EE2001 GA Support Log

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The table below documents some of the problems and solutions encountered by students working on the EE2001 projects. It will be updated on a weekly basis. Students are encouraged to look through this document before asking for assistance in the laboratory.

Week 2	**1**	**Issue**	Student complains about project setup suddenly stopped working, although it has been verified that the hardware has been wired according to schematics, even though the code has been rolled back to a previous version where it can work with the original hardware configuration.
		Resolution	Student uses the .hex file from the \Debug folder to flash into the PIC, although the project is built in Release mode. Therefore, the .hex file is not updated.
		Recommendation	Always check the timestamp of the generated .hex file before flashing.
	2	**Issue**	Student's hardware refuses to work, although setup has been patched according to schematics and the code is original. Development board also draws an extremely high current.
		Resolution	Student figured out that he has placed the PIC into the development board with all the pins shifted up by one position, leaving two ports from the PIC overhanging at the top and two ports on the development board unoccupied at the bottom.
		Recommendation	Double check placement whenever PIC has been transferred between programmer and development board. Do note that even when the PIC fully aligns, the PIC may be rotated 180 degrees, be it on the board or the programmer. Misalignment may cause power lines to be supplied to the wrong ports, therefore causing high current drawn on the board or during programming. If that is the case always double check with the lab technologist to see whether the chip is functional. As for during programming, always perform hardware identification prior towards erasure and burning as these operation uses a higher than normal voltage to program the flash, therefore possibly may cause larger damage to a wrongly oriented PIC.
	3	**Issue**	Student wanted to customize the duty cycle of the PWM, but is unsure of how to approach the problem. Student is aware of a predefined function provided in the sample code, which requires inputs for registers CCPR1L and CCP1CON.
		Resolution	Student is guided through §8.3.2 PWM DUTY CYCLE of the PIC16F87X datasheet. After which it is demonstrated how the bit fields of CCP1CON register is populated according to pg. 58.
		Recommendation	The student is advised to look at functions provided in the header files in the sample code. From there, look at what sort of parameters are passed into those functions. These parameters will most probably be written to a set of registers.

			From here, the student can read the relevant sections in the datasheets and see how this set of registers should be populated.
	4	**Issue**	Student patched a pushbutton and a 7-segment display, where the display will increment every time the button is pressed once. Upon pressing, the display jumps by several times, and the increase is not consistent each time the button is pressed.
		Resolution	Pushbutton circuitry has not been debounced. The output of the pushbutton consists of several transitions when pressed because the mechanical contact oscillates when contact is being established or released. This transitions resulting from a single depression of the pushbutton, when processed by the code running in the megahertz range, will cause the PIC to register as several pushes. Student has been briefed to revise EE2007 module where a debouncing assembly routine has been illustrated.
		Recommendation	Debouncing can be done in software using delays or in hardware using RC filtering.
	5	**Issue**	In mini project D, student is unsure about what is meant by "The tone frequency **can be further adjusted** by a factor set by dip switches".
		Resolution	Specifications of the problem are fully customizable by the student. Student is advised to think about how else the factor can be adjusted, and to state down assumptions in clear documentation.
		Recommendation	Say for example, there are four tones, {0,1,2,3}, which can be traversed by pushing the INC/DEC pushbutton. The DIP switches can be used to subdivide between tones. For example, DIP0/DIP1 can be used to subdivide tones {n,n+1} into four sections, {n,n+0.25,n+0.5,n+0.75,n+1}. Another method would be to multiply the tone by a constant factor, depending on the code of the DIP switches. Just think of it as a pair of coarse and fine tuning knobs on an old analog radio.
Week 3 	**1**	**Issue**	Servo motor does not rotate properly.
		Resolution	Oscilloscope is used to inspect waveform of the servo control signal. It has been found that the active high period of the control signal does not correspond to the desired duration. Code is modified by scaling the arguments passed into the delay functions. The period of the square waveform is also not constant when controlling the motor across different angles. Period has to be constant for varying duty cycles.
		Recommendation	Students are reminded that the delay function provided in the reference is not accurate. It uses delay introduced by implementing a double-for loop, therefore actual timing depends on the number of assembly instructions the for-loop compiles into. To ensure precise timing, use the PIC timer

			peripherals.
	2	**Issue**	VB project fails to compile cleanly on Microsoft Visual Basic Express Edition.
		Resolution	Create a new project under the application on the computer. Drag and drop project files provided on the EE2001 website into the appropriate folder directories created by the application, and recompile. Now it should compile.
		Recommendation	It is most probable that the project code provided on the EE2001 website is created by a deprecated version of the Microsoft Visual Basic, therefore it cannot be interpreted by newer versions of the compiler.
	3	**Issue**	LED that is controlled by a relay fails to light up as supposed to.
		Resolution	BJT is wrongly patched on the breadboard. Two of its legs are connected on the same track that is shorted. LED is also not biased with a resistor.
		Recommendation	Do familiarize with internal connection structures of breadboards. Different breadboards have different wiring schemes.