

10.4 PIC Circuit Debugging Recommendations

It is rare that a wired PIC circuit works the first time it is tested. Often there are "bugs" with the software or the wiring. Here are some recommendations that can help you when trying to get a PIC circuit to function (e.g., with your project):

- (1) If you are using a PIC that requires an external oscillator (e.g, the PIC16F84x), make sure your circuit includes the necessary clock crystal and capacitor components. If you are using a PIC with an internal oscillator (e.g., the PIC16F88), make sure you include the necessary initialization code (e.g., see the code template for the PIC16F88 available on the Lab website).
- (2) If you use MS Word or other word processor to edit your code, make sure you "Save As" a text file, or just copy and paste your code from the word processor into the MicroCode Studio or MPLAB editor.
- (3) Make sure your wiring is very neat (i.e., not a "rats nest"), keep all of your wires as short as possible to minimize electrical magnetic interference (EMI) (and added resistance, inductance, and capacitance), and use appropriate lengths (about 1/4") for all exposed wire ends (to help prevent breadboard damage and shorting problems).
- (4) Follow all of the recommendations in Section 7.4 for prototyping IC circuits.
- (5) **Be very gentle with the breadboards.** Don't force wires into or out of the holes. If you do this, the breadboard might be damaged and you will no longer be able to create reliable connections in the damaged holes or rows.
- (6) Make sure all components and wires are firmly seated in the breadboard, establishing good connections (especially with larger PICs you might use in your projects). You can check all of your connection with the beep continuity feature on a multimeter.
- (7) Before writing and testing the entire code for your project, start with the BLINK program in Lab 9 to ensure your PIC is functioning properly. Then incrementally add and test portions of your code one functional component at a time.
- (8) Use a "chip puller" (small tool) to remove PICs and other ICs from the breadboard to prevent damage (i.e., bent or broken pins).
- (9) **Always use the PIC programming procedure in Section 9.4 of the previous Lab to ensure you don't miss any important steps or details.**