
-Main circuit board with port expander and USB OTG
-Basic I/O Board
-Ethernet Interface Board

Developed easy-to-use APIs, making Ethernet and USB simple to use

Provided clear, condensed documentation to accomodate the rapid learning curve required for an academic setting

Main board with USB, PIC32, and Port Expander